

Republic of Lebanon  
Office of the Minister of State for Administrative Reform  
Center for Public Sector Projects and Studies  
(C.P.S.P.S.)



**RELATIVE COSTS AND RETURNS OF**  
**PRODUCING APPLES, CHERRIES AND PEACHES**  
**IN THE BEKAA VALLEY, LEBANON**

الجمهورية اللبنانية  
مكتب وزير الدولة لشؤون التنمية الإدارية  
مركز مشاريع ودراسات القطاع العام

**Agricultural Economics Section**  
**Bureau of Agricultural Economics and Statistics**  
**The Joint Technical Service**  
**Ministry of Agriculture**  
**Lebanon**  
**March 1964**

وزارة التصميم العام مركز التوتيق
الرقم 64
تاريخ الدخول

RELATIVE COSTS AND RETURNS OF PRODUCING APPLES,  
CHERRIES AND PEACHES IN THE BEKAA VALLEY, LEBANON

By Owen L. Brough, Jr. \* and Joseph Fuleihan\*\*

Introduction

Fruit production in Lebanon has been expanding at a gradual but significant rate during the past decade (see Table 1). The Bekaa Valley is becoming an increasingly important area for fruit production. Many farmers have planted or are planning to develop new orchards of apples, cherries and peaches.

Table 1. Area Planted, Production and Value of Production for Apples, Cherries and Peaches, Lebanon, 1955-1962

Crop	Average Number of Hectars Planted		Average Annual Production in Metric Tons	
	1955-1957	1960-1962	1955-1957	1960-1962
Apples	7,130	10,860	29,870	72,670
Cherries	330	530	2,830	6,170
Peaches	1,500	1,930	4,730	7,670
Total	8,960	13,320	37,430	86,510

The cost of developing a fruit orchard is high and once the orchard is developed it becomes costly to use the land for the production of other products. Farmers need information to help them make the long-time investment decision to develop a fruit orchard. Also, they need information to help them decide which fruit to plant. In

\* Program Specialist in Agricultural Economics, The Ford Foundation, assigned to the Ministry of Agriculture, Lebanon.

\*\* Agricultural Economist, Bureau of Agricultural Economics, Ministry of Agriculture, Lebanon.

addition, the farmer must become aware of the inputs used, the components of cost and the total cost of production so that he can determine how the costs of production can be reduced.

Research to help farmers make these decisions was initiated during 1963 by personnel of the Bureau of Agricultural Economics of the Ministry of Agriculture. This report is prepared to show the results of this research.

The specific objectives of this report are: (1) to record the typical inputs and costs of these inputs used by farmers in the production of apples, cherries and peaches in the Bekaa Plain; (2) to compare the relative investments in orchard development, the relative growing costs and components of costs for these three fruits; (3) to determine the relative profitability of the fruits when different typical yields and selling prices are considered; and (4) to make recommendations of ways of decreasing unit costs and/or improving production techniques.

### Methodology

Because of the shortage of finances and trained personnel, relatively small samples of reliable farmers were interviewed for each fruit. Both the individual and group interview techniques were used. Much judgement was used in the selection of the sample of farmers to be interviewed. In some cases farmers, who were known to give reliable information, were interviewed as individuals. These farmers kept records and were willing to give honest answers to questions asked. In other cases, small groups of three to five farmers from a village were interviewed as a group. They were asked to give the typical inputs for that area for each item of cost, such as the labor required for pruning and the cost of that labor. Their answers were recorded only after they had discussed this input among themselves and decided on a typical value for the item of cost. The results of the group interviews and individual interviews were averaged together, with appropriate weights according to how many farmers participated, to obtain the input and cost data for each item of cost. These were added to develop the total costs of production.

### Comparison of Costs

The items of cost were divided into two major categories, fixed costs and growing costs.

#### Fixed Costs

Fixed costs are those costs that are incurred each year regardless of the yield or changes in production practices. The components of fixed costs are: (1) interest on investment in land, buildings, irrigation facilities, machinery, fences, tools and the fully developed orchard; (2) depreciation on permanent items, such as buildings, irrigation facilities, machinery, fences, tools and the mature orchard; (3) repairs on buildings, fences and terraces.

#### Interest on Investments:

When money is invested in land, terraces, buildings or other similar inputs, a return must be calculated for the use of this money. If the money was not used for this purpose it could be put in a bank or invested elsewhere and earn an interest rate. Likewise, money that is used to develop a new orchard from the time the land is prepared before planting and until the returns from the orchard are greater than the production costs, must receive a return for its use. For this study, it was assumed the investments in land, buildings, machinery, fences and tools would be the same, whether the farmer planted apples, cherries or peaches. Therefore, the interest cost for the use of these fixed input items was assumed to be the same for the three fruits (see Tables 2, 3 and 4). The interest costs for all fixed items, except land, were calculated on one-half their original or new value. It was assumed that on the average these items were half worn out at the time of the survey.

Farmers gave estimates of the value of the undeveloped land. These estimates varied from LL600 to LL2000 per dunum. The average was LL1029 per dunum. The investments in terraces, subsoiling and land leveling averaged LL52 per dunum.

Orchard development costs were calculated by adding all costs of planting the trees and the yearly growing costs until the trees were mature. In Table 5 is given the yearly costs incurred during the development of the orchard. Peach trees mature at an earlier age than cherry or apple trees. Thus, the period for which the growing costs were charged as development costs for peaches was only 4 years, whereas for apples and cherries it was 7 years.

