JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF PUBLIC WORKS AND WATER RESOURCES
ARAB REPUBLIC OF EGYPT

# THE FEASIBILITY STUDY ON THE NORTH SINAI INTEGRATED RURAL DEVELOPMENT PROJECT (PHASE II) IN THE ARAB REPUBLIC OF EGYPT

## FINAL REPORT

## APPENDIX



MARCH 1997

SANYU CONSULTANTS INC.
PACIFIC CONSULTANTS INTERNATIONAL

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# APPENDIX A

# WATER CONVEYANCE AND WATER MANAGEMENT

# Appendix A

# Water Conveyance and Water Management

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## A-1 Unit Cost Estimation of Pipe

Unit cost of each pipe was estimated based on the following information:

Steel Pipe

- Unit price of 4,700 LE/ton was applied for the coated steal pipe based on the quotation of Mosahma Behera Company in Egypt.
- Joint welding, joint coating and installation cost were estimated based on the requirement per unit works referred to the WSP (Japan water Supply Steel Pipe Organization).
- Wall thickness of the pipe was confirmed by the structural calculation.

PCCP

- Unit prices of 3,600 LE/m for pipe, 1,000 LE/piece for inland transportation and 5 % for tax are applied based on the price quotation from the Egyptian company.
- Labour and equipment requirement for the installation work are referred to standard of the MAFF, Japan.

FRP

- Unit price of 7,500 LE/m including taxes and inland transportation is applied to the price of the FRP pipe based on the quotation of the Egyptian company " HOBAS EGYPT S.A.E".
- Labour and equipment requirement for the installation work are referred to standard of the MAFF, Japan.

DCIP

- Unit prices of 72,167 LE/4m for pipe(CIF Port Said) and 500 LE/piece for inland transportation are applied based on the price quotation from the Japan company.
- Labour and equipment requirement for the installation work are referred to standard of the MAFF, Japan.

The estimation and calculation results are shown in the followings:

## Table A-1 Steel Pipe Price

| STW400-A | | | | | | Pipe Fablication | | Coating | | | | Packing | | | Inland Transpor | Overhead Cost | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Material Cost | Other Cost | Coating Area | | Coating Cost | | Packing | Crate | Inspect. | | | Cost | per meter | per ton |
| N.D (mm) | O.D (mm) | L (m) | T (mm) | U.W. (Kg/m) | Weight (T/pcs) | 1.800LE/T (LE) | 2.300LE/T (LE) | Internal (sqm) | External (sqm) | Internal (LE) | External 100LE/sm (LE) | (LE) | (LE) | (LE) | 100LE/T (LE) | (LE) | (LE/pcs) | (LE/m) | (LE/t) |
| 700 | 711.2 | 6 | 7 | 122 | 0.729 | 1.313 | 1.678 | 13.142 | 13.406 | *1 | 1.341 | *2 | *3 | *4 | 73 | *5 | 4.404 | 734 | 6.038 |
| 800 | 812.8 | 6 | 8 | 159 | 0.953 | 1.715 | 2.191 | 15.019 | 15.321 | *1 | 1.532 | *2 | *3 | *4 | 95 | *5 | 5.533 | 922 | 5.808 |
| 900 | 914.4 | 6 | 8 | 179 | 1.073 | 1.931 | 2.468 | 16.934 | 17.236 | *1 | 1.724 | *2 | *3 | *4 | 107 | *5 | 6.230 | 1.038 | 5.807 |
| 1.000 | 1.016.0 | 6 | 9 | 223 | 1.341 | 2.414 | 3.084 | 18.812 | 19.151 | *1 | 1.915 | *2 | *3 | *4 | 134 | *5 | 7.547 | 1.258 | 5.628 |
| 1.100 | 1.117.6 | 6 | 10 | 273 | 1.639 | 2.950 | 3.769 | 20.689 | 21.066 | *1 | 2.107 | *2 | *3 | *4 | 164 | *5 | 8.990 | 1.498 | 5.485 |
| 1.200 | 1.219.2 | 6 | 11 | 328 | 1.966 | 3.540 | 4.523 | 22.567 | 22.981 | *1 | 2.298 | *2 | *3 | *4 | 197 | *5 | 10.557 | 1.760 | 5.369 |
| 1.350 | 1.371.6 | 6 | 12 | 402 | 2.414 | 4.345 | 5.552 | 25.402 | 25.854 | *1 | 2.585 | *2 | *3 | *4 | 241 | *5 | 12.724 | 2.121 | 5.271 |
| 1.500 | 1.524.0 | 6 | 14 | 521 | 3.128 | 5.630 | 7.194 | 28.199 | 28.727 | *1 | 2.873 | *2 | *3 | *4 | 313 | *5 | 16.010 | 2.668 | 5.118 |
| 1.600 | 1.625.6 | 6 | 15 | 596 | 3.575 | 6.434 | 8.222 | 30.076 | 30.642 | *1 | 3.064 | *2 | *3 | *4 | 357 | *5 | 18.077 | 3.013 | 5.057 |
| 1.650 | 1.676.4 | 6 | 15 | 615 | 3.687 | 6.637 | 8.481 | 31.034 | 31.599 | *1 | 3.160 | *2 | *3 | *4 | 369 | *5 | 18.647 | 3.108 | 5.057 |
| 1.800 | 1.828.8 | 6 | 16 | 715 | 4.292 | 7.725 | 9.871 | 33.869 | 34.472 | *1 | 3.447 | *2 | *3 | *4 | 429 | *5 | 21.472 | 3.579 | 5.003 |
| 1.900 | 1.930.4 | 6 | 17 | 802 | 4.813 | 8.663 | 11.069 | 35.746 | 36.387 | *1 | 3.639 | *2 | *3 | *4 | 481 | *5 | 23.853 | 3.975 | 4.956 |
| 2.000 | 2.032.0 | 6 | 18 | 894 | 5.364 | 9.655 | 12.337 | 37.624 | 38.302 | *1 | 3.830 | *2 | *3 | *4 | 536 | *5 | 26.358 | 4.393 | 4.914 |
| 2.100 | 2.133.6 | 4 | 19 | 991 | 3.963 | 7.134 | 9.115 | 26.334 | 26.812 | *1 | 2.681 | *2 | *3 | *4 | 396 | *5 | 19.326 | 4.832 | 4.877 |
| 2.200 | 2.235.2 | 4 | 20 | 1093 | 4.370 | 7.866 | 10.051 | 27.586 | 28.088 | *1 | 2.809 | *2 | *3 | *4 | 437 | *5 | 21.163 | 5.291 | 4.843 |
| 2.300 | 2.336.8 | 4 | 21 | 1199 | 4.797 | 8.635 | 11.033 | 28.837 | 29.365 | *1 | 2.937 | *2 | *3 | *4 | 480 | *5 | 23.084 | 5.771 | 4.812 |
| 2.400 | 2.438.4 | 4 | 22 | 1311 | 5.244 | 9.439 | 12.061 | 30.089 | 30.642 | *1 | 3.064 | *2 | *3 | *4 | 524 | *5 | 25.088 | 6.272 | 4.784 |
| 2.500 | 2.540.0 | 4 | 23 | 1428 | 5.710 | 10.279 | 13.134 | 31.341 | 31.919 | *1 | 3.192 | *2 | *3 | *4 | 571 | *5 | 27.175 | 6.794 | 4.759 |
| 2.600 | 2.641.6 | 4 | 24 | 1549 | 6.197 | 11.154 | 14.253 | 32.592 | 33.195 | *1 | 3.320 | *2 | *3 | *4 | 620 | *5 | 29.346 | 7.337 | 4.736 |
| 2.700 | 2.743.2 | 4 | 25 | 1676 | 6.703 | 12.066 | 15.417 | 33.844 | 34.472 | *1 | 3.447 | *2 | *3 | *4 | 670 | *5 | 31.600 | 7.900 | 4.714 |
| 2.800 | 2.844.8 | 4 | 26 | 1807 | 7.229 | 13.013 | 16.627 | 35.095 | 35.749 | *1 | 3.575 | *2 | *3 | *4 | 723 | *5 | 33.938 | 8.484 | 4.695 |
| 2.900 | 2.946.4 | 4 | 27 | 1944 | 7.775 | 13.995 | 17.883 | 36.347 | 37.026 | *1 | 3.703 | *2 | *3 | *4 | 778 | *5 | 36.358 | 9.090 | 4.676 |
| 3.000 | 3.048.0 | 4 | 29 | 2159 | 8.636 | 15.545 | 19.863 | 37.573 | 38.302 | *1 | 3.830 | *2 | *3 | *4 | 864 | *5 | 40.102 | 10.025 | 4.644 |

Note (1): The costs marked with *1 to *5 and taxes are included to the pipe fablication cost.

(2): The pipe fablication cost and external coating cost are estimated based on the quotation on the pipe diameter of 3.000mm.

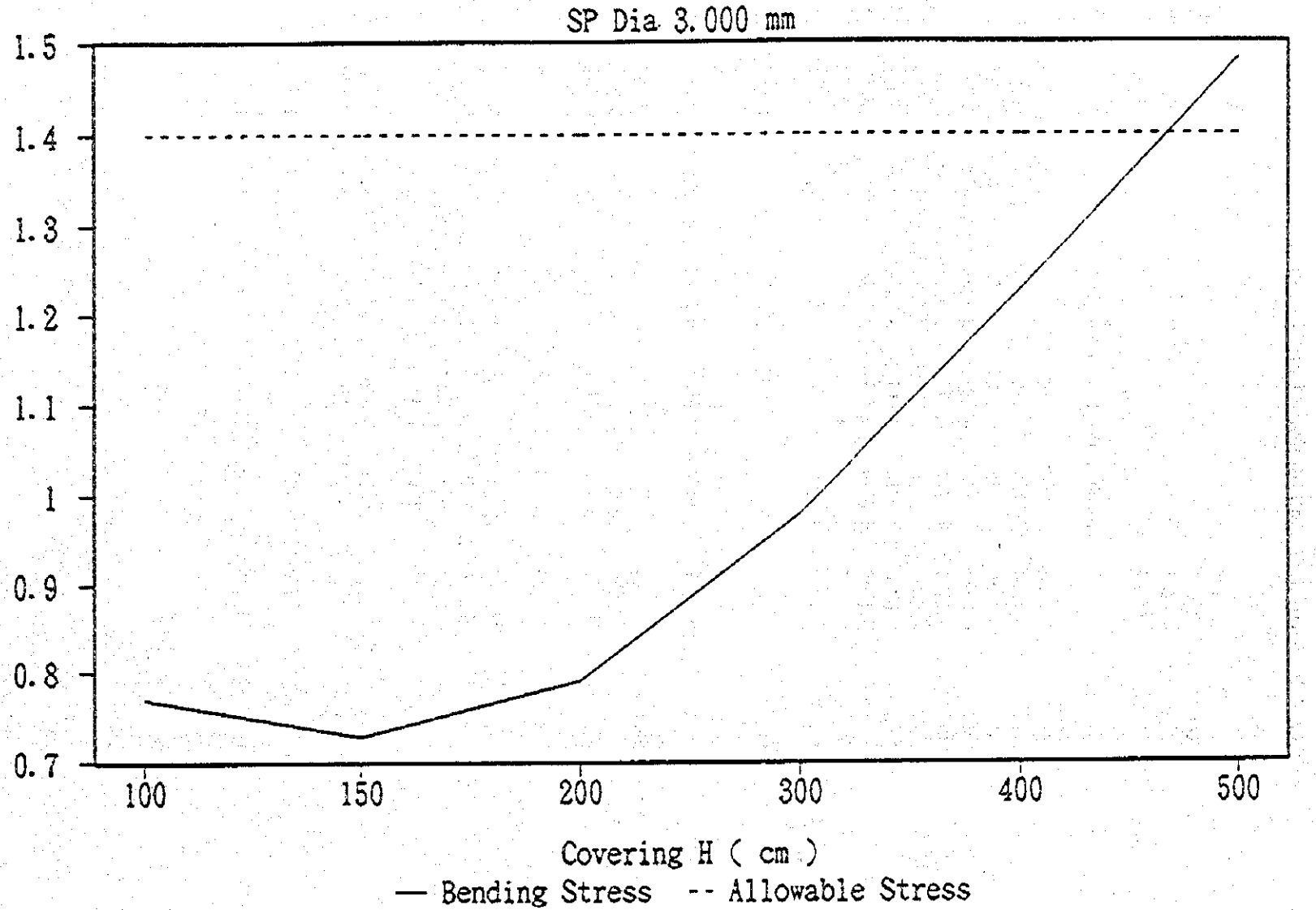
## Table A-2 Structural Calculation of Steel Pipe

| | |
|---|---|
| Do(cm) | 304.8 |
| t (cm) | 2.9 |
| Di(cm) | 299.0 |

Pmax(kg/cm2) 27.2 (Alloxable internal pressure)

| | | | | | | |
|---|---|---|---|---|---|---|
| H(cm) | 100 | 150 | 200 | 300 | 400 | 500 |
| B(cm) | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 |
| $\phi$ | 30 | 30 | 30 | 30 | 30 | 30 |
| K | 0.3333 | 0.3333 | 0.3333 | 0.3333 | 0.3333 | 0.3333 |
| $\mu'$ | 0.5774 | 0.5774 | 0.5774 | 0.5774 | 0.5774 | 0.5774 |
| Cd | 0.0893 | 0.1328 | 0.1756 | 0.2589 | 0.3393 | 0.4170 |
| $\gamma$ | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 |
| Cd・$\gamma$・B | 0.1769 | 0.2630 | 0.3477 | 0.5126 | 0.6719 | 0.8257 |
| $\gamma$・H | 0.1800 | 0.2700 | 0.3600 | 0.5400 | 0.7200 | 0.9000 |
| V.E.P | 0.1800 | 0.2700 | 0.3600 | 0.5126 | 0.6719 | 0.8257 |
| P(T-20) | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 | 8.000 |
| n | 1 | 1 | 1 | 1 | 1 | 1 |
| i | 0.50 | 0.50 | 0.45 | 0.35 | 0.25 | 0.15 |
| Wt | 0.2567 | 0.1429 | 0.0884 | 0.0422 | 0.0238 | 0.0147 |
| Supp.A | 90 | 90 | 90 | 90 | 90 | 90 |
| Kx | 0.096 | 0.096 | 0.096 | 0.096 | 0.096 | 0.096 |
| Kb | 0.157 | 0.157 | 0.157 | 0.157 | 0.157 | 0.157 |
| e' | 28 | 28 | 28 | 28 | 28 | 28 |
| R | 150.95 | 150.95 | 150.95 | 150.95 | 150.95 | 150.95 |
| E | 2.10E+06 | 2.10E+06 | 2.10E+06 | 2.10E+06 | 2.10E+06 | 2.10E+06 |
| I | 2.0324 | 2.0324 | 2.0324 | 2.0324 | 2.0324 | 2.0324 |
| Z | 1.4017 | 1.4017 | 1.4017 | 1.4017 | 1.4017 | 1.4017 |
| $\delta$X | 4.2918 | 4.0577 | 4.4068 | 5.4532 | 6.8373 | 8.2596 |
| $\delta$X/2R(%) | 1.4216 | 1.3440 | 1.4597 | 1.8063 | 2.2648 | 2.7359 |
| $\sigma$b(kg/cm2) | 770 | 728 | 791 | 978 | 1,227 | 1,482 |
| $\sigma$a(kg/cm2) | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |

Figure A-1 Bending Stress



## Table A-3 PCC Pipe Cost

PCC Pipe Cost per meter

| | | |
|---|---|---|
| Diameter | mm | 2,000 |
| Thickness | mm | 157 |
| Weight | kg/pc | 16,025 |
| Length | m/pc. | 6.15 |
| Const. Rate | m/day | 19.6 |
| Const. Rate | pcs/day | 3.2 |
| (1)Pipe Cost | LE/pc | 24,297 |
| (2)Installation | LE/pc | 840 |
| (3)Testing | LE/pc | 36 |
| Total | LE/pc | 25,173 |
| Per Meter | LE/m | 4,093 |

(2)Installation — Dia. 2,000mm

| | | Q'ty | Unit C. | Amount |
|---|---|---|---|---|
| Labour | | | | |
| Scaffolding Man | No./day | 2 | 18 | 36 |
| Skilled Labour | No./day | 4 | 18 | 72 |
| Common Labour | No./day | 10 | 15 | 150 |
| Sum | | | | 258 |
| Machine | | | | |
| Truck Crane | day | 50t | 1470 | 1,470 |
| Crawler Crane | day | 40t | 950 | 950 |
| Sum | | | | 2,420 |
| Total | | | | 2,678 |
| per piece | | 3.2pc/day | | 840 |

(3)Testing

| | | | | |
|---|---|---|---|---|
| Common Labour | No./day | 7 | 15 | 105 |
| Testing Equipmen | No./day | 1 | | 200 |
| Sum | | | | 305 |
| per piece | | 8.5pc/day | | 36 |

## Table A-4 FRP Pipe Cost

FRP Pipe Cost per meter

| | | |
|---|---|---|
| Diameter | mm | 2,500 |
| Thickness | mm | - |
| Weight | kg/pc | - |
| Length | m/pc. | 4 |
| Const. Rate | m/day | 29.6 |
| Const. Rate | pcs/day | 7.4 |
| (1)Pipe Cost | LE/pc | 29,600 |
| (2)Installation | LE/pc | 150 |
| (3)Testing | LE/pc | 36 |
| Total | LE/pc | 29,786 |
| Per Meter | LE/m | 7,447 |

(2)Installation — Dia. 2,500mm

| | | Q'ty | Unit C. | Amount |
|---|---|---|---|---|
| Labour | | | | |
| Scaffolding Man | No./day | 2 | 18 | 36 |
| Skilled Labour | No./day | 4 | 18 | 72 |
| Common Labour | No./day | 9 | 15 | 135 |
| Sum | | | | 243 |
| Machine | | | | |
| Truck Crane | day | 15t | 400 | 400 |
| Crawler Crane | day | 16t | 470 | 470 |
| Sum | | | | 870 |
| Total | | | | 1,113 |
| per piece | | 7.4pc/day | | 150 |

(3)Testing

| | | | | |
|---|---|---|---|---|
| Common Labour | No./day | 7 | 15 | 105 |
| Testing Equipmen | No./day | 1 | | 200 |
| Sum | | | | 305 |
| per piece | | 8.5pc/day | | 36 |

## Table A-5 DCI Pipe Cost

DCI Pipe Cost per meter

| | | |
|---|---|---|
| Diameter | mm | 2,600 |
| Thickness | mm | 157 |
| Weight | kg/pc | 9.21 |
| Length | m/pc. | 4.00 |
| Const. Rate | m/day | 12.0 |
| Const. Rate | pcs/day | 3.0 |
| (1)Pipe Cost | LE/pc | 72,167 |
| (2)Installation | LE/pc | 893 |
| (3)Testing | LE/pc | 36 |
| Total | LE/pc | 73,096 |
| Per Meter | LE/m | 18,274 |

(2)Installation — Dia. 2,600mm

| | | Q'ty | Unit C. | Amount |
|---|---|---|---|---|
| Labour | | | | |
| Scaffolding Man | No./day | 2 | 18 | 36 |
| Skilled Labour | No./day | 4 | 18 | 72 |
| Common Labour | No./day | 10 | 15 | 150 |
| Sum | | | | 258 |
| Machine | | | | |
| Truck Crane | day | 50t | 1470 | 1,470 |
| Crawler Crane | day | 40t | 950 | 950 |
| Sum | | | | 2,420 |
| Total | | | | 2,678 |
| per piece | | 3.0pc/day | | 893 |

(3)Testing

| | | | | |
|---|---|---|---|---|
| Common Labour | No./day | 7 | 15 | 105 |
| Testing Equipmen | No./day | 1 | | 200 |
| Sum | | | | 305 |
| per piece | | 8.5pc/day | | 36 |

## A-2 Flow Velocity Analysis of Pipeline

The most economical velocity of the pipeline will minimize the total amount of the pipeline construction and pump operation.