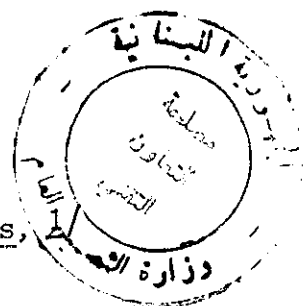


Table 2. Summary of Cost of Production for Apples, Bekaa Plain, Lebanon, 1963

<u>Fixed Costs</u>	<u>Cost Per Dunum LL</u>	<u>% of Total Cost</u>
Interest on Investments in:		
Land subsoiling and leveling, LL1081.00 @ 6% . . . .	64.80	15.6
Irrigation Facilities <sup>2/</sup> , LL80.00 <sup>3/</sup> @ 6% . . . . .	4.80	1.2
Buildings, LL22.00 <sup>3/</sup> @ 8% . . . . .	1.80	0.4
Machinery, LL15.00 <sup>3/</sup> @ 8% . . . . .	1.20	0.3
Fences and Windbreaks, LL41.30 <sup>3/</sup> @ 8% . . . . .	3.30	0.8
Hand Tools, LL7.00 <sup>3/</sup> @ 8% . . . . .	.60	0.1
Orchard Development Costs, LL1331.00 @ 8% (1/2 the cost until 7 years old) . . . . .	53.20	12.8
Depreciation on Buildings, Irrigation Facilities, Machinery, Fences, Windbreaks and Tools . . . . .	14.60	3.5
Depreciation on Orchard, LL1331.00 @ 4% . . . . . (assuming a 25-year life after full development)	53.20	12.8
Repairs on Buildings, Fences and Windbreaks . . . . .	<u>4.00</u>	<u>1.0</u>
Total Fixed Costs	201.50	48.5
<u>Growing Costs</u>		
Materials:		
Manure (includes transportation) . . . . .	13.20	3.2
Chemical Fertilizers (includes transportation) ..	43.80	10.6
Spray Materials (includes transportation) . . . . .	31.50	7.6
Water Costs (includes power for pumping) . . . . .	6.50	1.5
Harvesting Materials . . . . .	<u>3.30</u>	<u>0.8</u>
Total Materials Costs	98.30	23.7

<sup>1/</sup> Average costs based on interviews with 26 farmers.  
<sup>2/</sup> Including reservoirs, pipes, ditches, pumps and motors.  
<sup>3/</sup> This value is 1/2 the original investment.

Table 2 (Cont.) Summary of Cost of Production for Apples,  
Bekaa Plain, Lebanon, 1963

<u>Growing Costs (Cont.)</u>	<u>Cost</u> <u>Per Dunum</u> <u>LL</u>	<u>% of</u> <u>Total</u> <u>Cost</u>
Labor:		
Repairs on Machinery, Tools & Irrigation Facilities	4.10	1.0
Pruning and Removing Branches .....	10.80	2.6
Fertilizing (includes fertilizer mixing) .....	7.00	1.7
Hoeing and Cultivating (mainly by tractor) .....	15.50	3.7
Irrigating .....	11.00	2.7
Spraying (includes spray mixing) .....	15.40	3.7
Propping Trees .....	2.00	0.5
Harvesting (includes transportation to nearest road)	18.70	4.5
Guarding .....	10.00	2.4
Supervising .....	10.00	2.4
Miscellaneous Labor Costs .....	5.20	1.3
Total Labor Costs	109.70	26.5
Interest on Operating Capital (LL202.80 @ 8% annually for average period of 4 months) .....	5.40	1.3
Total Growing Costs	213.40	51.5
Total All Costs <u>1/</u> (excluding management)	414.90	100.0

If Yield is: <u>2/</u>	1200 Kg/Du	1700 Kg/Du	2200 Kg/Du
Total Fixed Costs Are:	16.7 Ps/Kg	11.8 Ps/Kg	9.2 Ps/Kg
Growing Costs Are:	17.3 Ps/Kg <u>3/</u>	12.6 Ps/Kg	10.0 Ps/Kg <u>3/</u>
Total All Costs Are:	34.0 Ps/Kg <u>3/</u>	24.4 Ps/Kg	19.3 Ps/Kg <u>3/</u>

- 1/ Cost of apples delivered to the nearest road in the buyers boxes.  
2/ All costs calculated on 35.6 as the average number of trees per dunum.  
3/ Costs adjusted for yield.

Table 3. Summary of Cost of Production for Cherries, 1/  
Bekaa Plain, Lebanon, 1963

<u>Fixed Costs:</u>	<u>Cost Per Dunum LL</u>	<u>% of Total Cost</u>
Interest on Average Investment in:		
Land and Terraces, LL1081.00 @ 6% .....	64.80	11.9
Irrigation Facilities, LL80.00 2/ @ 6% .....	4.80	0.9
Buildings, LL22.00 2/ @ 8% .....	1.80	0.3
Machinery, LL15.00 2/ @ 8% .....	1.20	0.2
Fences and Windbreaks, LL41.30 2/ @ 8% .....	3.30	0.7
Hand Tools, LL7.00 2/ @ 8% .....	.60	0.1
Orchard Development Costs, LL1373 @ 8% (Interest calculated on 1/2 the original development costs through the 7th year) .....	54.90	10.1
Depreciation on Buildings, Irrigation Facilities, Machinery, Fences and Tools .....	14.60	2.7
Depreciation on Orchard, LL1373 @ 10% (assuming a 12-year life after full development) .....	137.30	25.3
Repairs on Buildings, Fences and Terraces .....	<u>4.00</u>	<u>0.7</u>
Total Fixed Costs	291.30	52.9
<u>Growing Costs: 3/</u>		
Materials:		
Manure 4/, 1/2 bag cow manure/tree annually @ LL2.00/bag; (1/2 the farmers use manure)	20.00	3.7
Chemical Fertilizer 4/, 4 kgs. nitrofoska/tree @ 27 Ps/Kg.....	43.20	7.9
Spray Material 4/, 1 winter spray, 2 summer sprays, total of 20 Ps/tree/year .....	8.00	1.5
Water Costs .....	6.50	1.2
Harvesting Materials .....	<u>2.20</u>	<u>0.4</u>
Total Material Costs	79.90	14.7

1/ Growing costs based on interviews with 9 farmers. Fixed costs based on the cherry producers and a larger sample of apple producers.

2/ This value is 1/2 the original investment. This assumes that, on the average, these items are half-depreciated.

Table 3 (Cont.) Summary of Cost of Production for Cherries,  
Bekaa Plain, Lebanon, 1963

<u>Growing Costs (Cont.)</u>	<u>Cost</u> <u>Per Dunum</u> <u>LL.</u>	<u>% of</u> <u>Total</u> <u>Cost</u>
<b>Labor:</b>		
Repairs on Tools, Machinery & Irrigation Facilities	4.10	0.7
Pruning & Removing Branches, 1 man-day/dunum @ LL8.00/man-day .....	8.00	1.5
Fertilizing Manure 25 Ps/bag; Chemical Fertilizer, 2 applications, 1/3 man-day per dunum per application @ LL6.00/man-day .....	6.50	1.2
Cultivation, 4 times by Tractor @ LL2.00/dunum ..	8.00	1.5
Hoeing, 3 times; 2/3 man-days/dunum/time over @ LL6.00/man-day .....	12.00	2.2
Irrigating, 6 irrigations; 4 1/2 dunums/man-day/ irrigation @ LL6.00/man-day .....	8.00	1.5
Spraying, 28 tins/dunum/year @ 20 Ps/tin .....	5.60	1.0
Picking, 5 Ps/Kg .....	45.00	8.3
Sorting and Packing, 5 Ps/Kg .....	45.00	8.3
Guarding and Supervision .....	20.00	3.7
Miscellaneous Labor Costs .....	<u>7.00</u>	<u>1.2</u>
Total Labor Costs	169.20	31.1
Interest on Operating Capital @ 8% annually for an average period of 4 months .....	<u>7.10</u>	<u>1.3</u>
Total Growing Costs <sup>5/</sup>	256.20	47.1
Total All Costs <sup>5/</sup> (excluding management)	<u><u>543.50</u></u>	<u><u>100.0</u></u>