The analysis was made in case of ALT-37 to 40 on the route of B and C-2, which were expected to be the most promising route, with the pipeline length of 12.6km. In the analysis, the capital recovery factor is adopted to the annual cost calculation of the pipeline and pumping station constructions. Total annual cost is obtained by the sum of annual pump operation cost and construction cost.

The capital recovery factor(C.R.F) and annual construction cost are calculated as follows:

$$C.R.F = \frac{i(1+i)n}{(1+i)n - 1}$$

Annual Construction Cost = C.R.F x (Construction Cost)
Total Annual Cost = Annual Construction Cost + Operation Cost

Where, i : Interest rate, 12 % is assumed.
n : Useful lives in year, pipeline 50 yr
pumping station 25 yr

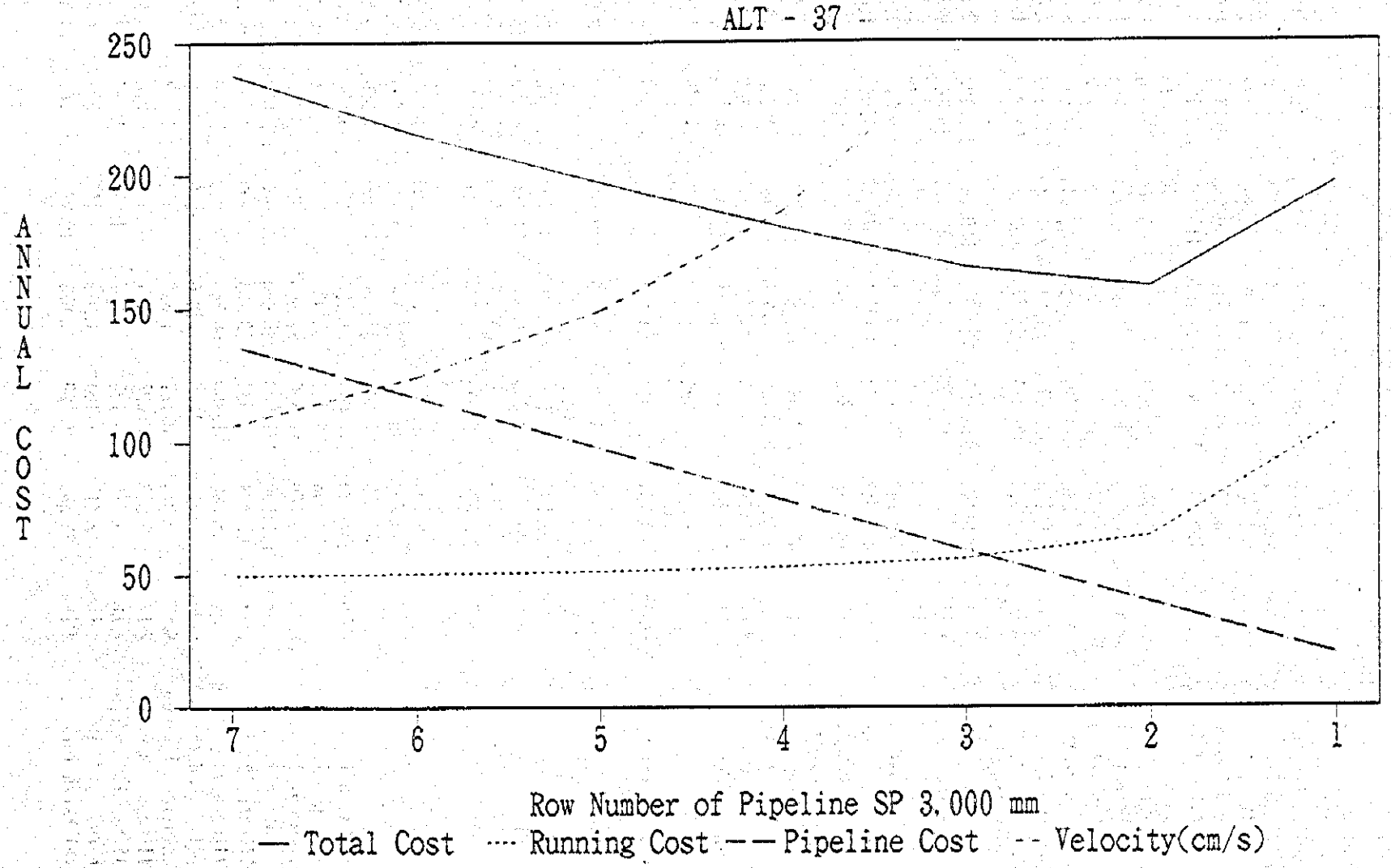
The calculation results are as follows:

Table A-6 : ALT-37, Steel Pipe Dia. 3,000 mm
Figure A-2 : ALT-37, Optimum velocity of Steel Pipe

**Table A-6** Flow Velocity Analysis of the Steel Pipe Dia. 3,000 mm ( ALT-37 : Route C-2)

| Item | Unit | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (1) Electric Cost | | | | | | | | |
| Pipe Diameter | mm | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Pipeline Length | Km/Row | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 |
| No. of Pipeline | Row | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Velocity in the Pipe | m/S | 1.064 | 1.242 | 1.490 | 1.862 | 2.483 | 3.725 | 7.450 |
| Pipe Head Loss(C=130) | m | 3.439 | 4.575 | 6.410 | 9.685 | 16.491 | 34.916 | 125.871 |
| Total Pump Lift | m | 109.069 | 110.205 | 112.040 | 115.315 | 122.121 | 140.546 | 231.501 |
| No. of Unit | No. | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Discharge/Unit | m3/S | 5.266 | 5.266 | 5.266 | 5.266 | 5.266 | 5.266 | 5.266 |
| Motor Output | KW/No. | 6,880 | 6,951 | 7,067 | 7,274 | 7,703 | 8,865 | 14,602 |
| Water Quantity/Yr | MCM/Yr | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| Operation Hr/Yr/No | Hr/Yr/No | 3,640 | 3,640 | 3,640 | 3,640 | 3,640 | 3,640 | 3,640 |
| Elec. Consump. | MWH | 250,395 | 253,001 | 257,214 | 264,734 | 280,359 | 322,656 | 531,466 |
| Elec. Cost | M.LE | 49.954 | 50.474 | 51.314 | 52.814 | 55.932 | 64.370 | 106.027 |
| (2) Pipeline Cost | | | | | | | | |
| Pipe Cost(11,910LE/m) | M.LE | 1,050.462 | 900.396 | 750.330 | 600.264 | 450.198 | 300.132 | 150.066 |
| Earth Work | M.LE | 26.583 | 24.129 | 21.675 | 19.221 | 16.767 | 14.313 | 0.842 |
| Others (5%) | M.LE | 53.852 | 46.226 | 38.600 | 30.974 | 23.348 | 15.722 | 7.545 |
| Pipeline Cost | M.LE | 1,130.898 | 970.752 | 810.606 | 650.460 | 490.314 | 330.168 | 158.453 |
| C.R.F(N=50, i=12%) | | 0.12042 | 0.12042 | 0.12042 | 0.12042 | 0.12042 | 0.12042 | 0.12042 |
| Pipeline Annu. Cost | M.LE | 136.179 | 116.895 | 97.610 | 78.326 | 59.042 | 39.758 | 19.080 |
| (3) Pump Station | | | | | | | | |
| Pump Station | M.LE | 405.573 | 374.980 | 377.827 | 382.909 | 393.467 | 422.048 | 563.147 |
| C.R.F(N=25, i=12%) | | 0.12750 | 0.12750 | 0.12750 | 0.12750 | 0.12750 | 0.12750 | 0.12750 |
| PS Annual Cost | M.LE | 51.711 | 47.810 | 48.173 | 48.821 | 50.167 | 53.811 | 71.801 |
| (4) Total Cost | M.LE | 237.843 | 215.178 | 197.098 | 179.961 | 165.140 | 157.939 | 196.909 |
| Ratio | | 1.440 | 1.303 | 1.248 | 1.139 | 1.046 | 1.000 | 1.247 |
| Pipeline Unit Cost | M.LE/Km | 89.754 | 77.044 | 64.334 | 51.624 | 38.914 | 26.204 | 12.576 |
| Earth Work | | | | | | | | |
| D1 | m | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| N1 | Nos. | 4 | 3 | 3 | 2 | 1 | 1 | 0 |
| B1 | m | 25.500 | 19.500 | 19.500 | 13.500 | 7.500 | 7.500 | 0.000 |
| C1 | m | 36.300 | 30.300 | 30.300 | 24.300 | 18.300 | 18.300 | 0.000 |
| W1 | m | 43.500 | 37.500 | 37.500 | 31.500 | 25.500 | 25.500 | 0.000 |
| D2 | m | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.000 |
| N2 | Nos. | 3 | 3 | 2 | 2 | 2 | 1 | 1 |
| B2 | m | 19.500 | 19.500 | 13.500 | 13.500 | 13.500 | 7.500 | 0.000 |
| C2 | m | 30.300 | 30.300 | 24.300 | 24.300 | 24.300 | 18.300 | 1.800 |
| W2 | m | 37.500 | 37.500 | 31.500 | 31.500 | 31.500 | 25.500 | 9.000 |
| Excavation 1 | cum/m | 207.000 | 171.000 | 171.000 | 135.000 | 99.000 | 99.000 | 0.000 |
| Fill(manu) 1 | cum/m | 82.966 | 68.434 | 68.434 | 53.903 | 39.371 | 39.371 | 0.000 |
| Fill(machi)1 | cum/m | 95.760 | 81.360 | 81.360 | 66.960 | 52.560 | 52.560 | 0.000 |
| Excavation 2 | cum/m | 171.000 | 171.000 | 135.000 | 135.000 | 135.000 | 99.000 | 13.500 |
| Fill(manu) 2 | cum/m | 68.434 | 68.434 | 53.903 | 53.903 | 53.903 | 39.371 | 0.540 |
| Fill(machi)2 | cum/m | 81.360 | 81.360 | 66.960 | 66.960 | 66.960 | 52.560 | 12.960 |
| Pipeline Length | Km/Row | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 |
| Excavation 1.9/cum | M.LE | 9.049 | 8.187 | 7.326 | 6.464 | 5.602 | 4.740 | 0.323 |
| Fill(manu) 5.0/cum | M.LE | 9.538 | 8.623 | 7.707 | 6.792 | 5.876 | 4.961 | 0.034 |
| Fill(machi) 2.5/cum | M.LE | 5.579 | 5.126 | 4.672 | 4.218 | 3.765 | 3.311 | 0.408 |
| Others 10% | M.LE | 2.417 | 2.194 | 1.970 | 1.747 | 1.524 | 1.301 | 0.077 |
| Total Earth Work | M.LE | 26.583 | 24.129 | 21.675 | 19.221 | 16.767 | 14.313 | 0.842 |

Figure A-2 Optimum Velocity of SP



## A-3 Design of Box Culvert Canal

The flow velocity in the culvert is designed with 1.2 times as fast as that of the open canal upstream to prevent from the sedimentation of sand.

The water depth of the culvert is designed the same with that of the open canal upstream and 4 rows of the box culvert type are adopted.

Results of the design are shown as follows:

Table A-7 : Hydraulic Dimension of the Proposed Open Canal and Box Culvert
Figure A-3 : Typical Section of the Box Culvert
Table A-8 : Box Culvert Unit Cost

## Table A-7 Hydraulic Dimension of the Proposed Open Canal & Box Culvert

| | | | Open Canal | Box Culvert |
|---|---|---|---|---|
| Water Depth | h | m | 3.305 | 3.300 |
| Bottom Width | B | m | 12.000 | 3.800 |
| Side Slope | 1:m | - | 2.000 | 0.000 |
| Flow Area | A | sqm | 61.506 | 12.540 |
| Wetted Perimeter | P | m | 26.780 | 10.400 |
| Hydraulic Depth | R | m | 2.297 | 1.206 |
| Manning "n" | 1/n | - | 55.000 | 67.000 |
| Bed Slope | I | - | 8.00E-05 | 1.91E-04 |
| Velocity | V | m/s | 0.856 | 1.050 |
| Velo. Ratio | Vcul/Vbox | - | (1.000) | 1.226 |
| Discharge | QQ | cum/s | 52.670 | 13.165 |
| Design Discharge | Q | cum/s | 52.660 | 13.165 x 4 |
| Critical F. Dep. | Dc | m | 1.170 | 1.069 |
| Critical F. Vel. | Vc | m/s | 3.139 | 3.240 |
| Max. Velocity | 2/3Vc | m/s | 2.092 | 2.160 |
| Free Board | Fb | m | 0.350 | 0.500 |
| Culvert Height | H=h+Fb | m | - | 3.800 |
| Culvert Dimens. | BxHxN | | 12mx3.65m | 3.8mx3.8m x 4 |

## BOX CULVERT TYPICAL SECTION

| HYDRAULIC CONDITION | | | |
|---|---|---|---|
| DESIGN DISCHARGE | Q | = 52.66 | CUM/S |
| HYDRAULIC GRADIENT | S | = 19.1 | CM/KM |
| FLOW VEROCITY | V | = 1.050 | M/S |
| FLOW DEPTH | H | = 3.300 | M |
| FREE BOARD | Fb | = 0.50 | M |
| CULVERT DIMENSION | W3.80M x H3.80M x 4 ROWS | | |

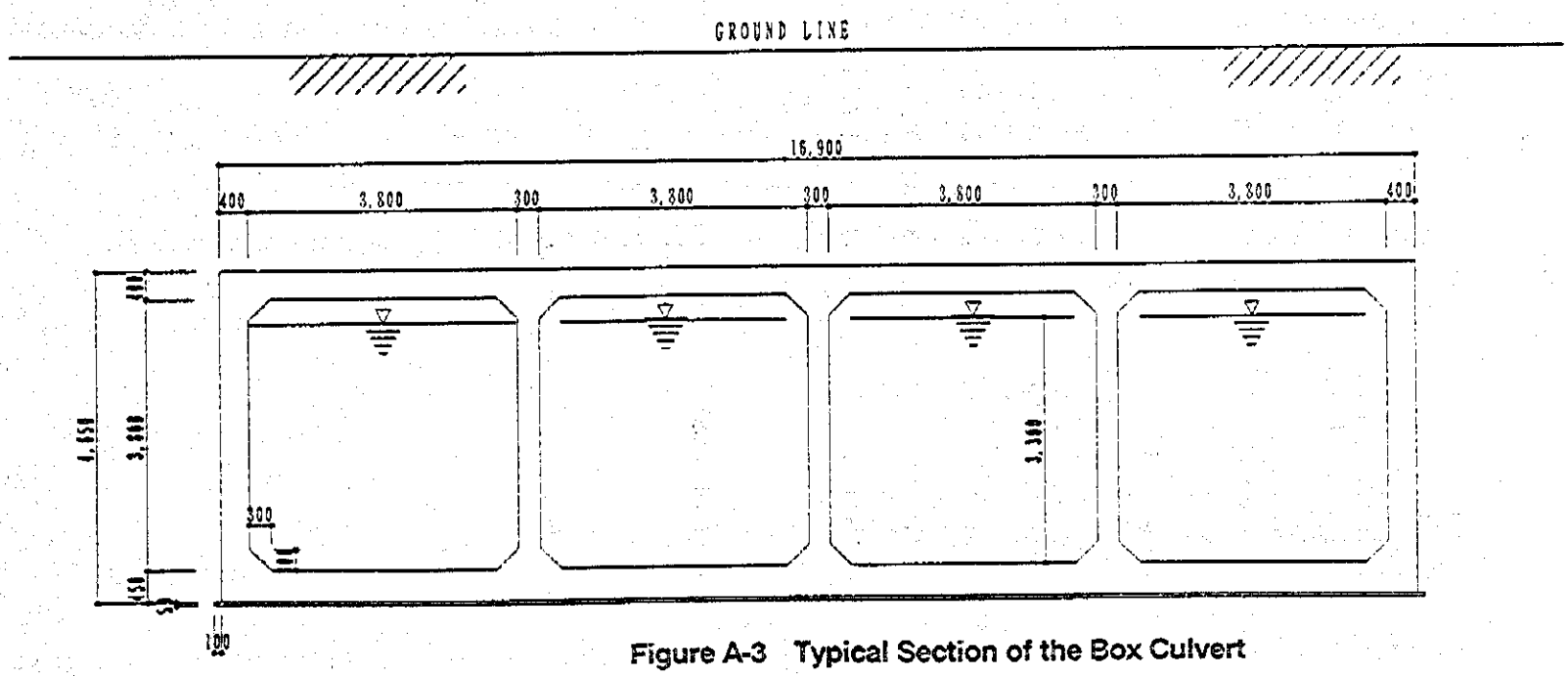



Figure A-3 Typical Section of the Box Culvert

## Table A-8 Box Culvert Unit Cost

| Item | Unit | Unit Cost (LE) | Q'ty | Amount (LE) |
|---|---|---|---|---|
| Excavation | cum | 2.15 | 95.7 | 205.8 |
| Backfill | cum | 2.60 | 56.0 | 145.6 |
| Embankment | cum | 2.60 | 99.8 | 259.5 |
| Soil Transportation | cum | 3.15 | 99.8 | 314.4 |
| Gravel & Soil Mixture | cum | 16.00 | 2.5 | 40.0 |
| Mortared Riprap(0.3m) | cum | 80.00 | 6.0 | 480.0 |
| Reinforced Conc. | cum | 850 | 21.55 | 18,317.5 |
| Re-bar(80 kg cum) | ton | (3,000) | (1.72) | (5,160.0) |
| Lean Conc. | cum | 200 | 0.86 | 172.0 |
| Others | L.S. | 20% | | 3,986.9 |
| Total per meter | LE/m | | | 23,921.6 |
| Say | LE/m | | | 24,000.0 |

Quantity Calculation

| | | | |
|---|---|---|---|
| Excavation | 1/2x(10.45+21.45)x6.0 x2 x 0.5m | = | 95.7 cum |
| Backfill | (191.4-8.45x4.70x2)x 0.5 | = | 56.0 cum |
| Embankment | ((20+44)/2x6.0-4.7x16.9)x 0.5 | = | 26.3 cum |
| | (49x6.0/2) x 0.5 | = | 73.5 cum |
| | Sum | | 99.8 cum |
| Reinforced Conc. | 16.90x4.65 | = | 78.59 |
| | -3.80x3.80x4 | = | -57.76 |
| | 1/2x0.3x0.3x4x4 | = | 0.72 |
| | Sum | | 21.55 cum |
| Lean Conc. | 0.05x17.10 | = | 0.86 cum |