If Yield is:	600 Kg/Du	900 Kg/Du	1200 Kg/Du
Fixed Costs Are:	47.9 Ps/Kg	31.9 Ps/Kg	23.9 Ps/Kg
Growing Costs Are: <sup>5/ 6/</sup>	37.7 Ps/Kg	28.5 Ps/Kg	23.9 Ps/Kg
Total All Costs Are: <sup>5/ 6/</sup>	85.6 Ps/Kg	60.4 Ps/Kg	47.8 Ps/Kg

- <sup>3/</sup> Cost calculated on 40 trees as the average number of trees per dunum.  
<sup>4/</sup> Includes the cost of transportation to the farm.  
<sup>5/</sup> Cost of cherries delivered to the nearest road in the buyers' boxes.  
<sup>6/</sup> Harvesting costs are adjusted for yield.



Table 4. Summary of Cost of Production for Peaches, 1/  
Bekaa Plain, Lebanon, 1963

<u>Fixed Costs:</u>	<u>Cost Per Dunum LL</u>	<u>% of Total Cost</u>
Interest on Average Investment in:		
Land and Terraces, LL1081.00 @ 6% .....	64.80	16.7
Irrigation Facilities, LL80.00 <sup>2/</sup> @ 6% .....	4.80	1.2
Buildings, LL22.00 <sup>2/</sup> @ 8% .....	1.80	0.5
Machinery, LL15.00 <sup>2/</sup> @ 8% .....	1.20	0.3
Fences and Windbreaks, LL41.30 <sup>2/</sup> @ 8% .....	3.30	0.9
Hand Tools, LL7.00 <sup>2/</sup> @ 8% .....	.60	0.2
Orchard Development Costs, LL707.00 @ 8% (Interest calculated on 1/2 this original development cost through 4th year) .....	28.30	7.3
Depreciation on Buildings, Irrigation Facilities, Machinery, Fences and Tools .....	14.60	3.8
Depreciation on Orchard, LL707.00 @ 5% (assuming a 20-year life after full development) .....	35.40	9.2
Repairs on Buildings, Fences and Terraces .....	<u>4.00</u>	<u>1.0</u>
Total Fixed Costs	158.80	41.1
<u>Growing Costs: 3/</u>		
Materials:		
Manure <sup>4/</sup> , 1/2 bag cow manure/tree annually @ LL2.00 per bag (1/2 of the farmers use manure) ..	22.50	5.8
Chemical Fertilizer <sup>4/</sup> , 3 Kgs. nitrate @ 16 Ps/Kg 2 Kgs. superphosphate @ 11 Ps/Kg 1 Kg. potassium chloride @ 18 Ps/Kg	39.60	10.2
Spray materials <sup>4/</sup> , 1 winter spray, 4 summer sprays @ 35 Ps per tree per year .....	15.70	4.0
Water Costs .....	6.50	1.7
Supports, 3 Ps per tree per year .....	1.40	0.4
Harvesting Materials .....	<u>1.00</u>	<u>0.3</u>
Total Material Costs	86.70	22.4

1/ Growing costs based on interviews with 9 farmers. Fixed costs based on peach producers and a larger sample of apple producers.

2/ This value is 1/2 the original investment. This assumes that, on the average, those items are half-depreciated.

Table 4 (Cont.) Summary of Cost of Production for Peaches,  
Bekaa Plain, Lebanon, 1963

<u>Growing Costs (Cont.)</u>	<u>Cost</u> <u>Per Dunum</u> <u>LL.</u>	<u>% of</u> <u>Total</u> <u>Cost</u>
<b>Labor:</b>		
Repairs on Tools, Machinery & Irrigation Facilities	4.10	1.0
Pruning and Removing Branches, 40 Ps. per tree per year .....	18.00	4.7
Fertilizing, 25 Ps/bag of manure; 2 applications chemical fertilizer, 1/2 man-day per dunum per application @ LL6.00 per man-day .....	7.40	1.9
Cultivating, 3 times by tractor @ LL2.00/du/time over	6.00	1.5
Hoeing, 3 times, 2/3 man-day/du/time over @ LL6.00/ man-day .....	12.00	3.1
Irrigating, 6 irrigations, 1 man-day for 4 1/2 dunums/ irrigation @ LL6.00 man-day .....	8.00	2.1
Spraying, 50 tins of spray/dunum/year @ 20 Ps/tin .	10.00	2.6
Thinning, 1 man-day/dunum @ LL6.00/man-day ....	6.00	1.6
Propping .....	1.50	0.4
Picking, 1.3 Ps/Kg .....	20.50	5.3
Sorting and Packing, 1.1 Ps/Kg .....	17.30	4.4
Guarding and Supervising .....	20.00	5.2
Miscellaneous Labor Costs .....	<u>5.50</u>	<u>1.4</u>
Total Labor Costs	136.30	35.2
Interest on Operating Capital, 8% annually for an average period of 4 months.....	<u>4.90</u>	<u>1.3</u>
Total Growing Costs <sup>5/</sup>	227.90	58.9
Total All Costs <sup>5/</sup> (excluding management)	<u>386.70</u>	<u>100.0</u>

If Yield is:	1150 Kg/Du	1575 Kg/Du	2000 Kg/Du
Fixed Costs Are:	13.8 Ps/Kg	10.1 Ps/Kg	7.9 Ps/Kg
Growing Costs Are: <sup>5/ 6/</sup>	19.0 Ps/Kg	14.5 Ps/Kg	11.9 Ps/Kg
Total All Costs Are: <sup>5/ 5/</sup>	32.8 Ps/Kg	24.6 Ps/Kg	19.8 Ps/Kg

- <sup>3/</sup> Costs calculated on 45 as the average number of trees per dunum.  
<sup>4/</sup> Includes cost of transportation to the farm.  
<sup>5/</sup> Cost of peaches delivered to nearest road in the buyers' boxes.  
<sup>6/</sup> Harvesting and hauling costs adjusted for yields.

Table 5. Comparison of Average Orchard Development Costs for Apples, Cherries and Peaches, Bekaa Plain, Lebanon, 1963

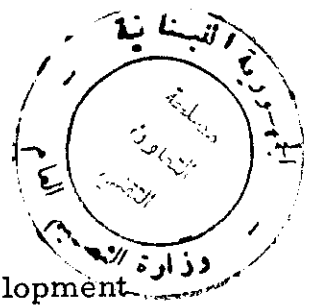
Item	Apples LL./Du	Cherries LL./Du	Peaches LL./Du
<u>1st Year:</u>			
Fixed Costs	76.00	76.00	76.00
Materials	98.70	109.80	168.20
Labor and Machine Operating Costs	48.50	60.30	65.50
Interest on This Year's Operating Capital	3.90	4.60	6.20
Interest on All Previous Orchard Development Costs	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Cost for Year	227.10	250.70	315.90
Returns from Sale of Product	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Net Cost for Year	227.10	250.70	315.90
<u>2nd Year:</u>			
Fixed Costs	76.00	76.00	76.00
Materials	26.80	28.80	38.70
Labor and Machine Operating Costs	46.20	51.10	56.10
Interest on This Year's Operating Capital	2.00	2.20	2.50
Interest on All Previous Orchard Development Costs	<u>18.00</u>	<u>20.00</u>	<u>25.00</u>
Total Cost for Year	169.00	178.10	198.30
Returns from Sale of Product	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Net Cost for Year	169.00	178.10	198.30
<u>3rd Year:</u>			
Fixed Costs	76.00	76.00	76.00
Materials	33.20	28.80	56.00
Labor and Machine Operating Costs	49.00	54.10	76.10
Interest on This Year's Operating Capital	2.20	2.20	3.40
Interest on All Previous Orchard Development Costs	<u>32.00</u>	<u>34.00</u>	<u>41.00</u>
Total Cost for Year	192.40	195.10	252.50
Returns from Sale of Product	<u>0.00</u>	<u>0.00</u>	<u>90.00</u>
Net Cost for Year	192.40	195.10	162.50

Table 5 (Cont.) Comparison of Average Orchard Development Costs for Apples, Cherries and Peaches, Bekaa Plain, Lebanon, 1963

Item	Apples LL/Du	Cherries LL/Du	Peaches LL/Du
<u>4th Year:</u>			
Fixed Costs	76.00	76.00	76.00
Materials	39.30	29.80	70.50
Labor and Machine Operating Costs	52.30	55.10	96.00
Interest on This Year's Operating Capital	2.40	2.30	4.00
Interest on All Previous Orchard Development Costs	<u>47.00</u>	<u>50.00</u>	<u>54.00</u>
Total Cost for Year	<u>217.00</u>	<u>213.20</u>	<u>300.50</u>
Returns from Sale of Product	<u>11.00</u>	<u>0.00</u>	<u>270.00</u>
Net Cost for Year	206.00	213.20	30.50
<u>5th Year:</u>			
Fixed Costs	76.00	76.00	
Materials	50.10	51.40	
Labor and Machine Operating Costs	58.30	64.20	
Interest on This Year's Operating Capital	2.90	3.10	
Interest on All Previous Orchard Development Costs	<u>64.00</u>	<u>67.00</u>	
Total Cost for Year	<u>251.30</u>	<u>261.70</u>	
Returns from Sale of Product	<u>30.00</u>	<u>0.00</u>	
Net Cost for Year	221.30	261.70	
<u>6th Year:</u>			
Fixed Costs	76.00	76.00	
Materials	61.50	66.30	
Labor and Machine Operating Costs	71.20	86.70	
Interest on This Year's Operating Capital	3.50	4.10	
Interest on All Previous Orchard Development Costs	<u>81.00</u>	<u>88.00</u>	
Total Cost for Year	<u>293.20</u>	<u>321.10</u>	
Returns from Sale of Product	<u>105.00</u>	<u>128.00</u>	
Net Cost for Year	188.20	193.10	

Table 5 (Cont.) Comparison of Average Orchard Development Costs for Apples, Cherries and Peaches, Bekaa Plain, Lebanon, 1963

Item	Apples LL/Du	Cherries LL/Du	Peaches LL/Du
<u>7th Year:</u>			
Fixed Costs	76.00	76.00	
Materials	73.90	73.80	
Labor and Machine Operating Costs	87.00	111.70	
Interest on This Year's Operating Capital	4.30	5.00	
Interest on All Previous Orchard Development Costs	<u>96.00</u>	<u>103.00</u>	
Total Cost for Year	<u>337.20</u>	<u>369.50</u>	
Returns from Sale of Product	<u>210.00</u>	<u>288.00</u>	
Net Cost for Year	<u>127.20</u>	<u>81.50</u>	
<hr/>			
Total Net Orchard Development Costs	1331.00	1373.40	707.20
<hr/>			



The value of production during these orchard development years was deducted from the growing costs to obtain a net development cost for each year. Interest was charged on all previous years' net costs until the orchard reached the assumed mature age. (4 years for peaches and 7 years for apples and cherries).

Interest on orchard development costs was calculated by multiplying the interest rate (8%) by one half the net cost of developing the orchard. After the orchard is fully developed it has a life expectancy of several years. The life expectancy of these orchards was assumed to be 25 years, 20 years and 10 years for apples, peaches and cherries respectively. During this period the productivity of the orchard decreases gradually. The new orchard is like a new machine that gradually becomes less valuable with time and the orchard must be depreciated in value over the period of its life. It was found that some orchards are new and some are old. It was assumed that on the average all orchards were half depreciated out. Therefore, the interest on the investments in the cost of developing the orchard was calculated at one half of the net cost of developing the orchard to the mature condition.

The orchard development costs were LL1331 for apples, LL1373 for cherries, and LL707 for peaches. The orchard development cost was much lower for peaches because in the 5th year the value of production exceeded the costs of production, while for apples and cherries it was the 8th year before returns exceeded the costs.

The interest rate used was 6% annually for investments in land, land improvements, and irrigation facilities. It was assumed that money used for these purposes could be borrowed at a lower rate than money for investments in such items as machinery or fences. A higher interest rate of 8% was used for the fixed investments other than developed land and irrigation facilities.

#### Depreciation:

Buildings, irrigation facilities, machinery, fences and tools all decrease in value over time. Therefore, a yearly depreciation cost for these items must be added to other fixed costs. The total depreciation cost amounted to LL14.60 per year for these items. As has already been explained above, the new orchard was depreciated over time. For each fruit the depreciation rate was based on the "Straight-line" method of calculation. The annual amount of the cost of depreciation depends on the number of productive years of the orchard.