## A-4 Alternative : DWL of 100 m

Table A-9 Construction and O & M Cost of the Case 100 m

| 1. Construction Cost | | | Cost |
|---|---|---|---|
| No. 7 Pumping Station | | | |
| Total Head | m | 105.32 | |
| Construction Cost | M.LE | | 367.40 |
| Open Canal | | | |
| Length | Km | 22.00 | |
| Construction Cost | M.LE | | 110.00 |
| Box Culvert | | | |
| Length | Km | 7.80 | |
| Construction Cost | M.LE | | 187.20 |
| Pipeline | | | |
| Length | Km | 12.60 | |
| Construction Cost | M.LE | | 650.46 |
| Booster Pumping Station | | | |
| Construction Cost | M.LE | | 119.65 |
| Electric Transmission Line | | | |
| Length | Km | 4.00 | |
| Construction Cost | M.LE | | 2.20 |
| Total | | | |
| Canal Length | Km | 42.40 | |
| Construction Cost | M.LE | | 1,436.91 |
| 2. Operation & Maintenance Cost | | | |
| No. 7 Pumping Station | | | |
| Total Head | m | 105.32 | |
| Total Dischargec | m3/s | 52.66 | |
| Total Motor Output | KW | 66,430.57 | |
| Annual Discharge Amount | MCM | 690.00 | |
| Annual Operation Hour | Hr | 3,639.70 | |
| Annual Operation Cost | 1000LE | | 45,939.6 |
| Annual Maintenance Cost | 1000LE | | 2,204.4 |
| Annual Operator Cost | 1000LE | | 87.6 |
| Annual Total O & M Cost | 1000LE | | 48,231.6 |
| Canal Maintenance Cost | | | |
| Pipeline | 1000LE | | 520.4 |
| Open Canal | 1000LE | | 220.0 |
| Box Culvert | 1000LE | | 149.8 |
| Patrol & Inspection | 1000LE | | 69.6 |
| Total | 1000LE | | 959.8 |
| Electric Transmission | | | |
| Maintenance Cost | 1000LE | | 1.8 |
| Booster Pumping Station | | | |
| Annual Operation Cost | 1000LE | | 2,294.0 |
| Annual Maintenance Cost | 1000LE | | 787.9 |
| Annual Total O & M Cost | 1000LE | | 3,081.9 |
| Total Operation & Maintenance Cost | 1000LE | | 52,275.1 |

## Table A-10 Booster Pump Facility Cost in the Study Area for WL 100m

| Description | Unit | No. 1 BP. ST | No. 2 BP. ST | TOTAL |
|---|---|---|---|---|
| (1) Dimension | | | | |
| Location | km | 4.5 | 14.0 | |
| Command Area | Feddan | 1,840 | 33,900 | 35,740 |
| Discharge | cum/s | 0.718 | 13.224 | 13.942 |
| Suction WL | m | 96.95 | 96.86 | |
| Discharge WL | m | 113.50 | 113.50 | |
| Pipeline | | | | |
| Length | km | 0.4 | 1.0 | 1.4 |
| Pipe | | S.P. | S.P. | |
| Diameter | mm | 900 | 2,000 | |
| Raw | Nos. | 1 | 3 | |
| Velocity | m/s | 1.128 | 1.403 | |
| Loss Head | m | 0.498 | 0.732 | |
| Pump | | | | |
| Actual Head | m | 16.55 | 16.64 | |
| Loss Head in PS | m | 1.5 | 1.5 | |
| Loss Head in PL | m | 0.498 | 0.732 | |
| Total Pump Head | m | 18.548 | 18.872 | |
| Number of Unit | Nos. | 2 + (1) | 4 + (1) | |
| Bore | mm | 400 x 350 | 1,200 x 900 | |
| Pump Efficiency | % | 76 | 86 | |
| Total Motor Output | KW | 188.8 | 3,128.2 | 3,317.0 |
| Pump House | m x m | 25 x 8.0 | 52 x 18.0 | |
| Elec. Transmis. Line | Km | (Included to the Water Conveyance Canal) | | |
| (2) Annual Op. Cost | | | | |
| Annual Quantity | MCM | 9.4 | 173.3 | 182.7 |
| Annual Op. Hour | Hr | 3,640 | 3,640 | |
| Elect. Consump. | MWH | 687 | 11,385 | 12,072 |
| Annual Op. Cost | 1000LE | 131 | 2,163 | 2,294 |
| Maintenance Cost | 1000LE | 191 | 597 | 788 |
| Annual O/M Cost | 1000LE | 322 | 2,760 | 3,082 |
| (3) Costruction Cost | | | | |
| Pump. Equ. Const. | | | | |
| Pump | 1000LE | 1,290 | 11,290 | |
| Motor | 1000LE | 1,290 | 6,774 | |
| Valve | 1000LE | 645 | 9,677 | |
| Others(Pipe, Crane) | 1000LE | 1,290 | 9,677 | |
| Elec. Panel | 1000LE | 3,871 | 17,742 | |
| Sub-total | 1000LE | 8,387 | 55,161 | |
| Installation(15%) | 1000LE | 1,258 | 8,274 | |
| Sub-station | 1000LE | 5,161 | 9,677 | |
| Total | 1000LE | 14,806 | 73,113 | 87,919 |
| BP. ST. Civil Const. | 1000LE | 2,170 | 7,420 | 9,590 |
| BP. ST. Build. Const. | 1000LE | 120 | 562 | 682 |
| Elec. Transmis. Cost | 1000LE | (Included to the Water Conveyance Canal) | | |
| Pipeline Const. | 1000LE | 500 | 15,600 | 16,100 |
| Suction Reserv. | 1000LE | 138 | 2,539 | 2,677 |
| Discharge Reserv. | 1000LE | 138 | 2,539 | 2,677 |
| Total Const. Cost | 1000LE | 17,872 | 101,773 | 119,645 |

## Table A-11 Civil Works for Booster Pump (Case 100 m)

| NAME | | BP No. 1 | BP No. 2 |
|---|---|---|---|
| No. of Unit | Nos. | H 2+(1) | H 4+(1) |
| Total Lift | m | H = 18.6 m | H = 18.9 m |
| W | m | 8.00 | 18.00 |
| L | m | 25.00 | 52.00 |
| H1 | m | 4.00 | 7.00 |
| H2 | m | 5.00 | 7.00 |
| 1. Conc | | | |
| Wall | cum | 79.20 | 568.40 |
| Base | cum | 200.00 | 1,123.20 |
| S. Base | cum | 260.00 | 780.00 |
| S. Wall | cum | 376.32 | 835.20 |
| S. Topslab | cum | 68.00 | 220.00 |
| O.p | cum | 43.04 | 193.33 |
| Gallery | cum | 67.50 | 162.75 |
| Sum | cum | 1,094.06 | 3,882.88 |
| 2. Second. Co | cum | - | - |
| 3. Earth Work | | | |
| Excav. | cum | 5,104.50 | 20,984.25 |
| Disposal | cum | 2,575.00 | 12,244.00 |
| Backfill | cum | 2,529.50 | 8,740.25 |
| Embank. | cum | 4,800.00 | 18,300.00 |
| 4. Foundation | | | |
| Pile in site (D 0.8 x 30m) | | 53 | 161 |

Cost Estimation( M.LE )

| | | | |
|---|---|---|---|
| (1) Conc. | 850 | 0.93 | 3.30 |
| (2) Earth Works | | | |
| Exca. | 2.15 | 0.01 | 0.05 |
| Backfill | 2.60 | 0.01 | 0.02 |
| Disposal | 3.15 | 0.01 | 0.04 |
| Embankment/Grading | 16.00 | 0.08 | 0.29 |
| (3) Foundation | 9,000 | 0.47 | 1.45 |
| (4) Sum | | 1.50 | 5.15 |
| (5) Others(20%) | | 0.30 | 1.03 |
| (6) Sub-total | | 1.81 | 6.18 |
| (7) Accomodation Cost(20%) | | 0.36 | 1.24 |
| (8) Total | | 2.17 | 7.42 |

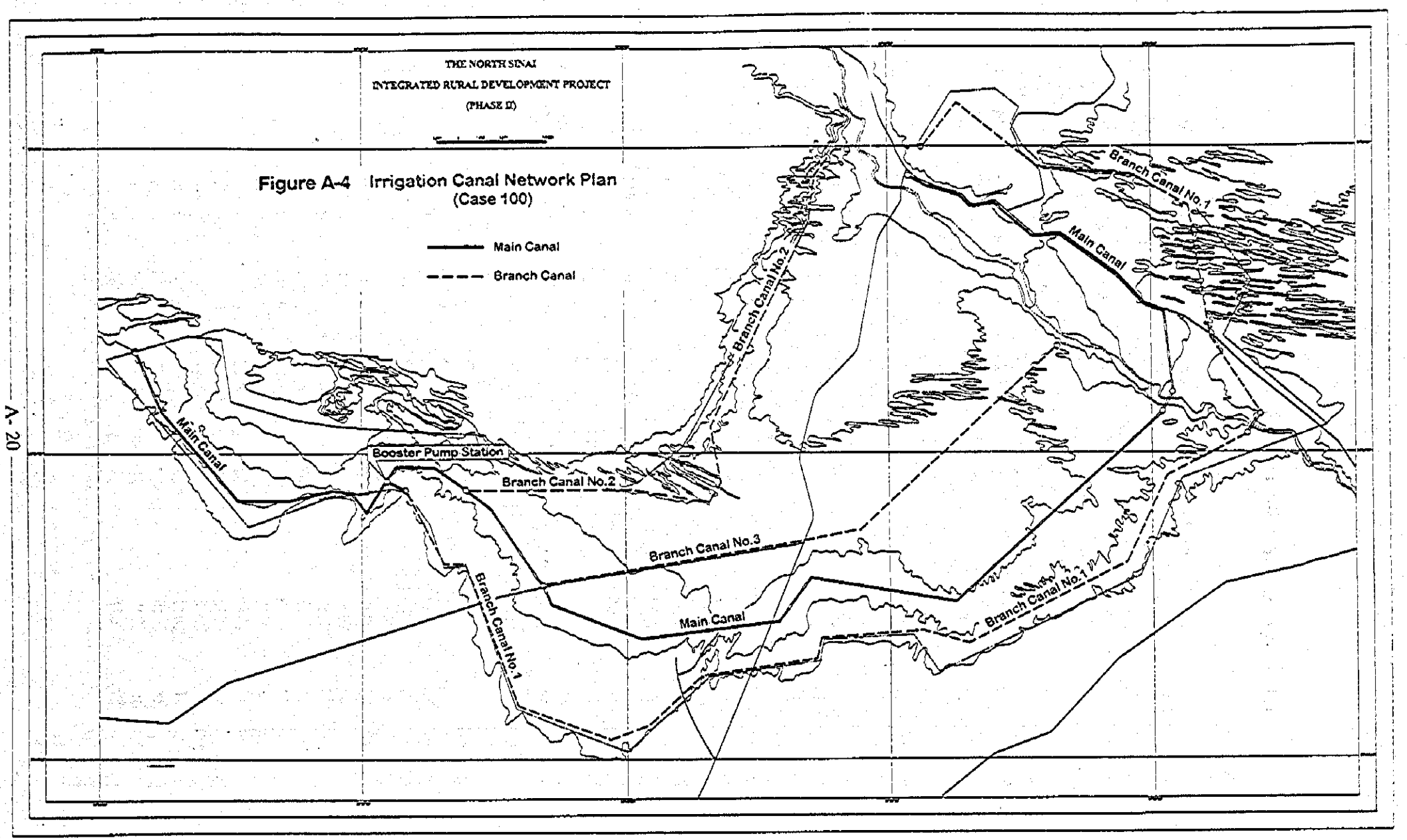
**Table A-12 Annual Maintenance Cost of the Booster Pump Facilities**

| Item | Unit | No. 1 BP. ST | No. 2 BP. ST | TOTAL |
|---|---|---|---|---|
| Operators (4ps3shft/d/PS) | 1000LE | 87.6 | 87.6 | 175.2 |
| BPS Maint. (15%/25Yr) | 1000LE | 102.6 | 486.6 | 589.1 |
| Pipeline ( 4%/50Yr) | 1000LE | 0.4 | 12.5 | 12.9 |
| Reservoir (10% 50Yr) | 1000LE | 0.6 | 10.2 | 10.7 |
| Total | 1000LE | 191.1 | 596.8 | 787.9 |

## Table A-13 Calculation of Net Present Value (ALT-100m)

ALT - 100m ( Unit: M.LE )

| Year | | Cost | | | Discount Rate | Net Present Value | Remarks |
|---|---|---|---|---|---|---|---|
| Proj. Year | A.D. | Invest. Cost | Operat. Cost | Total Cost | | | |
| | | 1,436.91 | 52.28 | | Interest | I = 12% | |
| 1 | 1998 | 215.54 | | 215.54 | 1.000 | 215.537 | Cx15% |
| 2 | 1999 | 431.07 | | 431.07 | 0.893 | 384.887 | Cx30% |
| 3 | 2000 | 431.07 | | 431.07 | 0.797 | 343.649 | Cx30% |
| 4 | 2001 | 359.23 | | 359.23 | 0.712 | 255.691 | Cx25% |
| 5 | 2002 | | 52.28 | 52.28 | 0.636 | 33.225 | OMx100% |
| 6 | 2003 | | 52.28 | 52.28 | 0.567 | 29.665 | OMx100% |
| 7 | 2004 | | 52.28 | 52.28 | 0.507 | 26.487 | OMx100% |
| 8 | 2005 | | 52.28 | 52.28 | 0.452 | 23.649 | OMx100% |
| 9 | 2006 | | 52.28 | 52.28 | 0.404 | 21.115 | |
| 10 | 2007 | | 52.28 | 52.28 | 0.361 | 18.853 | |
| 11 | 2008 | | 52.28 | 52.28 | 0.322 | 16.833 | |
| 12 | 2009 | | 52.28 | 52.28 | 0.287 | 15.029 | |
| 13 | 2010 | | 52.28 | 52.28 | 0.257 | 13.419 | |
| 14 | 2011 | | 52.28 | 52.28 | 0.229 | 11.981 | |
| 15 | 2012 | | 52.28 | 52.28 | 0.205 | 10.698 | |
| 16 | 2013 | | 52.28 | 52.28 | 0.183 | 9.551 | |
| 17 | 2014 | | 52.28 | 52.28 | 0.163 | 8.528 | |
| 18 | 2015 | | 52.28 | 52.28 | 0.146 | 7.614 | |
| 19 | 2016 | | 52.28 | 52.28 | 0.130 | 6.798 | |
| 20 | 2017 | | 52.28 | 52.28 | 0.116 | 6.070 | |
| 21 | 2018 | | 52.28 | 52.28 | 0.104 | 5.420 | |
| 22 | 2019 | | 52.28 | 52.28 | 0.093 | 4.839 | |
| 23 | 2020 | | 52.28 | 52.28 | 0.083 | 4.321 | |
| 24 | 2021 | | 52.28 | 52.28 | 0.074 | 3.858 | |
| 25 | 2022 | | 52.28 | 52.28 | 0.066 | 3.444 | |
| 26 | 2023 | | 52.28 | 52.28 | 0.059 | 3.075 | |
| 27 | 2024 | | 52.28 | 52.28 | 0.053 | 2.746 | |
| 28 | 2025 | | 52.28 | 52.28 | 0.047 | 2.452 | (Pump replace) |
| 29 | 2026 | 372.47 | 52.28 | 424.75 | 0.042 | 17.784 | PS.C x 80% |
| 30 | 2027 | | 52.28 | 52.28 | 0.037 | 1.954 | |
| 31 | 2028 | | 52.28 | 52.28 | 0.033 | 1.745 | |
| 32 | 2029 | | 52.28 | 52.28 | 0.030 | 1.558 | |
| 33 | 2030 | | 52.28 | 52.28 | 0.027 | 1.391 | |
| 34 | 2031 | | 52.28 | 52.28 | 0.024 | 1.242 | |
| 35 | 2032 | | 52.28 | 52.28 | 0.021 | 1.109 | |
| 36 | 2033 | | 52.28 | 52.28 | 0.019 | 0.990 | |
| 37 | 2034 | | 52.28 | 52.28 | 0.017 | 0.884 | |
| 38 | 2035 | | 52.28 | 52.28 | 0.015 | 0.789 | |
| 39 | 2036 | | 52.28 | 52.28 | 0.013 | 0.705 | |
| 40 | 2037 | | 52.28 | 52.28 | 0.012 | 0.629 | |
| 41 | 2038 | | 52.28 | 52.28 | 0.011 | 0.562 | |
| 42 | 2039 | | 52.28 | 52.28 | 0.010 | 0.502 | |
| 43 | 2040 | | 52.28 | 52.28 | 0.009 | 0.448 | |
| 44 | 2041 | | 52.28 | 52.28 | 0.008 | 0.400 | |
| 45 | 2042 | | 52.28 | 52.28 | 0.007 | 0.357 | |
| 46 | 2043 | | 52.28 | 52.28 | 0.006 | 0.319 | |
| 47 | 2044 | | 52.28 | 52.28 | 0.005 | 0.285 | |
| 48 | 2045 | | 52.28 | 52.28 | 0.005 | 0.254 | |
| 49 | 2046 | | 52.28 | 52.28 | 0.004 | 0.227 | |
| 50 | 2047 | | 52.28 | 52.28 | 0.004 | 0.203 | |
| Total | | 1,809.38 | 2,404.88 | 4,214.26 | 9.301 | 1,523.769 | |


THE NORTH SINAI
INTEGRATED RURAL DEVELOPMENT PROJECT
(PHASE II)
Figure A-4 Irrigation Canal Network Plan
(Case 100)
Main Canal
Branch Canal
Main Canal
Booster Pump Station
Branch Canal No.2
Branch Canal No.3
Branch Canal No.1
Main Canal
Branch Canal No.1
Branch Canal No.2
Main Canal
Branch Canal No.1

# APPENDIX B

# AGRICULTURE AND AGRO-PROCESSING

LIST OF TABLES

Table B- 1 Proposed Cropping area on farming Type

(Unit: Thousand feddan)

| Group Crops | Crops | Small Farmer | Graduate | | Small Investor | | Large Investor | | | | | Group Crops ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Vegeta. + Livestock | Vegeta. + Fruit | Beef Cattle + vegeta. | Fruit + vegeta. | Land Use Crops | Dairy Cattle | Beef Cattle | Fruit | Total | |
| Cereals | Wheat | 1.67 | | | | | 4.14 | 4.14 | 4.14 | | 14.09 | 25% |
| | Maize | | | | | | 4.14 | 8.28 | 8.28 | | 20.70 | |
| | Barley | | | | 2.08 | | 4.14 | 4.14 | 4.14 | | 14.50 | |
| Fodder | Sorghum | 4.16 | 1.39 | | 2.08 | | | 8.28 | 8.28 | | 24.19 | 24% |
| | Berseem/Long | | | | | | | | 4.14 | | 4.14 | |
| | Berseem/Short | 2.50 | 1.39 | | 2.08 | | | 4.14 | 4.14 | | 14.24 | |
| | Fodderbeet | | | | | | | 4.14 | | | 4.14 | |
| Oil Crops | Soybean | | | | 2.08 | 0.83 | 4.14 | | | | 7.05 | 6% |
| | Sesame | | | | | 0.83 | 4.14 | | | | 4.97 | |
| Pulse | Brord bean | 4.16 | 1.39 | 1.39 | | | | | | | 6.94 | 3% |
| Vegeta-bles | Tomato/fresh | 4.16 | 1.39 | 1.39 | | | | | | | 6.94 | 27% |
| | Tomato/process | | | | 2.08 | 0.83 | | | | | 2.91 | |
| | Cantaloupe | 4.16 | 1.39 | 1.39 | | | | | | | 6.94 | |
| | Water melon | 4.16 | | | | | | | | | 4.16 | |
| | Squash | | 1.39 | 1.39 | | | | | | | 2.78 | |
| | Green pepper | 4.16 | 1.39 | 1.39 | | | | | | | 6.94 | |
| | Cabbage | | | | 2.08 | 1.66 | 4.14 | | | | 7.88 | |
| | Poteto | | | | 2.08 | 0.83 | 4.14 | | | | 7.05 | |
| | Onion | | | | 2.08 | 1.66 | 4.14 | | | | 7.88 | |
| Medical Pl. | Cumin | 4.16 | 1.39 | 1.39 | | | | | | | 6.94 | 3% |
| Fruits | Almond | | | | | | | | | 4.14 | 4.14 | 12% |
| | Peach | | | 1.39 | | | | | | | 1.39 | |
| | Grape | | | | | 1.66 | | | | 4.14 | 5.80 | |
| | Olive | | | | | 1.66 | | | | 4.14 | 5.80 | |
| | Orange | | | | | 1.66 | | | | 4.14 | 5.80 | |
| Total Cropped Area | | 33.30 | 11.10 | 9.71 | 16.60 | 11.62 | 33.12 | 33.12 | 33.12 | 16.56 | 198.25 | 100% |
| Cultivable Area | | 16.7 | 5.6 | 5.6 | 8.3 | 8.3 | 16.6 | 16.6 | 16.6 | 16.6 | 110.6 | - |
| No. of households | | 1665 | 555 | 555 | 83 | 83 | 23 | 23 | 23 | 23 | 3033 | - |

Table B-2 Proposed Target Yield and Production

| Crops Group | Kind of Crops | Target Yield (ton/fed) | Planted Area (1000fed) | Production (1000ton) |
|---|---|---|---|---|
| Cereals | Wheat | 2.5 | 14.09 | 35.2 |
| | Maize | 2.7 | 20.70 | 55.9 |
| | Barley | 1.5 | 14.50 | 21.7 |
| Fodder | Sorghum | 18.0 | 24.19 | 435.3 |
| | Berseem(Long season) | 25.0 | 4.14 | 103.5 |
| | Berseem(Short season) | 16.5 | 14.24 | 235.0 |
| | Fodder beet | 50.0 | 4.14 | 207.0 |
| Oil crops | Soybean | 1.2 | 7.05 | 8.5 |
| | Sesame | 0.7 | 4.97 | 3.5 |
| Pulse | Broud bean | 1.2 | 6.94 | 8.3 |
| Vegetables | Tomato(Fresh)#1) | 40.0 | 6.94 | 277.5 |
| | Tomato(Processing)#2) | 25.0 | 2.91 | 72.6 |
| | Cantaloupe #2) | 10.0 | 6.94 | 69.4 |
| | Water melon #2) | 10.0 | 4.16 | 41.6 |
| | Squash | 8.0 | 2.78 | 22.2 |
| | Green pepper | 7.0 | 6.94 | 48.6 |
| | Cabbage | 20.0 | 7.88 | 157.5 |
| | Poteto | 12.0 | 7.05 | 84.5 |
| | Onion | 10.8 | 7.88 | 85.1 |
| Medical plant | Cumin | 1.1 | 6.94 | 7.6 |
| Fruits | Almond | 5.0 | 4.14 | 20.7 |
| | Peach | 7.3 | 1.39 | 10.1 |
| | Grape | 8.1 | 5.80 | 47.0 |
| | Olive | 7.0 | 5.80 | 40.6 |
| | Orange | 7.4 | 5.80 | 42.9 |
| | Total | | 198.25 | |

Note: #1 Planting by under plastic tunnels
#2 Nursery by the vinil house and planting by open cultivation.

Table B-3 Proposed Time Schedule to Build up Development

(Unit: ton/feddan)

| | 1 st Stage | | | 2 nd stage | | | | | 3rd Stage |
|---|---|---|---|---|---|---|---|---|---|
| Crops | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Wheat | 1.3 | 1.4 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 | 2.5 | 2.5 |
| Maize | 1.4 | 1.6 | 2.2 | 2.4 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Barley | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Sorghum | 10.8 | 14.4 | 16.2 | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 |
| Berseem/Long | 12.5 | 15.0 | 17.5 | 20.0 | 22.5 | 25.0 | 25.0 | 25.0 | 25.0 |
| Berseem/Short | 8.3 | 9.9 | 11.6 | 13.2 | 14.9 | 16.5 | 16.5 | 16.5 | 16.5 |
| Fodderbeet | 20.0 | 25.0 | 37.5 | 45.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| Soybean | 0.6 | 0.7 | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 | 1.2 | 1.2 |
| Sesame | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 |
| Broadbean | 0.6 | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Tomato/fresh | 20.0 | 26.0 | 32.0 | 36.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 |
| Tomato/process | 12.5 | 16.3 | 20.0 | 22.5 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| Cantaloupe | 5.0 | 6.5 | 8.0 | 9.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Water melon | 5.0 | 6.5 | 8.0 | 9.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Squash | 4.0 | 5.2 | 6.4 | 7.2 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Green pepper | 3.5 | 4.6 | 5.6 | 6.3 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Cabbage | 12.0 | 13.0 | 16.0 | 18.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Poteto | 7.2 | 7.8 | 9.6 | 10.8 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| Onion | 6.5 | 7.0 | 7.6 | 8.6 | 9.7 | 10.8 | 10.8 | 10.8 | 10.8 |
| Cumin | 0.4 | 0.6 | 0.7 | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.1 |
| Almond | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |
| Peach | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 2.9 | 4.4 | 5.8 | 7.3 |
| Grape | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 3.2 | 4.9 | 6.5 | 8.1 |
| Olive | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 2.8 | 4.2 | 5.6 | 7.0 |
| Orange | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 3.0 | 4.4 | 5.9 | 7.4 |

Table B-4 Chemical Composition of Crops

| Kaind of Crops | Moisture (%) | DCP (%) | SE (%) | Fibers (%) |
|---|---|---|---|---|
| Berseem(Avg) | 84.3 | 1.9 | 7.9 | 4.0 |
| 1st cutting | 88.3 | 1.8 | 6.3 | 2.5 |
| 2nd cutting | 85.2 | 2.6 | 7.8 | 3.9 |
| 3rd cutting | 80.5 | 2.0 | 9.6 | 6.1 |
| Hay of Berseem | 8.8 | 7.5 | 35.2 | 34.9 |
| Sorghum | 80.5 | 0.4 | 11.1 | 6.0 |
| Fodder beet | 86.5 | 0.8 | - | 0.9 |
| Maize leaves | 9.6 | 5.9 | 81.8 | 20.3 |
| Wheat Straw | 6.9 | 0.5 | 23.0 | 36.9 |
| Barley Straw | 7.2 | 0.5 | 24.0 | 37.0 |
| Olive Cake | 38.0 | 15.0 | 42.0 | - |

Note: DCP: Digestible crude Protein
SE : Starch Equivalent

Table B-5 Proposed Feeding Troughout the Year by Farm house hold

| Farming | Forage Crops | Fodder Production (ton) | DCP (%) | DCP Production (kg) | Per head Rearing day (day) | Rearing head for Year (head) | Rearing Variety |
|---|---|---|---|---|---|---|---|
| Small Farmer | Sorghum | 45 | 1.10 | 495 | 1,053 | | |
| | Berseem(S) | 25 | 2.13 | 527 | 1,122 | | |
| | Wheat straw | 3 | 0.30 | 8 | 16 | | |
| | Sub-total | | | 1,030 | 2,191 | 6 | Baladi |
| Graduate | Sorghum | 45 | 1.10 | 495 | 1,053 | | |
| | Berseem(S) | 41 | 2.13 | 879 | 1,869 | | |
| | Sub-total | | | 1,374 | 2,923 | 8 | Baladi |
| Small Investor | Sorghum | 450 | 1.10 | 4,950 | 10,532 | | |
| | Berseem(S) | 413 | 2.13 | 8,786 | 18,691 | | |
| | Barlay straw | 38 | 0.70 | 264 | 561 | | |
| | Sub-total | | 1.10 | 14,000 | 29,788 | 82 | Friesian |
| Large Investor (Dairy) | Sorghum | 6,480 | 1.10 | 71,280 | 151,660 | | |
| | Berseem(S) | 2,880 | 2.13 | 61,344 | 130,519 | | |
| | Fodder beet | 9,000 | 0.80 | 72,000 | 153,191 | | |
| | Wheat straw | 448 | 0.30 | 1,344 | 2,860 | | |
| | Barlay straw | 266 | 0.70 | 1,865 | 3,968 | | |
| | Maize leaves | 972 | 1.10 | 10,692 | 22,749 | | |
| | Sub-total | | | 218,525 | 464,946 | 1,274 | Friesian |
| Large Investor (Beef Cattle) | Sorghum | 6,480 | 1.10 | 71,280 | 151,660 | | |
| | Berseem(L) | 4,500 | 2.13 | 95,850 | 203,936 | | |
| | Berseem(S) | 2,880 | 2.13 | 61,344 | 130,519 | | |
| | Wheat straw | 448 | 0.30 | 1,345 | 2,861 | | |
| | Barlay straw | 266 | 0.70 | 1,865 | 3,968 | | |
| | Maize leaves | 972 | 1.10 | 10,692 | 22,749 | | |
| | Sub-total | | | 242,375 | 515,692 | 1,413 | Frieslan |
| | Total | | | | | | |

Note: Feed convert into 470g of Nutritive value(DCP)by head per day

Table B- 6 Crop Cultivetion and Input Material

| Crops Group | No. Crops | Name of Operation | Working Time | Name of Material | Volume per fed |
|---|---|---|---|---|---|
| Cereal | 1 Wheat | Sowing | 16-30/November | Seed | 70 Kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 375 Kg |
| | | | -do- | Superphoshate(15%) | 140 Kg |
| | | Herbicide application | Immediately sow. | Promin | 1 lit |
| | | Germicide/pesticide | Early of Apr. | Tamaron | 1.3 lit |
| | | | End of March | Ander | 0.2 lit |
| | 2 Barley | Sowing | 16-30/November | Seed | 40 Kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 225 Kg |
| | | | -do- | Superphoshate(15%) | 100 Kg |
| | | Herbicide application | Immediately sow. | Promin | 1 lit |
| | | Germicide/pesticide | Early of Apr. | Merachion | 1.3 lit |
| | | | End of March | Ander | 0.2 lit |
| | 3 Maize (grain) | Sowing | 1-15/May | Seed | 25 Kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 225 Kg |
| | | | -do- | Superphoshate(15%) | 100 Kg |
| | | Herbicide application | Immediately sow. | Promin | 1 lit |
| | | Germicide/pesticide | Middle of July | Tamaron | 1.3 lit |
| | | | Middle of July | Merachion | 1.3 lit |
| Fodder | 4 Sorughum (green) | Sowing | 16-31/May | Seed | 35 Kg |
| | | Fertilizer | -do- | Urea(46%) | 225 Kg |
| | | | -do- | Superphoshate(15%) | 100 Kg |
| | | Herbicide application | Immediately sow. | Casain | 0.75 lit |
| | | Germicide/pesticide | Middle of July | Tamaron | 1.3 lit |
| | 5 Berseem (long) | Sowing | 1-15/October | Seed | 3 kg |
| | | Fertilizer | -do- | Urea(46%) | 65 kg |
| | | | -do- | Superphoshate(15%) | 100 kg |
| | | Germicide/pesticide | Post-emergence | Ranneto | 0.3 lit |
| | 6 Berseem (short) | Sowing | 1-15/October | Seed | 3 kg |
| | | Fertilizer | -do- | Urea(46%) | 65 kg |
| | | | -do- | Superphoshate(15%) | 230 kg |
| | | | -do- | Potassium chloride(48%) | 52 kg |
| | | Germicide/pesticide | Post-emergence | Ranneto | 0.3 lit |
| | 7 Fodder beet | Sowing | 1-15/October | Seed | 6 kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 150 kg |
| | | | -do- | Superphoshate(15%) | 230 kg |
| | | | -do- | Potassium chloride(48%) | 93 kg |
| | | Herbicide application | Immediately sow. | Piramin | 2 kg |
| | | Germicide/pesticide | Post-emergence | Ranneto | 0.2 lit |
| | | | Growing srason | Tamaron | 1.3 lit |
| | | | -do- | Dalsen | 1.5 lit |
| | | | -do- | Purinar | 0.4 lit |
| Oil Crops | 8 Soybean | Sowing | 1-15/June | Seed | 40 kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 175 kg |
| | | | -do- | Superphoshate(15%) | 245 kg |
| | | | -do- | Potassium chloride(48%) | 93 kg |
| | | Herbicide application | Immediately sow. | Casain | 0.75 lit |
| | | Germicide/pesticide | Podding time | Ranneto | 1.3 lit |
| | 9 Sesame | Sowing | 1-15/May | Seed | 4 kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 150 kg |
| | | | -do- | Superphoshate(15%) | 150 kg |
| | | Herbicide application | Immediately sow. | Berinan | 2 lit |
| | | Germicide/pesticide | Growing season | Tamaron | 1.3 lit |
| | | | -do- | Dalsen | 1.3 lit |
| | | | Podding time | Dakonil | 5 kg |
| Pulses | 10 Broadbean | Sowing | 1-15/November | Seed | 60 kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 75 kg |
| | | | -do- | Superphoshate(15%) | 200 kg |
| | | Germicide/pesticide | Podding time | Dalsen | 1.3 lit |

Continuation

Table B 6 Crop Cultivation and Input Material

| Crops Group | No. Crops | Name of Operation | Working Time | Name of Material | Volume per fed |
|---|---|---|---|---|---|
| Vegetables | 11 Tomato (fresh) | Sowing | 1-15/February | Seed | 5 kg |
| | | Fertilizer/Planting | 1-15/June | Ammonium sulphate(20%) | 950 kg |
| | | | -do- | Superphoshate(15%) | 800 kg |
| | | | -do- | Potassium chloride(48%) | 185 kg |
| | | Herbicide application | Growing season | Acterik | 1.6 lit |
| | | Germicide/pesticide | -do- | Marshal | 1.5 lit |
| | | | -do- | Fosterson | 1.3 lit |
| | 12 Tomato (processig) | Sowing | 26-30/April | Seed | 5 kg |
| | | Fertilizer/Planting | 16-31/May | Urea(46%) | 260 kg |
| | | | -do- | Superphoshate(15%) | 400 kg |
| | | | -do- | Potassium chloride(48%) | 93 kg |
| | | Herbicide application | Growing season | Acterik | 1.6 lit |
| | | Germicide/pesticide | -do- | Marshal | 1.5 lit |
| | | | -do- | Fosterson | 1.3 lit |
| | 13 Cantaloupe | Sowing | 11-15/March | Seed | 6 kg |
| | | Fertilizer/Planting | 16-31/April | Ammonium sulphate(20%) | 100 kg |
| | | | -do- | Superphoshate(15%) | 300 kg |
| | | | -do- | Potassium chloride(48%) | 30 kg |
| | | Germicide/pesticide | Growing season | Marshal | 1.5 lit |
| | | | -do- | Fosterson | 1.3 lit |
| | 14 Watermelon | Sowing | 26-31/March | Seed | 5 kg |
| | | Fertilizer/Planting | 1-15/May | Urea(46%) | 43 kg |
| | | | -do- | Superphoshate(15%) | 300 kg |
| | | | -do- | Potassium chloride(48%) | 10 kg |
| | | Germicide/pesticide | Growing season | Marshal | 1.5 lit |
| | | | -do- | Fosterson | 1.3 lit |
| | 15 Squash | Sowing | 1-15/May | Seed | 5 kg |
| | | Fertilizer | 1-15/May | Ammonium sulphate(20%) | 125 kg |
| | | | -do- | Superphoshate(15%) | 300 kg |
| | | | -do- | Potassium chloride(48%) | 10 kg |
| | | Germicide/pesticide | Growing season | Marshal | 1.5 lit |
| | 16 Green pepper | Sowing | 1-15/July | Seed | 5 kg |
| | | Fertilizer/Planting | 1-15/August | Ammonium sulphate(20%) | 125 kg |
| | | | -do- | Superphoshate(15%) | 300 kg |
| | | | -do- | Potassium chloride(48%) | 10 kg |
| | | Germicide/pesticide | Growing season | Marshal | 1.5 lit |
| | 17 Cabbage | Sowing | 1-15/October | Seed | 5 kg |
| | | Fertilizer/Planting | 1-15/November | Ammonium sulphate(20%) | 125 kg |
| | | | -do- | Superphoshate(15%) | 300 kg |
| | | | -do- | Potassium chloride(48%) | 10 kg |
| | | Herbicide application | Post-planting | Gool | 2 lit |
| | | Germicide/pesticide | Growing season | Daisen | 3.4 lit |
| | 18 Potato | Sowing | 1-15/February | Seed | 60 kg |
| | | Fertilizer | 1-15/March | Ammonium sulphate(20%) | 750 kg |
| | | | -do- | Superphoshate(15%) | 400 kg |
| | | | -do- | Potassium chloride(48%) | 100 kg |
| | | Herbicide application | Post-planting | Acterik | 1.5 lit |
| | | Germicide/pesticide | Growing season | Binol | 1.5 lit |
| | | | -do- | Daisen | 1 lit |
| | 19 Onion | Sowing | 1-15/September | Seed | 4 kg |
| | | Fertilizer/Planting | 1-15/November | Ammonium sulphate(20%) | 450 kg |
| | | | -do- | Superphoshate(15%) | 200 kg |
| | | | -do- | Potassium chloride(48%) | 83 kg |
| | | Herbicide application | Post-planting | Gool | 1.5 lit |
| | | Germicide/pesticide | Growing season | Aricon | 3.4 lit |
| Medical plant | 20 Cumin | Sowing | 1-15/September | Seed | 4 kg |
| | | Fertilizer | -do- | Ammonium sulphate(20%) | 150 kg |
| | | | -do- | Superphoshate(15%) | 150 kg |
| | | | -do- | Potassium chloride(48%) | 62 kg |
| | | Germicide/pesticide | Growing season | Binol | 1.5 lit |

Continuation

Table B 6 Crop Cultivation and Input Material

| Crops Group | No. | Crops | Name of Operation | Working Time | Name of Material | Volume per fed |
|---|---|---|---|---|---|---|
| Fruits | 21 | Almond | | | Nursery stock | 100 tree |
| | | | Manure application | January | Manure | 10 ton |
| | | | Fertilizer | Farly of Februar | Ammonium nitrate(33%) | 125 kg |
| | | | | | Superphoshate(15%) | 312 kg |
| | | | | | Potassium sulphate(48%) | 125 kg |
| | | | Germicide/pesticide | Farly of March | Germicide | - |
| | | | | | Pesticide | - |
| | 22 | Peach | | | | 150 tree |
| | | | Manure application | Novemer | Manure | 15 ton |
| | | | Fertilizer | -do- | Ammonium nitrate(33%) | 60 kg |
| | | | | | Superphoshate(15%) | 320 kg |
| | | | | | Potassium sulphate(48%) | 160 kg |
| | | | Germicide/pesticide | Early of March | Sarichion | 1.5 lit |
| | | | | | Gichianon | 1.5 lit |
| | 23 | Grape | | | Nursery stock | 200 tree |
| | | | Manure application | Novemer | Manure | 20 ton |
| | | | Fertilizer | -do- | Ammonium sulphate(20%) | 100 kg |
| | | | | | Superphoshate(15%) | 250 kg |
| | | | | | Potassium sulphate | 100 kg |
| | | | Germicide/pesticide | Early of June | Germicide | - |
| | | | | | Pesticide | - |
| | 24 | Olive | | | Nursery stock | 80 tree |
| | | | Manure application | Farly of March | Manure | 8 ton |
| | | | Fertilizer | -do- | Ammonium nitrate(33%) | 110 kg |
| | | | | | Superphoshate(15%) | 100 kg |
| | | | | | Potassium sulphate(48%) | 130 kg |
| | | | Germicide/pesticide | Farly of August | Germicide | - |
| | | | | | Pesticide | - |
| | 25 | Orange | | | Nursery stock | 120 tree |
| | | | Manure application | End of March | Manure | 15 ton |
| | | | Fertilizer | -do- | Ammonium nitrate(33%) | 150 kg |
| | | | | | Superphoshate(15%) | 200 kg |
| | | | | | Potassium sulphate(48%) | 100 kg |
| | | | Germicide/pesticide | September | Germicide | - |
| | | | | | Pesticide | - |