For example, it was assumed that an average apple orchard would have a productive life of about 25 years after full development. Therefore, the yearly rate of depreciation would be 4% of the total orchard development cost. The annual depreciation rate for peaches was assumed to be 5% and for cherries 10% (see Tables 2, 3 and 4).

Repairs:

Permanent production items that require repairs regardless of the quantity of production are buildings, fences and windbreaks. A nominal cost for annual repairs of these items was calculated (see Tables 2, 3 and 4). Repairs on machinery, tools and irrigation facilities are related to how much these items are used each year. Therefore, they are considered as growing costs and will be discussed later.

Total Fixed Costs:

Using the methods of calculation outlined above, the total fixed costs for apples, cherries and peaches were determined. The fixed costs for the three fruits differed only because of the differences in the orchard development costs and the amount of depreciation charged for the orchard. In the case of cherries, the fixed costs were much higher, LL.291 per dunum per year as compared with peaches with only LL.159 per dunum, and apples with LL.202 per dunum per year. (See Tables 2, 3 and 4).

Growing Costs

Growing costs are those costs which occur each year and which vary with the quantity of production such as fertilizer, water, spray materials, labor and supervision. The yearly growing costs presented here are for a mature orchard and represent the average yearly costs expected over the life of the orchard after the development period.

Growing costs have been divided into three categories: materials, labor and interest on operating capital. Materials are those items which the farmer usually buys, such as manure, chemical fertilizers, spray materials, water and supplies used in harvesting.

Fertilizers:

The quantity of manure or chemical fertilizer used varies greatly among farmers. Some farmers use mostly manure with small

quantities of chemical fertilizers, while other farmers use only chemical fertilizers. The fertilizer costs shown in Tables 2, 3 and 4 are an average for all the farmers interviewed.

Farmers using manure usually used cow or horse manure with applications of between 1/4 to 1/3 sack per year per tree. It is interesting to note that most of the Bekaa fruit farmers use heavy applications of chemical fertilizer. The chemicals are a mixture of nitrates, super phosphates, and smaller quantities of potash. Nitrates are the most important ingredient. There are many types and combinations of chemical fertilizer mixes used and it was difficult to establish a most usual mixture. Average total fertilizer costs were about LL63 per dunum for cherries, LL62 for peaches, and only LL57 per dunum for apples. Farmers usually plant fewer apple trees per dunum; this explains the lower fertilizer cost per dunum for apples.

#### Spray Materials:

The number times the fruits are sprayed and the kinds of spray materials used vary among farmers. It appears that spraying techniques have not been standardized for anyone of the fruits. This point would seem to indicate that horticulturists need to establish desirable spraying recommendations and that the Agricultural Extension Service must make these recommendations known to the farmers.

The most common practices were to spray cherries 3 times per year, peaches 5 times and apples 7-9 times per year. The cost of spray materials are related to the number of times the orchard is sprayed (see Tables 2, 3 and 4).

#### Water Costs:

Many farmers interviewed have free access to gravity fed irrigation water. The right to use this water is included as part of the value of the land. Only a few of the farmers interviewed had high costs for pumping water from streams or wells. The cost of water shown in Tables 2, 3 and 4 represented an average of a few who pump water and a larger number who have free gravity fed water. For this reason, the average cost of water per dunum is relatively low.



### Labor Costs:

The labor, listed under this heading, includes all labor used in the production of the crop regardless of its source. It included both hired and family labor. The value assigned for family labor was established by using the daily rate of pay for comparable hired labor.

Repairs on machinery, tools and irrigation facilities are considered as a growing cost in this study because if there was no production there would be no need for these repairs.

### Pruning:

Most of the farmers prune their trees every year. Pruning costs were variable because of the difference in the cost of labor used for pruning. Some farmers paid LL7.00 per day per man while other farmers paid as high as LL12.00 per day. More labor was required to prune peaches than apples, and apples were pruned more heavily than cherries (see Tables 2, 3 and 4).

### Plowing, Cultivating and Hoeing:

Nearly all farmers cultivated their orchards by tractor, usually three to four times during the growing season. Hoeing or digging the soil around the trees was done by hand, and it was also done 3 to 4 times each year. It is interesting to note that the cost of cultivating and hoeing averaged about LL15.00 to LL20.00 per dunum per year, depending on the fruit (see Tables 2, 3 and 4). This can be compared with mountain orchards where these same operations cost between LL40.00 and LL50.00 per dunum per year. The lower cost is due to the use of tractors in the Bekaa Plain. Mechanized cultivation is an important way to reduce costs of production whenever it is physically feasible.

### Irrigation:

Peach and cherry producers irrigated their orchards about 6 times a year, while apple producers irrigated their orchards about 8 or 9 times during the year.

### Harvesting:

The cost of harvesting is much higher for cherries than for either apples or peaches. The costs of harvesting apples, as shown in Table 2,

does not include sorting or packing because most farmers sell their apples to the cold storage operator or have them stored at the storage plant where the sorting and packing is done. Peaches and cherries are usually sold on the fresh market and the sorting and packing is done at the farm. Therefore, the sorting and packing costs for peaches and cherries were included as a harvesting cost.

Guarding and Supervision:

The cost per dunum of guarding and supervision depends on the size of the orchard. Usually one man is hired to do this job for a particular orchard. The salary for this man is usually a set amount per month. Thus, the larger the orchard the smaller is the cost per dunum for these services. The average cost for guarding and supervising for the three fruits was LL20 per dunum. This amount was used for this item of cost for all three fruits. (See Tables 2, 3 and 4).

Miscellaneous Labor Costs:

Past experience has shown that when the cost of production is developed by adding the individual costs for each cultural operation a small quantity of what might be called "overhead labor" is not accounted for. This overhead labor consists of the time required for workers to travel to the field, to prepare their tools for use, or to change from one job to another. An arbitrary cost of 5% of total non-custom labor costs was added as miscellaneous labor costs to account for this overhead labor.

Interests on Operating Capital:

All during the year the farmer pays money for materials and labor. If he had not used this money for these purposes he could have earned an interest rate by investing it in some other use. If he borrowed the money to pay yearly operating costs, he must pay interest for the use of this money. In either case, the cost of using this money to pay operating costs must be charged as an expense against that year's crop. In this study, a charge of 8% of the total growing costs was used to determine the cost of using this money. However, farmers use this operating money for an average period of only 4 months; therefore, only one third of the annual interest cost (growing costs multiplied by 8%) was used as a cost of production (see Tables 2, 3 and 4).