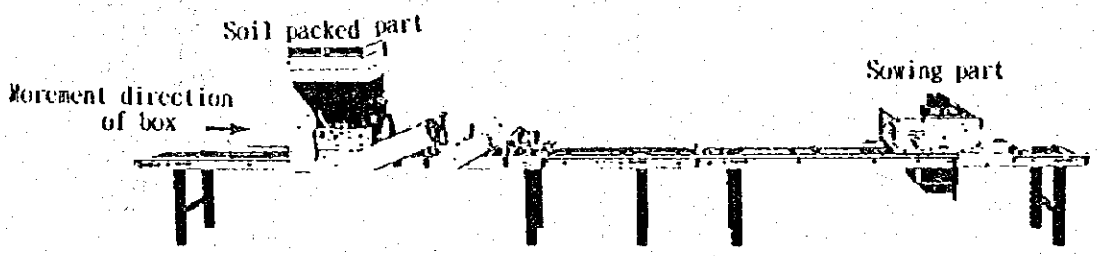
Note: Material volume on Bearing ochard

Table B- 7 Summary of Seedling Plan

There are five crops such as Tomato, Green pepper, Water melon, Cantaloupe and Cabbage which require nursery works to secure the health of the seedling. The seedling for shall be grown in vinyl house nursery beds so as to protect the weather.
Nursery of fresh tomato planting shall be grown by under plastic tunnels, and Nursery of processing tomato and ather nursery are grown in open culture.
Nursery of Tomato, Green pepper and Cabbage are used by tranplanter but other nurserys by hand. Summary of Seedling Plan is as follows:

- Nursery bed of Tomato, Green pepper, water melon, Cantaloupe.
  Owned jointly vinyl house on 10 (Small farmer/Graduates) farmer house hold.
- Nursery bed of Cabbage
  Vinyl house buildings by each Investors farmer house hold.
  - Required period about 30 day and seedling height 15 cm
  - Required area 50 m²
  - Required Acrages of nursery beds 21 m² per feddan
  - Required bed soil of raising seedling 75kg per feddan
  - Required machinery
    Preparcing of seedling boxs 630 pre feddan
    Seeding machine 1 (working capacity: 50 boxs/hr )
    Required labour 6 person per Seed machine

Seeding Machine




Transplanter

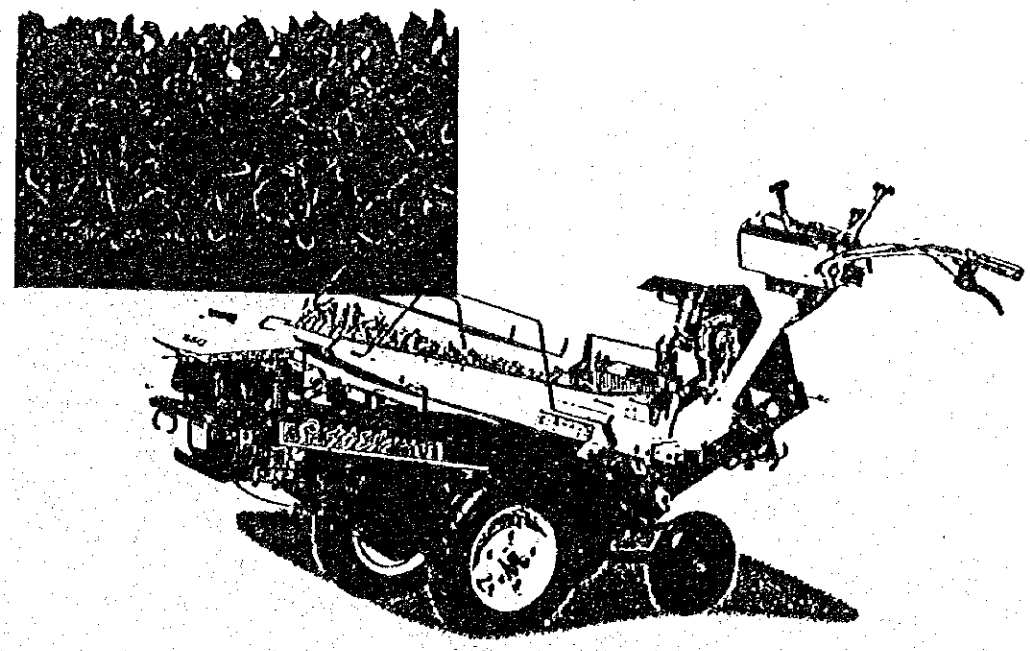


Table 8-8 Agricultural Machinery Efficiency and Number of Machinery
(Small Farmer and Graduates)

| Machinery | Operation width (m) | Oper. Power (ps) | Small Farmer | Graduates Vegeta. + Livestock | Graduates Vegeta. + Frui | Total |
|---|---|---|---|---|---|---|
| Hand Tractor | | 8ps | 1 | 1 | 1 | 2,775 |
| Rotaly | 60cm< | 8ps | 1 | 1 | 1 | 2,775 |
| Linesower | 1.5×1.1×0 | 5-8ps | 1 | 1 | 1 | 2,775 |
| Fertilizer/Drill. | 4 Line | 4-10ps | 1 | 1 | 1 | 2,775 |
| Planter | 1 Line | 7ps | *1/10 | *1/10 | *1/10 | 278 |
| Sprayer | 2.5×1.1× | 5-8ps | *1/ 5 | *1/ 5 | 1 | 999 |
| Combine, auto thres | 4 Line | 25-32 | 1 | 1 | 1 | 2,775 |
| Hand Mower | | 1-2 | 1 | 1 | - | 2,220 |
| Trailer | 0.5ton/8km/ | 8ps | 1 | 1 | 1 | 2,775 |
| No. of Household | | | 1,665 | 555 | 555 | 2,775 |

(Small and large Investors)

| Machinery | Operation width (m) | Oper. Power (ps) | Small Investor Beef Ca +Vegeta | Small Investor Fruit +Vegeta. | Small Investor Sub-total | Large Investor Land Use Crops | Large Investor Dairy Cattle | Large Investor Beef Cattle | Large Investor Fruit | Large Investor Sub total | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tractor | | 50ps | 1 | 1 | 166 | 7 | 7 | 7 | 7 | 644 | 810 |
| Botom plow | 16inch×3 | 50ps | 1 | 1 | 166 | 3 | 3 | 3 | - | 276 | 442 |
| Rotaly | 2.4m | 50ps | 1 | 1 | 166 | 3 | 3 | 3 | | 207 | 373 |
| Manure spreader | 1.5 ton | 50ps | 1 | 1 | 166 | 3 | 3 | 3 | 2 | 253 | 419 |
| Broadcaster | 300 Litter | 50ps | 1 | 1 | 166 | 3 | 3 | 3 | | 207 | 373 |
| Linesower | 2.1m | 50ps | 1 | 1 | 166 | 3 | 3 | 3 | - | 207 | 373 |
| Fertilizer/Drill. | 13 Line | 50ps | 1 | 1 | 166 | 4 | 2 | 4 | | 138 | 304 |
| Poteto planter | 2 Line | 50ps | 1 | 1 | 166 | 2 | - | | - | 46 | 212 |
| Trance Planter | 1 Line | | 1 | 1 | 166 | 3 | | - | - | 69 | 235 |
| Cultivator | 2.5m | 50ps< | 1 | 1 | 166 | 2 | 2 | 2 | | 92 | 258 |
| Swarth Sprayer | 600 Litter | 50ps | 1 | 1 | 166 | 2 | 2 | 2 | 2 | 184 | 350 |
| Combine | 300 380cm | | * 1/4 | * 1/4 | 42 | 1 | 1 | 1 | - | 69 | 111 |
| Bean harvestor | 4.5m | | * 1/4 | * 1/4 | 42 | 1 | | | | 23 | 65 |
| Corn viker | 1-2 Line | 50ps | - | | | 1 | 2 | 2 | | 115 | 115 |
| Poteto harvester | 1 ton | | 1 | 1 | 166 | 5 | | | | 115 | 281 |
| Beet harvestor | 1 Line | 50ps | - | - | | - | 2 | 1 | | 69 | 69 |
| Rotaly Mower | 1.7m | 50ps | 1 | - | 83 | - | 2 | 2 | | 92 | 175 |
| Tedder Rake | 4.0m | | 1 | - | 83 | - | 1 | 2 | | 69 | 152 |
| Trencher | | | - | - | | - | | | 2 | 46 | 46 |
| Pruning machine | | | - | - | | - | - | - | 4 | 92 | 92 |
| Truck | 6 ton | | 1 | 1 | 166 | - | - | - | - | | 166 |
| Truck | 10 ton | | | | | 1 | 1 | 1 | 2 | 161 | 161 |
| Trailer | 1.5 ton | | 1 | 1 | 166 | | | | | | 166 |
| Trailer | 3.0 ton | | | | | 7 | 7 | 7 | 7 | 644 | 644 |
| No. of Household | | | 83 | 83 | 166 | 23 | 23 | 23 | 23 | 92 | 258 |

Note: * Owned jointly

Table B-9 Proposed Labour and Mechanization on Small Farmer

| Crops | Operation | Operation time | Name of Farm Machinery | Planted area Machinery (hr) | Opereter (hr) | Assistant (hr) | Labour Total |
|---|---|---|---|---|---|---|---|
| Wheat | Manure spreading | 1-15/Nov. | Hand Tractor8ps/Trailer | 30.0 | 30.0 | 37.5 | 67.5 |
| | Plowing | 1-15/Nov. | Hand Tractor8ps/Rotaly | 4.7 | 4.7 | | 4.7 |
| | Fertili.application | 16-30/Nov. | Hand Tractor8ps/ | 2.1 | 2.1 | 2.6 | 4.7 |
| | Sowing | 16-30/Nov. | Fertilizer-Drill seeder | 0.0 | 0.0 | | 0.0 |
| | Water manegment | 16/Nov-5/May | Hand move Sprinkler | 0.0 | 0.0 | 12.1 | 12.1 |
| | Disease control | 1-10/Apl | Hand move Sprayer2ps | 1.8 | 1.8 | 2.3 | 4.1 |
| | Weeding | 16-30/Nov. | Hand move Sprayer2ps | 1.8 | 1.8 | 2.3 | 4.1 |
| | Harvesting | 16-31/May | Combine, auto thresher8ps | 1.1 | 1.1 | 1.4 | 2.5 |
| | Carrying | 16-31/May | Hand Tractor/Trailer | 12.0 | 12.0 | 15.0 | 27.0 |
| | Sub-total | | | 53.5 | 53.5 | 73.1 | 126.6 |
| Sorghum | Manure spreading | 6-31/May | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| | Plowing | 6-31/May | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | | 11.8 |
| | Fertili.application | 16-31/May | Hand Tractor8ps/ | 5.3 | 5.3 | 6.6 | 11.8 |
| | Sowing | 16-31/May | Fertilizer-Drill seeder | 0.0 | 0.0 | | 0.0 |
| | Water manegment | 16/May-25/Sep | Hand move Sprinkler | 0.0 | 0.0 | 32.0 | 32.0 |
| | Weeding | 16-31/May | Hand move Sprayer2ps | 4.5 | 4.5 | 2.3 | 6.8 |
| | Disease control | 1-15/Jun | Hand move Sprayer2ps | 4.5 | 4.5 | 2.3 | 6.8 |
| | Cutting | 25/Jun-30/Sep | Mower | 10.5 | 10.5 | 10.5 | 21.0 |
| | Carrying | 25/Jun-30/Sep | Hand Tractor8ps/Trailer | 30.0 | 30.0 | 37.5 | 67.5 |
| | Sub-total | | | 141.5 | 141.5 | 184.8 | 326.3 |
| Berseem (Short) | Manure spreading | 21-31/Oct | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 56.3 | 131.3 |
| | Plowing | 1-15/Oct | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | | 11.7 |
| | Fertili.application | 1-15/Oct | Lain soiler | 5.3 | 5.3 | 3.9 | 9.2 |
| | Sowing | 1-15/Oct | by hand | 0.0 | 0.0 | 0.7 | 0.7 |
| | Water manegment | 1/Oct-10/Feb | Hand move Sprinkler | 0.0 | 0.0 | 13.6 | 13.6 |
| | Disease control | 11-25/Oct | Hand move Sprayer2ps | 4.5 | 4.5 | 2.7 | 7.2 |
| | Cutting | 11/Nov-15/Feb | Hand Mower | 4.5 | 4.5 | 2.7 | 7.2 |
| | Carrying | 11/Nov-15/Feb | Hand Tractor8ps/Trailer | 10.5 | 10.5 | 7.9 | 18.4 |
| | Sub-total | | | 111.4 | 111.4 | 87.8 | 199.2 |
| Water melon | Prep.of nursery bed | 26/Mar-15May | by Vinil house | 23.8 | 23.8 | 29.7 | 53.4 |
| | Manure spreading | 21-30/Apr | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| | Plowing | 21-30/Apr | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | | 11.7 |
| | Fertili.application | 1-15/May | by hand | 5.3 | 5.3 | 6.6 | 11.8 |
| | Planting | 1-15/May | by hand | 0.0 | 0.0 | 30.0 | 30.0 |
| | Water manegment | 1/May-10/Sep | Drip Irrigation | 0.0 | 0.0 | 20.2 | 20.2 |
| | Disease control | 1/Jun-31/Jul | Hand move Sprayer2ps | 4.4 | 4.4 | 5.5 | 9.8 |
| | Weeding | - | by hand | 0.0 | 0.0 | | 0.0 |
| | Harvesting | 1-15/Sep | by hand | 0.0 | 0.0 | 210.9 | 210.9 |
| | Carrying | 1-15/Sep | Hand Tractor8ps/Trailer | 80.8 | 80.8 | 111.0 | 191.8 |
| | Post-treatment | 16-20/Sep | Hand Tractor8ps/Trailer | 59.5 | 59.5 | | 59.5 |
| | Sub-total | | | 260.4 | 260.4 | 507.5 | 767.9 |
| Tomato | Prep.of nursery bed | 26/Jan-15/Mar | by Vinil house | 23.8 | 23.8 | 29.8 | 53.6 |
| | Manure spreading | 21-30/Feb | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| | Plowing | 21-30/Feb | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | | 11.7 |
| | Fertili.application | 1-15/Mar | by hand | 5.3 | 5.3 | 6.6 | 11.8 |
| | Planting | 1-15/Mar | Planter | 7.0 | 7.0 | | 7.0 |
| | Plastic tunnels coll | 1-15/Mar | by hand | 20.0 | 20.0 | 25.0 | 45.0 |
| | Water manegment | 1/Mar-25/Jul | Drip Irrigation | 0.0 | 0.0 | 22.3 | 22.3 |
| | Disease control | 1/Jun-31/Jul | Hand move Sprayer2ps | 4.4 | 4.4 | 4.4 | 8.8 |
| | Weeding | - | by hand | 0.0 | 0.0 | | 0.0 |
| | Harvesting | 16/Jun-31/Jul | by hand | 0.0 | 0.0 | 1,238.0 | 1,238.0 |
| | Carrying | 16/Jun-31/Jul | Hand Tractor8ps/Trailer | 200.0 | 200.0 | 200.0 | 400.0 |
| | Post-treatment | 1-5/Aug | Hand Tractor8ps/Trailer | 40.0 | 40.0 | | 40.0 |
| | Sub-total | | | 387.1 | 387.1 | 1,619.7 | 2,006.8 |

-Continuation

Table B-9 Proposed labour and Mechanization on Small Farmer

| Crops | Operation | Operation time | Name of Farm Machinery | Planted area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour Total |
|---|---|---|---|---|---|---|---|
| Green | Prep. of nursery bed | 26/Jun-15/Aug | by Vinil house | 6.3 | 6.3 | 29.8 | 36.0 |
| pepper | Manure spreading | 21-31/Jul | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| | Ploving | 21-31/Jul | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | | 11.7 |
| | Fertili. application | 1-15/Aug | Hand Tractor8ps/Ferti. ap. | 5.3 | 5.3 | 6.6 | 11.8 |
| | Planting | 1-15/Aug | Planter | 7.0 | 7.0 | | 7.0 |
| | Water manegment | 1/Aug-10/Nov | Drip Irrigation | 0.0 | 0.0 | 17.7 | 17.7 |
| | Weeding | | by hand | 0.0 | 0.0 | | 0.0 |
| | Disease control | 1-15/Sep | Hand move Sprayer2ps | 4.4 | 4.4 | 4.4 | 8.8 |
| | Harvesting | 1-15/Nov | by hand | 0.0 | 0.0 | 166.6 | 166.6 |
| | Carrying | 1-15/Nov | Hand Tractor8ps/Trailer | 35.0 | 35.0 | 35.0 | 70.0 |
| | Post treatment | 16-20/Nov | Hand Tractor8ps/Trailer | 12.5 | 12.5 | | 12.5 |
| | Sub total | | | 157.1 | 157.1 | 353.7 | 510.7 |
| Broad | Manure spreading | 6-30/Nov | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| bean | Ploving | 6-30/Nov | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | | 11.7 |
| | Fertili. application | 6-30/Nov | Hand Tractor8ps/Ferti. Dri | 5.3 | 5.3 | 6.6 | 11.8 |
| | Sowing | 6-30/Nov | | 0.0 | 0.0 | | 0.0 |
| | Water manegment | 16/Nov-10/Apr | Drip Irrigation | 0.0 | 0.0 | 22.7 | 22.7 |
| | Weeding | | by hand | 0.0 | 0.0 | | 0.0 |
| | Disease control | 1-15/Feb | Hand move Sprayer2ps | 4.4 | 4.4 | 4.4 | 8.8 |
| | Harvesting | 1-15/Apr | by hand | 0.0 | 0.0 | 206.0 | 206.0 |
| | Carrying | 1-15/Apr | Hand Tractor8ps/Trailer | 13.3 | 13.3 | 13.3 | 26.5 |
| | Processing/grading | | by hand | 0.0 | 0.0 | 60.0 | 60.0 |
| | Sub total | | | 109.6 | 109.6 | 406.6 | 516.2 |
| Canta | Prep. of nursery bed | 11/Mar-30/Apr | by Vinil house | 23.8 | 23.8 | 29.8 | 53.6 |
| loupe | Manure spreading | 6-15/Apr | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 168.8 |
| | Ploving | 16-30/Apr | Hand Tractor8ps/Rotaly | 11.7 | 11.7 | 14.6 | 26.3 |
| | Fertili. application | 16-30/Apr | | 0.0 | 0.0 | | 0.0 |
| | Planting | 16-30/Apr | by hand | 0.0 | 0.0 | 175.0 | 175.0 |
| | Water manegment | 16-Apr-25/Aug | Drip Irrigation | 0.0 | 0.0 | 20.2 | 20.2 |
| | Disease control | 1/Jun-31/Jul | Hand move Sprayer2ps | 8.8 | 8.8 | 10.9 | 19.7 |
| | Weeding | | by hand | 0.0 | 0.0 | | 0.0 |
| | Harvesting | 16-31/Aug | by hand | 0.0 | 0.0 | 419.0 | 419.0 |
| | Carrying | 16-31/Aug | Hand Tractor8ps/Trailer | 50.0 | 50.0 | 50.0 | 100.0 |
| | Sub total | | | 169.2 | 169.2 | 813.3 | 982.5 |
| Medical | Manure spreading | 6-15/Oct | Hand Tractor8ps/Trailer | 75.0 | 75.0 | | 75.0 |
| plant | Ploving | 6-15/Oct | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | | 11.8 |
| | Fertili. application | 16-31/Oct | Hand Tractor8ps/Ferti. Dri | 5.3 | 5.3 | 6.6 | 11.8 |
| | Sowing | 16-31/Oct | by hand | 0.0 | 0.0 | 6.0 | 6.0 |
| | Water manegment | 16/Oct-25/Mar | Hand move Sprinkler | 0.0 | 0.0 | 25.2 | 25.2 |
| | Weeding | | by hand | 0.0 | 0.0 | | 0.0 |
| | Disease control | 1-10/Feb | Hand move Sprayer2ps | 8.8 | 8.8 | 10.9 | 19.7 |
| | Harvesting | 16-31/Mar | by hand | 0.0 | 0.0 | 325.0 | 325.0 |
| | Carrying | 16-31/Mar | Hand Tractor8ps/Trailer | 11.0 | 11.0 | 11.0 | 22.0 |
| | Sub total | | | 111.8 | 111.8 | 384.7 | 496.4 |
| | | | | 1,501 | 1,501 | 4,431 | 5,933 |

Table B-10 Proposed labour and Mechanization on Graduates(Vegetable + Beef Cattle)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Sorghum | Manure spreading | 5-31/May | Hand Tractor8ps/Trailer | 75 | 75 | 94 | 169 |
| | Plowing | 5-31/May | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 16-31/May | Hand Tractor8ps | 5 | 5 | 7 | 12 |
| | Sowing | 16-31/May | /Drill-Fertilizer | | | | 0 |
| | Water manegment | 16/May-25/Sep | Hand move Sprinkler | | | 32 | 32 |
| | Weeding | 16-31/May | Hand move Sprayer | 5 | 5 | 2 | 7 |
| | Disease control | 1-15/Jun | Hand move Sprayer | 5 | 5 | 2 | 7 |
| | Cutting | 26/Jun-30/Sep | Hand mower | 11 | 11 | 11 | 21 |
| | Carrying | 26/Jun-30/Sep | Hand Tractor8ps/Trailer | 30 | 30 | 38 | 68 |
| | Sub-total | | | 112 | 142 | 185 | 327 |
| Persecm | Manure spreading | 1-30/Sep | Hand Tractor8ps/Trailer | 75 | 75 | 56 | 131 |
| (Short) | Plowing | 1-15/Oct | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 1-15/Oct | Line sowers | 5 | 5 | 4 | 9 |
| | Sowing | 1-15/Oct | by hand | | | | 0 |
| | Water manegment | 1/Oct-25/Feb | Hand move Sprinkler | | | 14 | 14 |
| | Disease control | 1-31/Oct | Hand move Sprayer | 5 | 5 | 3 | 7 |
| | Cutting | 11/Nov-28/Feb | Hand mower | 5 | 5 | 3 | 7 |
| | Carrying | 11/Nov 28/Feb | Hand Tractor8ps/Trailer | 11 | 11 | 8 | 18 |
| | Sub-total | | | 112 | 112 | 87 | 199 |
| Squash | Manure spreading | 1-30/Apr | Hand Tractor8ps/Trailer | 75 | 75 | 75 | 150 |
| | Plowing | 21-30/Apr | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 1-15/May | by hand | 5 | 5 | 5 | 11 |
| | Sowing | 1-15/May | by hand | 0 | 0 | 5 | 5 |
| | Water manegment | 1/May-10/Sep | Drip Irrigation | 0 | 0 | 16 | 16 |
| | Weeding | | by hand | | | | 0 |
| | Disease control | 26-31/May | Hand move Sprayer | 5 | 5 | 5 | 9 |
| | Harvesting | 1-15/Sep | by hand | 43 | 43 | 53 | 96 |
| | Carrying | 1-15/Sep | Hand Tractor8ps/trailer | 40 | 40 | 20 | 60 |
| | Post treatment | 16-20/Sep | Hand Tractor8ps/Trailer | 39 | 39 | 0 | 39 |
| | Sub-total | | | 218 | 218 | 179 | 396 |
| Tomato | Prep.of nursery bed | 26/Jan-15/Mar | by Vinil house | 24 | 24 | 30 | 54 |
| | Manure spreading | 1-28/Feb | Hand Tractor8ps/Trailer | 75 | 75 | 91 | 169 |
| | Plowing | 1-28/Feb | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 1-28/Feb | /Drill-Fertilizer | 5 | 5 | 7 | 12 |
| | Planting | 1-15/Mar | Planter | 7 | 7 | 0 | 7 |
| | Plastic tunnelse cul | 1-15/Mar | by hand | 20 | 20 | 25 | 45 |
| | Water manegment | 1/Mar 25/Jul | Drip Irrigation | 0 | 0 | 22 | 22 |
| | Weeding | | by hand | | | 4 | 4 |
| | Disease control | 1/Jun 31/Jul | Hand move Sprayer | 5 | 5 | 0 | 5 |
| | Harvesting | 16Jun 31/Jul | by hand | 0 | 0 | 1,238 | 1,238 |
| | Carrying | 16Jun-31/Jul | Hand Tractor8ps/Trailer | 200 | 200 | 200 | 400 |
| | Post treatment | 1-15/Aug | Hand Tractor8ps/Trailer | 40 | 40 | 0 | 40 |
| | Sub-total | | | 387 | 387 | 1,620 | 2,007 |

Continuation

Table B-10 Proposed Labour and Mechanization on Graduates(Vegetable + Cattle)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Green | Prep.of nursery bed | 26/Jun-15/Aug | by Vinil house | 6 | 6 | 30 | 36 |
| Pepper | Manure spreading | 21/Jul-15/Aug | Hand Tractor8ps/Trailer | 75 | 75 | 94 | 169 |
| | Plowing | 1-15/Aug | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 1-15/Aug | /Drill-Fertilizer | 5 | 5 | 7 | 12 |
| | Planting | 1-15/Aug | Planter | 7 | 7 | 0 | 7 |
| | Water manegment | 1/Aug-10/Nov | Drip Irrigation | 0 | 0 | 18 | 18 |
| | Weeding | - | by hand | | | | 0 |
| | Disease control | 1-15/Sep | Hand move Sprayer | 5 | 5 | 4 | 9 |
| | Harvesting | 15/Oct-15/Nov | by hand | 0 | 0 | 167 | 167 |
| | Carrying | 1-15/Nov | Hand Tractor8ps/Trailer | 35 | 35 | 35 | 70 |
| | Post treatment | 16-30/Nov | Hand Tractor8ps/Trailer | 13 | 13 | 0 | 13 |
| | Sub total | | | 157 | 157 | 354 | 511 |
| Broad | Manure spreading | 1-30/Nov | Hand Tractor8ps/Trailer | 75 | 75 | 94 | 169 |
| bean | Plowing | 16-30/Nov | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 16-30/Nov | Hand Tractor8ps/Rotaly | 5 | 5 | 7 | 12 |
| | Sowing | 16-30/Nov | /Drill-Fertilizer | 0 | 0 | 0 | 0 |
| | Water manegment | 16/Nov-10/Apr | Drip Irrigation | 0 | 0 | 23 | 23 |
| | Weeding | - | by hand | | | | 0 |
| | Disease control | 1-15/Feb | Hand move Sprayer | 5 | 5 | 4 | 9 |
| | Harvesting | 1-15/Apr | by hand | 0 | 0 | 206 | 206 |
| | Carrying | 1-15/Apr | Hand Tractor8ps/Trailer | 13 | 13 | 13 | 27 |
| | Processing/grading | 16-30/Apr | by hand | 0 | 0 | 60 | 60 |
| | Sub total | | | 110 | 110 | 407 | 517 |
| Canta | Prep.of nursery bed | 11/Mar-30/Apr | by Vinil house | 24 | 24 | 30 | 54 |
| loupe | Manure spreading | 16/Mar-15/Apr | Hand Tractor8ps/Trailer | 75 | 75 | 94 | 169 |
| | Plowing | 16-30/Apr | Hand Tractor8ps/Rotaly | 12 | 12 | 15 | 26 |
| | Fertili.application | 16-30/Apr | /Drill-Fertilizer | 0 | 0 | 0 | 0 |
| | Planting | 16-30/Apr | by hand | 0 | 0 | 175 | 175 |
| | Water manegment | 16/Apr-25/Aug | Drip Irrigation | 0 | 0 | 20 | 20 |
| | Weeding | | by hand | | | | 0 |
| | Disease control | 1/Jun-30/Jul | Hand move Sprayer | 9 | 9 | 11 | 20 |
| | Harvesting | 16-31/Aug | by hand | 0 | 0 | 419 | 419 |
| | Carrying | 16-31/Aug | Hand Tractor8ps/Trailer | 50 | 50 | 50 | 100 |
| | Sub total | | | 169 | 169 | 813 | 983 |
| Medical | Manure spreading | 16/Sep-15/Oct | Hand Tractor8ps/Trailer | 75 | 75 | 0 | 75 |
| plant | Plowing | 1-15/Oct | Hand Tractor8ps/Rotaly | 12 | 12 | 0 | 12 |
| | Fertili.application | 16-31/Oct | /Drill Fertilizer | 5 | 5 | 7 | 12 |
| | Sowing | 16-31/Oct | by hand | | | 6 | 6 |
| | Water manegment | 16/Oct-25/Mar | Hand move Sprinkler | 0 | 0 | 25 | 25 |
| | Weeding | | by hand | | | | 0 |
| | Disease control | 1-15/Feb | Hand move Sprayer | 9 | 9 | 11 | 20 |
| | Harvesting | 16-31/Mar | by hand | 0 | 0 | 325 | 325 |
| | Carrying | 16-31/Mar | Hand Tractor8ps/Trailer | 11 | 11 | 11 | 22 |
| | Sub total | | | 112 | 112 | 385 | 497 |
| | total(hr) | | | 1,407 | 1,407 | 4,030 | 5,436 |

Table B-11 Proposed Labor and Mechanization on Graduates(Vegetable & Fruit)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour Total (hr) |
|---|---|---|---|---|---|---|---|
| Squash | Manure spreading | 21-30/Apr | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 75.0 | 150 |
| | Plowing | 21-30/Apr | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | 0.0 | 12 |
| | Fertili.application | 1-15/May | by hand | 5.3 | 5.3 | 5.3 | 11 |
| | Sowing | 1-15/May | by hand | 0.0 | 0.0 | 5.3 | 5 |
| | Water manegment | 1/May-10/Sep | Drip Irrigation | 0.0 | 0.0 | 16.0 | 16 |
| | Weeding | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Disease control | 26-31/May | Hand move Sprayer | 4.5 | 4.5 | 4.5 | 9 |
| | Harvesting | 1-15/Sep | by hand | 42.5 | 42.5 | 53.1 | 96 |
| | Carrying | 1-15/Sep | Hand Tractor8ps/Trailer | 40.0 | 40.0 | 20.0 | 60 |
| | Post-treatment | 16-20/Aug | Hand Tractor8ps/Trailer | 38.5 | 38.5 | 0 | 39 |
| | Sub-total | | | 217.5 | 217.5 | 179.2 | 397 |
| Tomato | Prep.of nursery bed | 26Jan-15/Mar | by Vinil house | 23.8 | 23.8 | 29.7 | 53 |
| | Manure spreading | 21-30/Feb | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 169 |
| | Plowing | 21-30/Feb | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | 0.0 | 12 |
| | Fertili.application | 1-15/Mar | by hand | 5.3 | 5.3 | 6.6 | 12 |
| | Planting | 1-15/Mar | Planter | 7.0 | 7.0 | 0.0 | 7 |
| | Plastic tunnels cul. | 1-15/May | by hand | 0.0 | 0.0 | 25.0 | 25 |
| | Water manegment | 1/Mar-25/Jul | Drip Irrigation | 0.0 | 0.0 | 22.3 | 22 |
| | Disease control | 1/Jun-30/Jul | Hand move Sprayer | 0.0 | 0.0 | 4.0 | 4 |
| | Weeding | | by hand | 0.0 | 0.0 | 5.0 | 5 |
| | Harvesting | 16Jun-31/Jul | by hand | 0.0 | 0.0 | 1238.0 | 1,238 |
| | Carrying | 16Jun-31/Jul | Hand Tractor8ps/Trailer | 200.0 | 200.0 | 200.0 | 400 |
| | Post-treatment | 1-5/Aug | Hand Tractor8ps/Trailer | 40.0 | 40.0 | 0.0 | 40 |
| | Sub-total | | | 362.8 | 362.8 | 1624.4 | 1,987 |
| Green pepper | Prep.of nursery bed | 26Jun-15/Aug | by Vinil house | 6.3 | 6.3 | 29.8 | 36 |
| | Manure spreading | 21-31/Jul | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 169 |
| | Plowing | 21-31/Jul | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | 0.0 | 12 |
| | Fertili.application | 1-15/Aug | by hand | 5.3 | 5.3 | 6.6 | 12 |
| | Planting | 1-15/Aug | by hand | 7.0 | 7.0 | 0.0 | 7 |
| | Water manegment | 1/Aug-10/Nov | Drip Irrigation | 0.0 | 0.0 | 17.7 | 18 |
| | Weeding | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Disease control | 1-15/Sep | Hand move Sprayer | 4.5 | 4.5 | 4.4 | 9 |
| | Harvesting | 1-15/Nov | by hand | 0.0 | 0.0 | 166.6 | 167 |
| | Carrying | 1-15/Nov | Hand Tractor8ps/Trailer | 35.0 | 35.0 | 35.0 | 70 |
| | Post-treatment | 16-20/Nov | Hand Tractor8ps/Trailer | 12.5 | 12.5 | 0 | 13 |
| | Sub-total | | | 157.3 | 157.3 | 353.9 | 511 |
| Broad bean | Manure spreading | 1-15/Nov | Hand Tractor8ps/Trailer | 75.0 | 75.0 | 93.8 | 169 |
| | Plowing | 16-30/Nov | Hand Tractor8ps/Rotaly | 11.8 | 11.8 | 0.0 | 12 |
| | Fertili.application | 16-30/Nov | Hand Tractor8ps/Rotaly | 5.3 | 5.3 | 6.6 | 12 |
| | Sowing | 16-30/Nov | /Drill-Fertilizer | 0.0 | 0.0 | 0.0 | 0 |
| | Water manegment | 16Nov-10/Apr | Drip Irrigation | | | 22.8 | 23 |
| | Weeding | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Disease control | 1-15/Feb | Hand move Sprayer | 4.5 | 4.5 | 4.5 | 9 |
| | Harvesting | 1-15/Apr | by hand | 0.0 | 0.0 | 206.0 | 206 |
| | Carrying | 1-15/Apr | Hand Tractor8ps/Trailer | 13.3 | 13.3 | 13.3 | 27 |
| | Processing/grading | 16-25/Apr | by hand | 0.0 | 0.0 | 60.0 | 60 |
| | Sub-total | | | 109.8 | 109.8 | 407.0 | 517 |

Continuation-

Table B-11 Proposed Labor and Mechanization on Graduates(Vegetable & Fruit)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour Total (hr) |
|---|---|---|---|---|---|---|---|
| Canta loupe | Prep.of nursery bed | 11Mar 30/Apr | by Vinil house | 23.8 | 23.8 | 29.8 | 54 |
| | Manure spreading | 1 15/Apr | Hand Tractor8ps/Trailer | 75.0 | 93.8 | 93.8 | 188 |
| | Plowing | 16 30/Apr | Hand Tractor8ps/Rotaly | 11.8 | 14.7 | 0.0 | 15 |
| | Fertili.application | 16 30/Apr | by hand | 0.0 | 0.0 | 35.0 | 35 |
| | Planting | 16 30/Apr | by hand | 0.0 | | 140.0 | 140 |
| | Water manegment | 16Apr 25/Aug | Drip Irrigation | 0.0 | 0.0 | 20.2 | 20 |
| | Disease control | 1/Jun 30/Jul | Hand move Sprayer | 8.8 | 8.8 | 8.8 | 18 |
| | Weeding | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Harvesting | 16 31/Aug | by hand | 0.0 | 0.0 | 419.0 | 419 |
| | Carrying | 16 31/Aug | Hand Tractor8ps/Trailer | 50.0 | 62.5 | 50.0 | 113 |
| | Sub total | | | 169.3 | 203.5 | 796.6 | 1,000 |
| Melical plant | Manure spreading | 6 15/Oct | Hand Tractor8ps/Trailer | 75.0 | 93.8 | 0.0 | 91 |
| | Plowing | 6 15/Oct | Hand Tractor8ps/Rotaly | 11.8 | 14.7 | 0.0 | 15 |
| | Fertili.application | 16 31/Oct | by hand | 5.3 | 6.6 | 6.6 | 13 |
| | Sowing | 16 31/Oct | by hand | 0.0 | 0.0 | 6.0 | 6 |
| | Water manegment | 10Oct 25/Mar | Hand move Sprinkler | | | 25.2 | 25 |
| | Weeding | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Disease control | 1 10/Feb | Hand move Sprayer | 8.8 | 8.8 | 10.9 | 20 |
| | Harvesting | 16 31/Mar | by hand | 0.0 | 0.0 | 325.0 | 325 |
| | Carrying | 16 31/Mar | Hand fractor8ps/Trailer | 11.0 | 13.8 | 11.0 | 25 |
| | Sub total | | | 111.8 | 137.6 | 381.7 | 522 |
| Peach | Manure spreading | 1 30/Nov | Hand Tractor8ps/Trailer | 100.0 | 100.0 | 100.0 | 200 |
| | Fertili.application | 1 30/Nov | by hand | 0.0 | 0.0 | 12.5 | 13 |
| | Pruning | 11 30/Dec | by hand | 0.0 | 0.0 | 75.0 | 75 |
| | Fruit thinning | 26Feb 10/Mar | by hand | 0.0 | 0.0 | 50.0 | 50 |
| | Water manegment | 1/Jan 31/Dec | Drip Irrigation | 0.0 | 0.0 | 62.5 | 63 |
| | Disease control | 1 10/Jan | Hand move Sprayer | 4.5 | 4.5 | 0.0 | 5 |
| | Weeding | | Hand Tractor8ps/Rotaly | 12.0 | 12.0 | 0.0 | 12 |
| | Harvesting | 26Mar 31/May | by hand | 0.0 | 0.0 | 80.0 | 80 |
| | Carrying | 26Mar 31/May | Hand Tractor8ps/Trailer | 36.3 | 36.3 | 11.6 | 48 |
| | Sub total | | | 152.8 | 152.8 | 391.6 | 541 |
| | Total(hr) | | | 1,281.1 | 1,311.1 | 4,137.3 | 5,478 |