### Cost Per Kilogram

Cost per dunum is only one way of looking at cost of production. Cost per kilogram of product is more important as a measure of cost. Yearly growing costs do not vary much from year to year but yields may differ greatly from year to year. Therefore, to demonstrate the effect of yield changes on the cost per kilogram, three levels of yield were chosen for each fruit (see Tables 2, 3 and 4). It can be seen that the level of yield has an important effect on the cost of production per kilogram and thus the cost at which the farmer can sell his product and still cover his cost of production. For example, if the yield of a dunum of apples is only 1200 kilograms, the total cost of production is about 34 piasters per kilogram, while if the yield per dunum is 2200 kilograms, the total cost of production is only about 19 piasters per kilogram.

The main reason the cost per kilogram becomes smaller as yield increases is because fixed costs are a set amount for each dunum per year, and as yield increases this cost is spread over more kilograms.

### Comparison of Costs of Production

The total cost per dunum of producing peaches is the lowest of the three fruits; peaches LL387, apples LL415, and cherries LL540 (see Table 6). The main difference in cost per dunum among the three fruits is in the fixed costs and the costs of harvesting and packing.

The fixed costs differ because of two reasons: first, the length of time needed to develop a mature orchard; peaches only require about 5 years, while cherries and apples require about 8 years. This fact causes the orchard development costs to be higher for the latter two fruits. Second, the cost of developing a mature cherry orchard was depreciated over a fewer number of years than either apples or peaches, (cherries - 10 years, peaches - 20 years, and apples - 25 years).

The total annual growing costs per dunum for cherries was highest mainly because of the high cost of harvesting. Material costs per dunum were highest for apples because of the higher cost of spray materials. Fertilizer costs per dunum were about the same for all three fruits (see Table 6).

الجمهورية اللبنانية  
مكتب وزير الدولة لشؤون التنمية الإدارية  
مركز مشاريع ودراسات القطاع العام

Table 6. Comparison of Average Costs of Production for Apples, Cherries and Peaches, Bekaa Plain, 1963

Cost Item	Apples LL/Du	Cherries LL/Du	Peaches LL/Du
<u>Fixed Costs:</u>			
Interest on Investments in Land, Terraces, Irrigation Facilities, Buildings, Machinery, Tools, Fences and Developed Orchards	129.70	131.40	104.80
Depreciation on Buildings, Irrigation Facilities, Machinery, Fences, Tools and Developed Orchards	67.80	151.90	50.00
Repairs on Buildings, Fences and Terraces	4.00	4.00	4.00
Total Fixed Costs	201.50	287.30	158.80
<u>Materials:</u>			
Manure	12.20	20.00	22.50
Chemical Fertilizer	43.80	43.20	39.60
Spray Materials	31.50	8.00	15.70
Water and Other Materials	9.80	8.70	8.90
Total Materials	98.30	79.90	86.70
<u>Labor Costs:</u>			
Pruning and Removing Branches	10.80	8.00	18.00
Fertilizer Application	7.00	6.50	7.40
Cultivation	6.00	8.00	6.00
Hoeing	9.50	12.00	12.00
Irrigating	11.00	8.00	8.00
Spray Application	15.40	5.60	10.00
Propping Trees and Thinning	2.00	0.00	7.50
Harvesting and Packing	18.70	<sup>1/</sup> 90.00	37.80
Miscellaneous Labor and Repairs on Machinery and Tools	9.30	11.10	9.60
Supervising and Guarding	20.00	20.00	20.00
Total Labor Costs	109.70	169.20	136.30
<u>Interest on Operating Capital:</u>	5.40	7.10	4.90
Total Growing Costs	213.40	256.90	227.90
Total All Costs	414.90	543.50	386.70

<sup>1/</sup> Does not include labor for packing and sorting.

Labor costs are interesting to examine. If we exclude labor for harvesting and packing operations, the labor for guarding and supervision, and tractor cultivation costs, apples required 11 man-days per dunum, peaches 12 man-days, and cherries only 8 1/2 man-days per dunum (see Table 7). Harvesting operations required about 15 man-days per dunum for cherries, about 6 man-days for peaches, and only about 3 man-days per dunum for apples. Total labor requirements (excluding tractor cultivation and guarding and supervision) were 23 1/2 man-days per dunum for cherries, 18 man-days for peaches, and only 14 man-days per dunum for apples (see Table 7).

Table 7. Comparison of Average Labor Requirements <sup>1/</sup> for Apples, Cherries and Peaches, Bekaa Plain, 1963

Kind of Labor	Apples man-days Labor Per Dunum	Cherries man-days Labor Per Dunum	Peaches man-days Labor Per Dunum
Labor used for growing operations	11	8 1/2	12
Labor used for harvesting operations	3	15	6
Total Growing Labor	14	23 1/2	18

<sup>1/</sup> Excludes tractor cultivation, guarding and supervision.

#### Ways of Reducing Cost of Production

The cost of production can be measured in two ways: the cost per dunum and the cost per kilogram. When considering ways of reducing the cost, the latter is a more important concept to consider. The fruit is usually sold at a price per kilogram and thus cost per kilogram is most valuable as a measure of the farmers' ability to make profit. However, in this report, reductions in both cost per dunum and cost per kilogram will be considered.

### Cost Per Dunum:

A large proportion, or about half of the total cost of production per dunum, is made up of fixed costs (fixed costs represent about 49%, 53% and 41% of total cost for apples, cherries, and peaches respectively). The two major factors that affect fixed costs are the cost of land and the orchard development costs. It is unlikely that any reduction in the price of land can be achieved and, most likely, land prices will increase during the next few years. Therefore, any reduction in fixed costs, due to lower land costs, is unlikely.

Interest on money invested in orchard development and depreciation of the value of a developed orchard are the two ways in which orchard development costs can affect fixed costs. These two items represent more than half of the fixed costs per dunum. For an orchard that is already developed, orchard development costs cannot be changed. For an orchard that is to be developed in the future, it is likely that material and labor used in the development of the orchard will become higher priced. Therefore, it seems that there is no real practical possibility of reducing orchard development costs, and thus fixed costs.

The reduction of growing costs per dunum appear to be the only possibility of reducing total cost per dunum. Observation of the cost information presented in Tables 2, 3 and 4, indicate that the cost of materials make up from 35% to 45% of the growing costs, depending on the fruit. Fertilizer costs are the most important component of the cost of materials. Present recommendations suggest the use of even higher rates of fertilizer applications, thus increasing further the fertilizer costs. However, preliminary recommendations also suggest that the application of less manure and more chemical fertilizer, especially the nitrates will result in a higher level of plant nutrition, and thus a lower total cost for fertilizer. Further research and testing is needed to determine the most profitable kinds and quantities of fertilizer to apply on fruits grown in the Bekaa.