Table B-12 Proposed Labour and Mechanization on Small Scale Investors(Vegeta. &Beef Ca.)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Barley | Manure spreding | 1-15/Nov | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 1-15/Nov | Tractor50ps/Rotaly | 15 | 15 | 15 | 30 |
| | Ferti.application | 16-30/Nov | Fertilizer/Drill seeder | 13 | 13 | 27 | 40 |
| | Sowing | 16-30/Nov | | | | | 0 |
| | Water manegment | 16-Nov-30/Apr | Automated sprinkler | 0 | 0 | 36 | 36 |
| | Disease control | 1-15/Mar | Swerth sprayer | 4 | 4 | 9 | 13 |
| | Weeding | 1-15/Feb | Cultivater | 12 | 12 | 0 | 12 |
| | Harvesting | 1-15/May | Combine | 11 | 11 | 21 | 32 |
| | Carrying | 1-15-May | Tractor50/trailer | 25 | 25 | 50 | 75 |
| | Sub-total | | | 106 | 106 | 237 | 343 |
| Sorghum | Manure spreding | 1-31/May | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 1-15-Jun | Tractor50ps/Rotaly | 15 | 15 | 15 | 30 |
| | Ferti.application | 1-15/Jun | Fertilizer/Drill seeder | 13 | 13 | 27 | 40 |
| | Sowing | 1-15/Jun | | | | | 0 |
| | Water manegment | 1/Jun-30/Sep | Automated sprinkler | 0 | 0 | 24 | 24 |
| | Weeding | 1-15/Jul | Cultivater | 4 | 4 | 9 | 13 |
| | Cutting | 16/Jul-30/Sep | Rotaly mower | 16 | 16 | 32 | 48 |
| | Carrying | 16/Jul-30/Sep | Tractor50/trailer | 25 | 25 | 50 | 75 |
| | Sub-total | | | 99 | 99 | 236 | 335 |
| Berseem | Manure spreding | 1-30/Sep | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 1-15/Oct | Tractor50ps/Rotaly | 15 | 15 | 15 | 30 |
| | Ferti.application | 1-15/Oct | Line sowers | 13 | 13 | 27 | 40 |
| | Sowing | 1-15/Oct | by hand | | | | 0 |
| | Water manegment | 1/Oct-28/Feb | Automated sprinkler | 0 | 0 | 29 | 29 |
| | Weeding | 16-31/Oct | Cultivater | 4 | 4 | 9 | 13 |
| | Cutting | 16/Nov-28/Feb | Rotaly mower | 16 | 16 | 32 | 48 |
| | Carrying | 16/Nov-28/Feb | Tractor50/trailer | 25 | 25 | 50 | 75 |
| | Sub-total | | | 99 | 99 | 241 | 340 |
| Cabbage | Prep.of nursery bed | 26/Sep-15/Nov | by Vinil house | 238 | 238 | 238 | 476 |
| | Manure spreding | 16/Oct-15/Nov | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 1-15/Nov | Tractor50ps/Rotaly | 15 | 15 | 15 | 30 |
| | Ferti.application | 1-15/Nov | Fertilizer/Drill seeder | 13 | 13 | 27 | 40 |
| | Planting | 1-15/Nov | Trance planter | 32 | 32 | 61 | 96 |
| | Water manegment | 1/Nov-31/Mar | Automated sprinkler | 0 | 0 | 25 | 25 |
| | Weeding | 1-15/Mar | Cultivater | 12 | 12 | 0 | 12 |
| | Disease control | 1-15-Dec | Swerth sprayer | 4 | 4 | 9 | 13 |
| | Harvesting | 16-31/Mar | Combine | 0 | 0 | 213 | 213 |
| | Carrying | 16-31/Mar | Tractor50/trailer | 125 | 125 | 125 | 250 |
| | Sub total | | | 465 | 465 | 795 | 1,260 |

Continuation

Table B-12 Proposed Labour and Mechanization on Small Scale Investors(Vegeta. \Beef Ca. )

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery Operater (hr) | Planted Area Machinery Operater (hr) | Labour Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Soybean | Manure spreding | 16/May-15/Jun | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 1-15/Jun | Tractor50ps/Rotaly | 15 | 15 | 15 | 30 |
| | Ferti. application | 16-30/Jun | Fertilizer/Drill seeder | 13 | 13 | 27 | 40 |
| | Sowing | 16-30/Jun | | | | | 0 |
| | Water management | 16/Jun-30/Oct | Automated sprinkler | 0 | 0 | 24 | 24 |
| | Weeding | 1-15/Jul | Cultivater | 13 | 13 | 13 | 26 |
| | Disease control | 1-15/Aug | Swerth sprayer | 4 | 4 | 9 | 13 |
| | Harvesting | 16-31-Oct | Combine | 8 | 8 | 23 | 31 |
| | Carrying | 16-31/Oct | Tractor50/trailer | 8 | 8 | 15 | 23 |
| | Sub total | | | 87 | 87 | 205 | 292 |
| Tomato | Prep. of nursery bed | 26-31/Mar | by Vinil home | 238 | 238 | 238 | 476 |
| | Manure spreding | 1-15/May | Tractor50ps/Manure spreader | 26 | 26 | 26 | 52 |
| | Plowing | 1-15/May | Tractor50ps/Rotaly | 13 | 13 | 27 | 40 |
| | Ferti. application | 16-31/May | Fertilizer/Drill seeder | | | | 0 |
| | Planting | 16-31/May | Trance planter | 32 | 32 | 64 | 96 |
| | Water management | 16/May-25/Oct | Automated sprinkler | 0 | 0 | 36 | 36 |
| | Weeding | 16-31/Jul | Cultivater | 12 | 12 | 12 | 24 |
| | Disease control | 16/Jun-31/Jul | Swerth sprayer | 4 | 4 | 9 | 13 |
| | Harvesting | 1/Aug-31/Oct | Combine | 0 | 0 | 3,950 | 3,950 |
| | Carrying | 1/Aug-31/Oct | Tractor50/trailer | 100 | 100 | 200 | 300 |
| | Sub total | | | 425 | 425 | 4,552 | 4,987 |
| Potato | Manure spreding | 16/Mar-15/Apr | Tractor50ps/Manure spreader | 26 | 26 | 79 | 105 |
| | Plowing | 16-30/Apr | Tractor50ps/Rotaly | 13 | 13 | 25 | 38 |
| | Ferti. application | 16-30/Apr | Fertilizer/Drill seeder | 18 | 18 | 35 | 53 |
| | Sowing | 16-30/Apr | Trance planter | 0 | 0 | 0 | 0 |
| | Water management | 16/Apr-15/Aug | Automated sprinkler | 0 | 0 | 60 | 60 |
| | Weeding | 16-31/May | Cultivater | 12 | 12 | 12 | 24 |
| | Harvesting | 1-15/Aug | Combine | 58 | 58 | 175 | 233 |
| | Carrying | 1-15-Aug | Tractor50/trailer | 75 | 75 | 150 | 225 |
| | Sub total | | | 202 | 202 | 536 | 738 |
| Onion | Prep. of nursery bed | 16-25/Sep | Tractor50ps/Rotaly | 5 | 5 | 315 | 320 |
| | Manure spreding | 1-31/Oct | Tractor50ps/Manure spreader | 26 | 26 | 26 | 52 |
| | Plowing | 1-15/Nov | Tractor50ps/Rotaly | 13 | 13 | 27 | 40 |
| | Ferti. application | 1-15/Nov | Fertilizer/Drill seeder | | | | 0 |
| | Sowing | 1-15/Nov | Trance planter | 0 | 0 | 1,168 | 1,168 |
| | Water management | 1/Nov-15/Apr | Automated sprinkler | 0 | 0 | 75 | 75 |
| | Weeding | 1-15/Dec | Swerth sprayer | 4 | 4 | 9 | 13 |
| | Harvesting | 1-15/Apr | Reaping machines | 58 | 58 | 175 | 233 |
| | Carrying | 1-15/Apr | Tractor50/trailer | 30 | 30 | 60 | 90 |
| | Sub total | | | 136 | 136 | 1,855 | 1,991 |
| | Total(hr) | | | 1,619 | 1,619 | 8,667 | 10,286 |

Table B-13 Proposed Labour and Mechanization on Small Scale Investors(Vegeta. &Fruit)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Cabbage | Prep.of nursery bed | 25/Sep-15/Nov | by Vinil house | 190.0 | 190.0 | 190.0 | 380 |
| | Manure spreading | 21-31/Oct | Tractor50ps/Manure spreader | 21.0 | 21.0 | 63.0 | 84 |
| | Plowing | 21-31/Oct | Tractor50ps/Rotaly | 12.0 | 12.0 | 12.0 | 24 |
| | Fertili.application | 1-15/Nov | Fertilizer machine | 10.6 | 10.6 | 21.2 | 32 |
| | Planting | 1-15/Nov | Trance planter | 25.4 | 25.4 | 50.8 | 76 |
| | Water manegment | 1/Nov-25/Mar | Automated Sprinkler | 0.0 | 0.0 | 28.0 | 28 |
| | Weeding | - | Cultivater | 9.4 | 9.4 | 9.4 | 19 |
| | Harvesting | 16-31/Mar | by hand | 0.0 | 0.0 | 600.0 | 600 |
| | Carrying | 16-31/Mar | Tractor50ps/Trailer | 100.0 | 100.0 | 100.0 | 200 |
| | Total | | | 368.4 | 368.4 | 1071.4 | 1,443 |
| Soybean | Manure spreading | 5-15/Jun | Tractor50ps/Manure spreader | 10.5 | 10.5 | 31.5 | 42 |
| | Plowing | 5-15/Jun | Tractor50ps/Rotaly | 6.0 | 6.0 | 6.0 | 12 |
| | Fertili.application | 16-30/Jun | Fertilizer/Drill seeder | 5.3 | 5.3 | 10.6 | 16 |
| | Sowing | 16-30/Jun | - | 0.0 | 0.0 | 0.0 | 0 |
| | Water manegment | 16/Jun-25/Oct | Automated Sprinkler | 0.0 | 0.0 | 12.0 | 12 |
| | Weeding | - | Cultivater | 5.0 | 5.0 | 5.0 | 10 |
| | Harvesting | 16-31/Oct | Bean harvester | 6.4 | 6.4 | 18.4 | 25 |
| | Carrying | 16-31/Oct | Tractor50ps/Trailer | 10.0 | 10.0 | 20.0 | 30 |
| | Total | | | 43.2 | 43.2 | 103.5 | 147 |
| Sesame | Manure spreading | 21-31/May | Tractor50ps/Manure spreader | 10.5 | 10.5 | 31.5 | 42 |
| | Plowing | 21-31/May | Tractor50ps/Rotaly | 6.0 | 6.0 | 6.0 | 12 |
| | Fertili.application | 1-16/Jun | Fertilizer/Drill seeder | 5.3 | 5.3 | 10.6 | 16 |
| | Sowing | 1-16/Jun | - | 0.0 | 0.0 | 0.0 | 0 |
| | Water manegment | 1/Jun-10/Oct | Automated Sprinkler | 0.0 | 0.0 | 12.0 | 12 |
| | Weeding | - | Cultivater | 4.7 | 4.7 | 4.7 | 9 |
| | Cutting | 1-15/Oct | Vinder | 42.0 | 42.0 | 0.0 | 42 |
| | Carrying | 1-15/Oct | Tractor50ps/Trailer | 10.0 | 10.0 | 20.0 | 30 |
| | Total | | | 78.5 | 78.5 | 84.8 | 163 |
| Tomato | Prep.of nursery bed | 26-31/Mar | by Vinil house | 95.0 | 95.0 | 95.0 | 190 |
| | Manure spreading | 5-15/May | Tractor50ps/Manure spreader | 10.5 | 10.5 | 10.5 | 21 |
| | Plowing | 5-15/May | Tractor50ps/Rotaly | 5.3 | 5.3 | 10.6 | 16 |
| | Fertili.application | 16-31/May | Fertilizer machine | 0.0 | 0.0 | 0.0 | 0 |
| | Planting | 16-31/May | Trance planter | 12.7 | 12.7 | 25.4 | 38 |
| | Water manegment | 16/May-25/Oct | Automated sprinkler | 0.0 | 0.0 | 18.0 | 18 |
| | Disease/pest cotrol | 26/Jun-25/Jul | Swerth sprayer | 1.7 | 1.7 | 3.4 | 5 |
| | Weeding | | Cultivater | 4.7 | 4.7 | 4.7 | 9 |
| | Harvesting | 1/Aug 31/Oct | by hand | 0.0 | 0.0 | 1580.0 | 1,580 |
| | Carrying | 1/Aug-31/Oct | Tractor50ps/Trailer | 40.0 | 40.0 | 80.0 | 120 |
| | Total | | | 169.9 | 169.9 | 1827.6 | 1,998 |
| Poteto | Manure spreading | 1-15/Apr | Tractor50ps/Manure spreader | 10.5 | 10.5 | 0.0 | 11 |
| | Plowing | 1-15/Apr | Tractor50ps/Rotaly | 5.0 | 5.0 | 10.0 | 15 |
| | Fertili.application | 16-30/Apr | Fertilizer machine | 0.0 | 0.0 | 0.0 | 0 |
| | Sowing | 16-30/Apr | Poteto planter | | | | 0 |
| | Water manegment | 16/Apr-10/Aug | Automated sprinkler | 0.0 | 0.0 | 12.0 | 12 |
| | Weeding | | Cultivater | 4.7 | 4.7 | 4.7 | 9 |
| | Harvesting | 1/Aug-15/Aug | Poteto harvester | 23.3 | 23.3 | 0.0 | 23 |
| | Carrying | 1/Aug-15/Aug | Tractor50ps/Trailer | 30.0 | 30.0 | 60.0 | 90 |
| | Total | | | 73.5 | 73.5 | 86.7 | 160 |
| Onion | Prep.of nursery bed | 16-25/Sep | Nursery bed | 0.0 | 0.0 | 252.0 | 252 |
| | Manure spreading | 6-15/Nov | Tractor50ps/Manure spreader | 21.0 | 21.0 | 0.0 | 21 |
| | Plowing | 16-30/Nov | Tractor50ps/Rotaly | 10.6 | 10.6 | 21.2 | 32 |
| | Fertili.application | 16-30/Nov | Fertilizer machine | 0.0 | 0.0 | 0.0 | 0 |
| | Planting | 16-30/Nov | by hand | 0.0 | 0.0 | 504.0 | 504 |
| | Water manegment | 16/Nov-10/Apr | Automated sprinkler | 0.0 | 0.0 | 30.0 | 30. |
| | Weeding | | Swerth sprayer | 3.4 | 3.4 | 7.2 | 11 |
| | Harvesting | 1/Apr-15/Apr | Reaping machines | 46.6 | 46.6 | 1340.0 | 1,387 |
| | Carrying | 1/Apr-15/Apr | Tractor50ps/Trailer | 80.0 | 80.0 | 140.0 | 220 |
| | Total | | | 161.6 | 161.6 | 2294.4 | 2,456 |

Continuation

Table B-13 Proposed labour and Mechanization on Small Scale Investors(Vegeta.(Fruit)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery Operater (hr) | Assistant (hr) | Labour total (hr) | |
|---|---|---|---|---|---|---|---|
| Grapes | Manure spreding | 1-30/Nov | Tractor50ps/Manure spreader | 21.0 | 21.0 | 42.0 | 63 |
| | Fertili.application | 1-30/Nov | Trencher/by hand | 21.0 | 21.0 | 21.0 | 42 |
| | Pruning | 1-15/Jan | by hand | 0.0 | 0.0 | 480.0 | 480 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0.0 | 0.0 | 73.0 | 73 |
| | Disease control | 1-10/Jul | Swerth Sprayer | 24.0 | 24.0 | 24.0 | 48 |
| | Weeding | | Cultivator | 30.0 | 30.0 | 30.0 | 60 |
| | Harvesting | 16/Jul-30/Sep | by hand | 0.0 | 0.0 | 2016.0 | 2,016 |
| | Carrying | 16/Jul-30/Sep | Tractor50ps/trailer | 108.0 | 108.0 | 61.8 | 173 |
| | Sub total | | | 204.0 | 204.0 | 2750.8 | 2,955 |
| Olive | Manure spreding | 1-10/Mar | Tractor50ps/Manure spreader | 21.0 | 21.0 | 42.0 | 63 |
| | Fertili.application | 1-10/Mar | Trencher/by hand | 21.0 | 21.0 | 21.0 | 42 |
| | Pruning | | by hand | 0.0 | 0.0 | 0.0 | 0 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0.0 | 0.0 | 73.0 | 73 |
| | Disease control | 1-10/Aug | Swerth Sprayer | 24.0 | 24.0 | 24.0 | 48 |
| | Weeding | | Cultivator | 9.4 | 9.4 | 9.4 | 19 |
| | Harvesting | 1/Oct-30/Nov | by hand | 0.0 | 0.0 | 2680.0 | 2,680 |
| | Carrying | 1/Oct-30/Nov | Tractor50ps/Trailer | 91.0 | 91.0 | 56.0 | 150 |
| | Sub total | | | 169.4 | 169.4 | 2905.4 | 3,075 |
| Orange | Manure spreding | 16-25/Mar | Tractor50ps/Manure spreader | 21.0 | 21.0 | 42.0 | 63 |
| | Fertili.application | 16-25/Mar | Trencher/by hand | 21.0 | 21.0 | 21.0 | 42 |
| | Pruning | 16-31/Jan | by hand | 0.0 | 0.0 | 168.0 | 168 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0.0 | 0.0 | 73.0 | 73 |
| | Disease control | 1-20/Sep | Swerth Sprayer | 3.4 | 3.4 | 6.8 | 10 |
| | Weeding | | Cultivator | 9.4 | 9.4 | 9.4 | 19 |
| | Harvesting | 16/Nov-31/Dec | by hand | 0.0 | 0.0 | 2460.0 | 2,460 |
| | Carrying | 16/Nov-31/Dec | Tractor50ps/Trailer | 100.0 | 100.0 | 60.0 | 160 |
| | Sub total | | | 154.8 | 154.8 | 2840.2 | 2,995 |
| | Total | | | 1423.3 | 1423.3 | 13967.8 | 15,391 |

Table B-14 Proposed Labour and Mechanization on Large Scale Investors(Land Use Crops)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Wheat | Manure spreading | 1-30/Nov. | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-30/Nov. | Tractor50ps/Rotaly 2.4m | 108 | 108 | 108 | 216 |
| | Fertili. application | 16-30/Nov. | Tractor50ps | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov. | Fertilizer-Drill seeder | 0 | 0 | 0 | 0 |
| | Water manegment | 16/Nov-10/May | Automated Sprinkler | 0 | 0 | 108 | 108 |
| | Disease control | 16-30/Mar | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Weeding | | Cultivator | 85 | 85 | 85 | 169 |
| | Harvesting | 16-31/May | Combine, auto thresher | 76 | 76 | 151 | 227 |
| | Carrying | 16-31/May | Tractor50ps/Trailer | 51 | 51 | 108 | 162 |
| | Sub-total | | | 731 | 731 | 1.188 | 1.919 |
| Maize | Manure spreading | 16May-5Jun | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Jun. | Tractor50ps/Rotaly 2.4m | 108 | 108 | 108 | 216 |
| | Fertili. application | 1-15/Jun. | Tractor50ps | 189 | 189 | 189 | 378 |
| | Sowing | 1-15/Jun. | Fertilizer-Drill seeder | 0 | 0 | 0 | 0 |
| | Water manegment | 1/Jun-10/Oct. | Automated Sprinkler | 0 | 0 | 72 | 72 |
| | Disease control | 1-15/Aug. | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Weeding | - | Cultivator | 85 | 85 | 85 | 169 |
| | Harvesting | 1-15/Oct. | Combine, auto thresher | 113 | 113 | 227 | 340 |
| | Carrying | 1-15/Oct. | Tractor50ps/Trailer | 324 | 324 | 648 | 972 |
| | Sub-total | | | 1,039 | 1.039 | 1.768 | 2.806 |
| Barley | Manure spreading | 25/Oct-15/Nov. | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Nov. | Tractor50ps/Botom plow | 108 | 108 | 108 | 216 |
| | Fertili. application | 16-30/Nov. | Tractor50ps | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov. | Fertilizer-Drill seeder | 0 | 0 | 0 | 0 |
| | Water manegment | 16/Nov-5/May | Automated Sprinkler | 0 | 0 | 67 | 67 |
| | Disease control | 16 25/Mar | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Weeding | - | Cultivator | 85 | 85 | 85 | 169 |
| | Harvesting | 1-15/May | Combine, auto thresher | 76 | 76 | 151 | 227 |
| | Carrying | 1-15/May | Tractor50ps/Trailer | 51 | 51 | 108 | 162 |
| | Sub-total | | | 731 | 731 | 1.147 | 1.877 |
| Soy bean | Manure spreading | 5-14/Jun | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 5-14/Jun | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili. application | 15-30/Jun | Tractor50ps/ | 95 | 95 | 191 | 286 |
| | Sowing | 15-30/Jun | Fertili. Drill seeder | 0 | 0 | 0 | 0 |
| | Water manegment | 15/Jun 25/Oct | Automated Sprinkler | 0 | 0 | 81 | 81 |
| | Weeding | 15-30/Jun | by Herbicide | 31 | 31 | 61 | 92 |
| | Disease control | 5-15/Aug | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 15-31/Oct | Bean harvester | 54 | 54 | 108 | 162 |
| | Carrying | 15-31/Oct | Tractor50ps/Trailer | 144 | 144 | 288 | 432 |
| | Processing/grading | 1-5/Nov | by hand | 0 | 0 | 1.080 | 1.080 |
| | Sub-total | | | 652 | 652 | 2.356 | 3.008 |