Horticultural specialists have suggested that some farmers may be spraying too many times per year (this is especially true for apples), or they are using spray materials that are too expensive. However, at present, there does not seem to be sufficient evidence to substantiate this claim. Research is needed to develop recommendations for farmers concerning the most profitable spraying practices for each of these fruits.

The examination of labor requirements to perform the growing operations and the labor costs do not suggest any ways of significantly reducing labor costs. The Bekaa fruit farmers are already using mechanized methods of cultivation, and cultivation costs are low relative to the mountain farmers. It has been suggested that farmers might cultivate fewer times per season. Even if farmers cultivated only half as many times as they do now, this would not result in a significant reduction in growing costs (see Tables 2, 3 and 4). Daily wages for labor have been increasing and thus future labor costs may be even higher than at present.

#### Cost Per Kilogram:

The cost of production per kilogram may be reduced in two ways: first, by a reduction in the cost of production per dunum for a given yield, or by an increase in yield. As has been pointed out above, there is little hope of reducing the cost per dunum and still maintaining yield. However, it is very possible to increase yield and, therefore, reduce cost per kilogram even though costs per dunum are increased.

Yield may be increased by using more fertilizer, more water and/or better spraying methods. It is likely that to increase yield by any of these means will result in higher cost per dunum, but lower cost per kilogram. The important point to consider is that the added returns gained from adding fertilizer, water or spray materials must be equal to or greater than the cost of these added materials. In other words, the cost per kilogram can be reduced if for each additional Lebanese Pound invested in more fertilizer, water or spray material, more than one additional Lebanese Pound in product can be obtained. The question of what are the most profitable quantities and kinds of fertilizer, spray material, and quantities of water to apply must be answered by horticulturists and other agronomic specialists. Research and extension programs must be aimed at giving answers to these questions.

#### Use of Cost Information by Individual Farmers

The cost information and the explanation of costs presented above are the average for groups of farmers interviewed during the year 1963. Individual farmers or agricultural extension agents may want to calculate the exact cost of production for a particular orchard. The cost summaries presented in this report can serve as a guide to this job. The farmer can use his own costs for each item of cost and

compare these with the group average. For example, a farmer may have higher land values or higher water costs than the average for the group of farmers interviewed. He can substitute his values for those listed in Tables 2, 3 and 4. Also he may use different quantities of fertilizer, or have a different cost for spray materials than those listed for the average of the group of farmers interviewed. For these cost items he can substitute his own costs for those shown in Tables 2, 3 and 4. For items of cost for which he does not have accurate records, such as orchard development costs, he can use the average for the group as shown in Tables 2, 3 and 4.

After making the appropriate substitutions of his costs for the costs listed in Tables 2, 3 and 4, the farmer will be able to make a good estimate of the costs per dunum for his particular orchard. Once his cost per dunum is calculated, he can easily calculate his own cost per kilogram by dividing his total cost per dunum by his yield per dunum.

These cost summaries have other important uses for the farmer or agricultural extension agents. After the farmer has calculated his own costs of production he can then compare each item of cost with those for the average of the group. If, for example, his costs are higher for any particular item of cost, he should ask himself why they are higher, and try to determine if there are ways of reducing the cost for this particular item. If the farmer does this for each item of cost, listed in Tables 2, 3 and 4, he may discover ways of reducing his costs of production.

Farmers who consider planting new orchards will find this information useful. The orchard development costs will give him a good estimate of how much money he must invest to plant and develop a new orchard and take care of it until the orchard is in full production or until he can expect returns from the orchard.

#### Factors Affecting Decisions to Develop New Orchard

Farmers with established mature orchards already have made large investments per dunum, and unless the fruit crop is very unprofitable, it is uneconomic for them to remove the orchard and plant a different fruit or another crop. However, farmers who are considering planting and developing new orchards must consider several factors in order to decide which fruit to grow.



Most important of these factors is the relative profitability of each fruit as compared to other fruits. He must consider expected yields, prices, and costs of production. Farmers interested in developing new orchards can develop good estimates of expected average yield of the new orchard by observing the yields of their neighbors who have mature orchards, and he can use estimates of cost presented in this report. However, the farmer does not know the future prices for each kind of fruit. As a guide to these new producers, the relative profitability of apples, cherries, and peaches can be examined under different price and yield assumptions.

### Break-Even Prices and Profit

By assuming a level of yield and a price for one fruit and by using the average production costs and expected yield for a second fruit crop, it is possible to determine the price that the farmer must receive for the second fruit crop in order to make the same profit (returns minus costs), this price is called the "break-even" price or the price of equal profit. The prices recorded in tables 8 and 9 are the break-even prices for peaches and cherries relative to apples. In Table 10 is given the break-even prices of cherries relative to peaches.

As an example of how to use these tables, assume a farmer expects a yield for apples of 1700 Kg. per dunum, and he estimates the average future price for which he can sell his apples to be 25 piasters per kilogram, the break-even price for peaches (Table 8) can be found by first looking across the top of the Table to find the apple yield of 1700 Kg; second, under this heading, find the column with 25 piasters at the top (this is the expected price of apples); third, look down that column to the price that corresponds to the expected yield of peaches (let us assume the expected yield of peaches is 1600 Kg. per dunum); the break-even price for peaches is 24.9 piasters per kilogram. To say this another way, if a farmer expects an average apple yield of 1700 kilograms per dunum, a selling price for apples of 25 piasters per kilogram and an expected average yield for peaches of about 1600 kilograms per dunum, then peaches will be more profitable if he can get 25 piasters per kilogram or more for his peaches.

The information in Tables 8, 9 and 10 can be very helpful to farmers when they are trying to decide which is the most profitable fruit to plant in the Bekaa Plain. He can determine a series of reasonable possibilities for different yields and prices and if they all favor one fruit then he can be quite sure that this crop will be the most profitable.

Table 8. Break-even Prices of Peaches for Selected Price and Yield Levels for Apples, Bekaa Valley

Yield of Apples →	1200 Kg/Du			1700 Kg/Du			2200 Kg/Du		
	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.
Price of Apples →	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.
Yield of Peaches ↓	(Break-even Price in Ps/Kilogram for Peaches)								
1200 Kg/Du	22.5	32.5	42.5	32.4	46.6	60.8	42.3	60.7	79.0
1600 Kg/Du	17.5	25.0	32.5	24.9	35.6	46.2	32.4	46.1	59.9
2000 Kg/Du	14.4	20.4	26.4	20.4	28.9	37.4	26.4	37.4	48.4
2400 Kg/Du	12.4	17.4	21.7	17.4	24.4	31.5	22.3	31.5	40.7

$$P_p = \frac{(Y_a \times P_a) - C_a + C_p}{Y_p}$$

Where:  $P_p$  = Break-even Price of Peaches, Ps/Kg

$Y_a$  = Yield of Apples, Kg/Du

$P_a$  = Price of Apples, Ps/Kg

$C_a$  = Cost of Producing Apples, L/Du

$C_p$  = Cost of Producing Peaches, L/Du

$Y_p$  = Yield of Peaches, Kg/Du

Table 9. Break-even Prices for Cherries for Selected Price and Yield Levels for Apples, Bekaa Valley

Yield of Apples →	1200 Kg/Du			1700 Kg/Du			2200 Kg/Du		
	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.
Price of Apples →	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.	25 Ps.	35 Ps.	45 Ps.
Yield of Cherries ↓	(Break-even Prices in Ps/Kg for Cherries)								
600 Kg/Du	67.7	87.7	107.7	87.5	115.8	144.2	107.3	144.0	180.7
900 Kg/Du	48.4	61.8	75.1	61.7	80.6	99.4	74.9	99.3	123.8
1200 Kg/Du	38.8	48.8	58.8	48.7	62.9	77.1	58.7	77.0	95.3
2400 Kg/Du	33.1	41.1	49.1	41.0	52.3	63.1	48.9	63.6	78.3

$$P_c = (Y_a \times P_a) - C_a + C_c$$

$$Y_c$$

Where:

- $P_c$  = Breakeven Price of Cherries, Ps/Kg
- $Y_a$  = Yield of Apples, Kg/Du
- $P_a$  = Price of Apples, Ps/Kg
- $C_a$  = Cost of Producing Apples, L/Du
- $C_c$  = Cost of Producing Cherries, L/Du
- $Y_c$  = Yield of Cherries, Kg/Du

Table 10. Break-even Prices for Cherries for Selected Price and Yield Levels for Peaches, Bekaa Valley

Yield of Peaches →	1200 Kg/Du			1600 Kg/Du			2000 Kg/Du		
	30 Ps.	40 Ps.	50 Ps.	30 Ps.	40 Ps.	50 Ps.	30 Ps.	40 Ps.	50 Ps.
Price of Peaches →	30 Ps.	40 Ps.	50 Ps.	30 Ps.	40 Ps.	50 Ps.	30 Ps.	40 Ps.	50 Ps.
<u>Yield of Cherries ↓</u>	(Break-even Prices in Ps./Kg for Cherries)								
600 Kg/Du	82.7	102.7	122.7	101.0	127.7	154.3	119.3	152.7	186.0
900 Kg/Du	58.4	71.8	85.1	70.7	88.4	106.2	81.8	104.0	126.2
1200 Kg/Du	46.3	56.3	66.3	55.5	68.8	82.2	63.8	80.5	97.2
1500 Kg/Du	39.1	47.1	55.1	46.4	57.1	67.7	53.1	66.4	79.7

$$P_c = \frac{(Y_p \times P_p) - C_p + C_c}{Y_c}$$

Where:

$P_c$  = Break-even Price of Cherries, Ps/Kg

$Y_p$  = Yield of Peaches, Kg/Du

$P_p$  = Price of Peaches, Ps/Kg

$C_p$  = Cost of Producing Peaches, LL/Du

$C_c$  = Cost of Producing Cherries, LL/Du

$Y_c$  = Yield of Cherries, Kg/Du

Risk and Uncertainty:

Net profit is not the only factor to consider when deciding which fruit to plant. The farmer must also be concerned with the relative year-to-year instability of prices and yields among the different fruits.

Apples tend to have more price stability because they are storable and have a greater potential export market, while peaches and cherries are highly perishable and the market is mostly a local market. A large crop of cherries or peaches may mean very much lower prices for that year. Apples also appear to have less year-to-year variability in yield than either cherries or peaches. These points all seem to suggest that the year-to-year income and net profit may be more stable for apples than for either cherries or peaches. Therefore, if a farmer does not have adequate financial resources to survive a low profit year, he will be interested in the fruits that have a more stable year-to-year income, even though on the average the fruit is slightly less profitable.

Labor Requirements:

The small farmer who considers planting one of these fruits should be concerned about the returns from the use of his family labor. If he plans to have his family perform all of the labor required in the production of the fruit, he should consider which fruit will give him the highest returns for his family labor. Data in Table 11 shows the total value of production per dunum (assuming average yields and prices), the labor returns above costs (except labor costs) and the returns to labor. There appears to be no significant differences in labor income among the three fruits.

Other Factors:

The quantity of water required is another factor that should be considered when deciding which fruit to plant. Apples use more water than either peaches or cherries. Therefore, if scarcity of water is a problem, apple yields would be affected more and either cherries or peaches would be a better fruit to plant.

Another factor to consider is the amount of investment required to develop an orchard. On the average, it requires about LL1300 to develop a dunum of either apple or cherry trees and only about LL700 to develop a dunum of peach trees. Also, returns from peaches start

coming to the farmer in a much shorter time after planting than is the case for apples or cherries. Farmers with small capital resources should take this fact into consideration.

Another factor to consider is the future export potential of each fruit. If future export potentials are good for a fruit, it is likely that prices will be steady and at a higher level. Not much is known at this time about export possibilities. Research is needed to determine estimates of these potentials.

Trends in local consumption, both in Lebanon and in neighboring Arab countries, could also have an effect on future prices and thus the relative profitability of each crop.

Table 11. Relative Returns to Labor for Apples, Cherries and Peaches, Bekaa Valley

Item	Apples	Cherries	Peaches
Expected Yield	1700 Kg/Du	900 Kg/Du	1600 Kg/Du
Expected Price	35 Ps/Kg	90 Ps/Kg	40 Ps/Kg
Value of Production	LL.595/Du	LL.810/Du	LL.640/Du
Cost of Production (excluding labor costs)	<u>LL.305/Du</u>	<u>LL.378/Du</u>	<u>LL.256/Du</u>
Returns to Labor	LL.290/Du	LL.432/Du	LL.384/Du
Number of man-days Equivalent of Labor Required Per Dunum <sup>1/</sup>	17.3	26.9	21.7
Returns per man-day of Labor	LL. 16.76	LL. 16.06	LL. 16.04

<sup>1/</sup> Excluding cultivation by tractor.

الجمهورية اللبنانية

مكتب وزير الدولة لشؤون التنمية الإدارية  
مركز مشاريع ودراسات القطاع العام