Continuation

Table B-14 Proposed labour and Mechanization on Large Scale Investors(Land Use Crops)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | labour total (hr) |
|---|---|---|---|---|---|---|---|
| Sesame | Manure spreading | 16/Apr-15/May | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16-30/Jun | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili. application | 16-30/Jun | Fertili. Drill seeder | 95 | 95 | 191 | 286 |
| | Sowing | 16-30/Jun | | 0 | 0 | 0 | 0 |
| | Water manegment | 1/Jun-10/Oct | Automated Sprinkler | 0 | 0 | 72 | 72 |
| | Weeding | | Cultivator | 85 | 85 | 85 | 169 |
| | Disease control | 25/Jun-31/Jul | Swerth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 1-15/Oct | Vinder | 756 | 756 | 1,512 | 2,268 |
| | Carrying | 1-15/Oct | Tractor50ps/Trailer | 108 | 108 | 216 | 324 |
| | Post-treatment | 1-10/Nov | Tractor50ps/trailer | 0 | 0 | 612 | 612 |
| | Sub-total | | | 1,372 | 1,372 | 3,235 | 4,606 |
| Poteto | Manure spreading | 1-15/Apr | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Apr | Tractor50ps/Rotaly | 108 | 108 | 216 | 324 |
| | Fertili. application | 15-30/Apr | Fertilizer machine | 0 | 0 | 0 | 0 |
| | Sowing | 15-30/Apr | Poteto planter | 126 | 126 | 252 | 378 |
| | Water manegment | 15/Apr-10/Aug | Drip irrigtion | 0 | 0 | 63 | 63 |
| | Weeding | 15-30/Apr | Swerth Sprayer | 31 | 31 | 61 | 92 |
| | Disease control | 1-5/Apr | Swerth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 1-15/Aug | Poteto harvester | 419 | 419 | 1,258 | 1,678 |
| | Carrying | 1-15/Aug | Tractor50ps/Trailer | 1,440 | 1,440 | 1,440 | 2,880 |
| | Sub-total | | | 2,344 | 2,344 | 3,730 | 6,073 |
| Onion | Prep. of nursery bed | 16-30/Sep | Rotaly(Nursery bed) | 22 | 22 | 43 | 65 |
| | Manure spreading | 1-15/Nov | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16-30/Nov | Tractor50ps/Rotaly | 108 | 108 | 216 | 324 |
| | Fertili. application | 16-30/Nov | Fertilizer machine | 0 | 0 | 0 | 0 |
| | Planting | 16-30/Nov | by hand | 0 | 0 | 9,000 | 9,000 |
| | Water manegment | 16/Nov-10/Apr | Automated Sprinkler | 0 | 0 | 81 | 81 |
| | Weeding | | by hand | 31 | 31 | 61 | 92 |
| | Harvesting | 1-15/Apr | by hand | 419 | 419 | 1,258 | 1,678 |
| | Carrying | 1-15/Apr | Tractor50ps/Trailer | 684 | 684 | 1,080 | 1,764 |
| | Processing | 16-30/Apr | by hand | 0 | 0 | 2,160 | 2,160 |
| | Sub-total | | | 1,453 | 1,453 | 14,278 | 15,730 |
| Cabbage | Prep. of nursery bed | 25/Sep-14/Nov | Seeder(in Vinil house) | 1,710 | 1,710 | 1,764 | 3,474 |
| | Manure spreading | 20-30/Oct | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 20-30/Oct | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili. application | 1-15/Nov | Fertilizer machine | 90 | 90 | 180 | 270 |
| | Planting | 1-15/Nov | Trance planter | 234 | 234 | 468 | 702 |
| | Water manegment | 1/Nov-25/Mar | Automated Sprinkler | 0 | 0 | 72 | 72 |
| | Weeding | 16-25/Nov | Swerth Sprayer | 31 | 31 | 61 | 92 |
| | Disease control | 1-10/Dec | Swerth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 15-31/Mar | by hand | 0 | 0 | 5,040 | 5,040 |
| | Carrying | 15-31/Mar | Tractor50ps/Trailer | 1,728 | 1,728 | 2,304 | 4,032 |
| | Post-treatment | 1-5Apr | Tractor50ps/Trailer | 108 | 108 | 216 | 324 |
| | Sub-total | | | 4,228 | 4,228 | 10,652 | 14,881 |
| | Total | | | 12,548 | 12,548 | 38,353 | 50,900 |

Table B-15 Proposed Labour and Mechanization on Large Scale Investors(Dairy)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour total (hr) |
|---|---|---|---|---|---|---|---|
| Wheat | Manure spreading | 1-15/Nov | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16-30/Nov | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili.application | 16-30/Nov | Tractor50ps/Rotaly 2.4m | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov | Ferti-Drill seeder(13Line) | | | | 0 |
| | Water manegment | 16/Nov-10/May | Automated Sprinkler | 0 | 0 | 108 | 108 |
| | Weeding | - | Cultivater(2.5m) | 85 | 85 | 0 | 85 |
| | Disease control | 16-31/Mar | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 16-31/May | Combine | 76 | 76 | 151 | 227 |
| | Carrying | 16-31/May | Tractor50ps/Trailer(5 ton) | 27 | 27 | 54 | 81 |
| | Sub-total | | | 705 | 705 | 1,049 | 1,754 |
| Maize | Manure spreading | 1/Apr-15/May | Tractor50ps/Manure spreader | 378 | 378 | 756 | 1,134 |
| | Plowing | 1-31/May | Tractor50ps/Rotaly | 216 | 216 | 216 | 432 |
| | Fertili.application | 1-31/May | Tractor50ps/Rotaly 2.4m | 378 | 378 | 378 | 756 |
| | Sowing | 1-31/May | Ferti-Drill seeder(13Line) | | | | 0 |
| | Water manegment | 1/May-15/Sep | Automated Sprinkler | 0 | 0 | 144 | 144 |
| | Weeding | - | Cultivater(2.5m) | 169 | 169 | 0 | 169 |
| | Disease control | 1-15/Aug | Sverth Sprayer | 61 | 61 | 122 | 183 |
| | Harvesting | 1-30/Sep | Tractor50ps/Mower(3 time) | 227 | 227 | 454 | 681 |
| | Carrying | 1-30/Sep | Tractor50ps/Trailer(5 ton) | 324 | 324 | 648 | 972 |
| | Sub-total | | | 1,753 | 1,753 | 2,718 | 4,471 |
| Barley | Manure spreading | 16/Oct-15/Nov | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Nov | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili.application | 16-30/Nov | Tractor50ps/Rotaly 2.4m | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov | Ferti-Drill seeder(13Line) | | | | 0 |
| | Water manegment | 16/Nov-30/Apr | Automated Sprinkler | 0 | 0 | 67 | 67 |
| | Weeding | - | Cultivater(2.5m) | 31 | 31 | 0 | 31 |
| | Disease control | 16-31/Mar | Sverth Sprayer | 85 | 85 | 85 | 170 |
| | Harvesting | 1-15/May | Combine | 76 | 76 | 151 | 227 |
| | Carrying | 1-15/May | Tractor50ps/Trailer(5 ton) | 27 | 27 | 54 | 81 |
| | Sub-total | | | 705 | 705 | 1,032 | 1,737 |
| Sorghum | Manure spreading | 1/May-15/Jun | Tractor50ps/Manure spreader | 378 | 378 | 756 | 1,131 |
| | Plowing | 1-31/Jun | Tractor50ps/Rotaly | 216 | 216 | 216 | 432 |
| | Fertili.application | 1-31/Jun | Tractor50ps/Rotaly 2.4m | 191 | 191 | 382 | 573 |
| | Sowing | 1-31/Jun | Ferti-Drill seeder(13Line) | 3 | 0 | 0 | 0 |
| | Water manegment | 1/Jun-15/Oct | Automated Sprinkler | 0 | 0 | 144 | 144 |
| | Weeding | - | | 0 | 0 | 0 | 0 |
| | Disease control | 1-15/Aug | Sverth Sprayer | 61 | 0 | 122 | 122 |
| | Cutting | 25/Jun-15/Oct | Roraly Mower(3 time) | 108 | 108 | 216 | 324 |
| | Carrying | 25/Jun-15/Oct | Tractor50ps/Trailer(5 ton) | 2,160 | 2,160 | 4,320 | 6,480 |
| | Sub-total | | | 3,114 | 3,053 | 6,156 | 9,209 |
| Berseem (short) | Manure spreading | 1-30/Sep | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Oct | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Fertili.application | 1-15/Oct | Tractor50ps/Rotaly 2.4m | 95 | 95 | 191 | 286 |
| | Sowing | 1-15/Oct | Ferti-Drill seeder(13Line) | 0 | 0 | 0 | 0 |
| | Water manegment | 1/Oct-25/Feb | Automated Sprinkler | 0 | 0 | 72 | 72 |
| | Weeding | - | - | 0 | 0 | 0 | 0 |
| | Disease control | 16-31/Oct | Sverth Sprayer | 85 | 85 | 85 | 170 |
| | Cutting | 10/Nov-28/Feb | Roraly Mower(3 time) | 756 | 756 | 1,512 | 2,268 |
| | Carrying | 10/Nov-28/Feb | Tractor50ps/Trailer(5 ton) | 990 | 990 | 1,980 | 2,970 |
| | Sub-total | | | 2,223 | 2,223 | 4,326 | 6,549 |
| Fodder beet | Manure spreading | 16/Spt-15/Oct | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16-31/Oct | Tractor50ps/Rotaly | 108 | 108 | 216 | 324 |
| | Fertili.application | 16-31/Oct | Tractor50ps/Rotaly 2.4m | 126 | 126 | 252 | 378 |
| | Sowing | 16-31/Oct | Ferti-Drill seeder(13Line) | 0 | 0 | 0 | 0 |
| | Water manegment | 16/Oct-15/Apr | Automated Sprinkler | 0 | 0 | 63 | 63 |
| | Weeding | 1-15/Feb | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Disease control | 1-15/Mar | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 1-15/Apr | Beet harvestor | 419 | 419 | 1,258 | 1,677 |
| | Carrying | 1-15/Apr | Tractor50ps/Trailer(5 ton) | 2,880 | 2,880 | 5,940 | 8,820 |
| | Sub-total | | | 3,784 | 3,784 | 8,229 | 12,013 |
| | Total(hr) | | | 12,281 | 12,223 | 23,510 | 35,733 |

Table B-16 Proposed Labour and Mechanization on Large Scale Investor(Beef Cattle)

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labor total (hr) |
|---|---|---|---|---|---|---|---|
| Wheat | Manure spreading | 1-15/Nov. | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16-30/Nov. | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Ferti.application | 16-30/Nov. | Tractor50ps/Rotaly 2.4m | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov. | Ferti.-Drill seeder(13Line) | | | | |
| | Water manegment | 16Nov-10/May | Automated Sprinkler | 0 | 0 | 108 | 108 |
| | Disease control | 16-25/Mar | Sverth Sprayer(600Lit) | 31 | 31 | 61 | 92 |
| | Weeding | | Cultivator(2.5m) | 85 | 85 | 85 | 169 |
| | Harvesting | 16-31/May | Combine(300cm) | 76 | 76 | 151 | 227 |
| | Carrying | 16-31/May | Tractor50ps/Trailer(3 ton) | 27 | 27 | 54 | 81 |
| | Sub total | | | 701 | 701 | 1,131 | 1,838 |
| Maize | Manure spreading | 20 31/May | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1 15/Jun | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Ferti.application | 1-15/Jun | Tractor50ps/Rotaly 2.4m | | | | |
| | Sowing | 1 15/Jun | Fertilizer-Drill seeder | 90 | 90 | 180 | 270 |
| | Water manegment | 1/Jun-10/Oct | Automated sprinkler | 0 | 0 | 72 | 72 |
| | Weeding | | Cultivator | 85 | 85 | 85 | 169 |
| | Disease control | 1 15/Aug | Sverth sprayer | 31 | 31 | 61 | 92 |
| | Cutting | 1 15/Oct | Tractor50ps/Cornharvester | 113 | 113 | 227 | 340 |
| | Carrying | 1 15/Oct | Tractor50ps/Trailer | 162 | 162 | 324 | 486 |
| | Sub total | | | 778 | 778 | 1,435 | 2,212 |
| Barley | Manure spreading | 1 15/Nov. | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1 15/Nov. | Tractor50ps/Botom plow | 108 | 108 | 108 | 216 |
| | Ferti.application | 16 30/Nov. | Tractor50ps/Rotaly 2.4m | 189 | 189 | 189 | 378 |
| | Sowing | 16-30/Nov. | Fertilizer-Drill seeder | | | | |
| | Water manegment | 16Nov-5/May | Automated sprinkler | 0 | 0 | 67 | 67 |
| | Disease control | 16-25/Mar | Sverth sprayer | 31 | 31 | 61 | 92 |
| | Weeding | | Cultivator | 85 | 85 | 85 | 169 |
| | Harvesting | 1 15/May | Combine | 76 | 76 | 151 | 227 |
| | Carrying | 1-15/May | Tractor50ps/Trailer | 27 | 27 | 54 | 81 |
| | Sub total | | | 701 | 701 | 1,093 | 1,796 |
| Sorghum | Manure spreading | 1 11/May | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 16 31/May | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Ferti.application | 16-31/May | Tractor50ps/ | 95 | 95 | 191 | 286 |
| | Sowing | 16 31/May | Fertili.Drill seeder | | | | |
| | Water manegment | 16Jun-25/Oct | Automated sprinkler | 0 | 0 | 72 | 72 |
| | Weeding | 16 30/Jun | | 0 | 0 | 0 | 0 |
| | Disease control | 1 15/Jun | Sverth sprayer | 31 | 31 | 61 | 92 |
| | Cutting | 25Jun-30/Sep | Tractor50ps/Mower(3 time) | 54 | 54 | 108 | 162 |
| | Carrying | 25Jun-30/Sep | Tractor50ps/Trailer | 1,080 | 1,080 | 2,160 | 3,240 |
| | Sub total | | | 1,557 | 1,557 | 3,078 | 4,635 |
| Persoon (short) | Manure spreading | 20 31/Sep | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1 15/Oct | Tractor50ps/Rotaly | 108 | 108 | 108 | 216 |
| | Ferti.application | 1 15/Oct | Tractor50ps/ | 95 | 95 | 191 | 286 |
| | Sowing | 1-15/Oct | Brodcaster | | | | |
| | Water manegment | 1/Oct 25/Feb | Automated sprinkler | 0 | 0 | 72 | 72 |
| | Disease control | 16 25/Oct | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Weeding | | | 85 | 85 | 85 | 169 |
| | Cutting | 11Nov-28/Feb | Rotaly mower | 756 | 756 | 1,125 | 1,881 |
| | Carrying | 11Nov-28/Feb | Tractor50ps/Trailer | 990 | 990 | 1,980 | 2,970 |
| | Sub-total | | | 2,251 | 2,251 | 4,000 | 6,253 |
| Persoon (Long) | Manure spreading | 20-31/Sep | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Plowing | 1-15/Oct | Tractor50ps/Rotaly | 108 | 108 | 216 | 324 |
| | Ferti.application | 1 15/Oct | Tractor50ps | 95 | 95 | 191 | 286 |
| | Sowing | 1-15/Oct | Brodcaster | | | | |
| | Water manegment | 1/Oct 25/May | Automated Sprinkler | 0 | 0 | 144 | 144 |
| | Weeding | | | | | | |
| | Disease control | 16-25/Oct | Sverth Sprayer | 31 | 31 | 61 | 92 |
| | Harvesting | 11Nov-28/May | Beet harvester | 419 | 419 | 1,258 | 1,678 |
| | Carrying | 11Nov-28/May | Tractor50ps/frailer | 1,491 | 1,491 | 2,988 | 4,482 |
| | Sub total | | | 2,336 | 2,336 | 5,236 | 7,573 |
| | Total | | | 8,332 | 8,332 | 15,975 | 24,307 |

Table B-17 Proposed Labor and Mechanization on Large-scale Investor( Fruit )

| Crops | Operation | Operation time | Name of Farm Machinery | Planted Area Machinery (hr) | Operater (hr) | Assistant (hr) | Labour Total |
|---|---|---|---|---|---|---|---|
| Almond | Manure spreding | 1-15/Jan | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Ferti.application | 16-31/Jan | Trencher/by hand | 189 | 189 | 189 | 378 |
| | Pruning | 1-15/Feb | by hand | 0 | 0 | 0 | 0 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0 | 0 | 657 | 657 |
| | Disease control | 1-10/Mar | Swerth Sprayer | 216 | 216 | 432 | 648 |
| | Weeding | | Cultivator | 270 | 270 | 270 | 540 |
| | Harvesting | 1/May-30/Jun | by hand | | | 17.820 | 17.820 |
| | Carrying | 1/May-30/Jun | Tractor50ps/Trailer | 972 | 972 | 576 | 1.548 |
| | Sub-total | | | 1.836 | 1.836 | 20.322 | 22.158 |
| Grapes | Manure spreding | 16-31/Jan | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Ferti.application | 1-15/Feb | Trencher/by hand | 189 | 189 | 189 | 378 |
| | Pruning | 16-28/Feb | Pruning Machin | 540 | 540 | 540 | 1.080 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0 | 0 | 657 | 657 |
| | Disease control | 1-10/Jul | Swerth Sprayer | 216 | 216 | 432 | 648 |
| | Weeding | | Cultivator | 270 | 270 | 270 | 540 |
| | Harvesting | 16/Jul-30/Sep | by hand | 0 | 0 | 18.144 | 18.144 |
| | Carrying | 16/Jul-30/Sep | Tractor50ps/Trailer | 972 | 972 | 576 | 1.548 |
| | Sub total | | | 2.376 | 2.376 | 21.186 | 23.562 |
| Olive | Manure spreding | 1-10/Mar | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Ferti.application | 1-10/Mar | Trencher/by hand | 189 | 189 | 189 | 378 |
| | Pruning | 1-20/Jan | | 0 | 0 | 0 | 0 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0 | 0 | 657 | 657 |
| | Disease control | 1-10/Aug | Swerth Sprayer | 216 | 216 | 216 | 432 |
| | Weeding | | Cultivator | 90 | 90 | 90 | 180 |
| | Harvesting | 1/Oct-30/Nov | by hand | 0 | 0 | 24.120 | 24.120 |
| | Carrying | 1/Oct-30/Nov | Tractor50ps/Trailer | 846 | 846 | 504 | 1.350 |
| | Sub-total | | | 1.530 | 1.530 | 26.154 | 27.684 |
| Orange | Manure spreding | 16-25/Mar | Tractor50ps/Manure spreader | 189 | 189 | 378 | 567 |
| | Ferti.application | 16-25/Mar | Trencher/by hand | 189 | 189 | 189 | 378 |
| | Pruning | 1-20/Jan | Pruning Machin | 540 | 540 | 540 | 1.080 |
| | Water manegment | 1/Jan-31/Dec | Drip irrigtion | 0 | 0 | 666 | 666 |
| | Disease control | 1-20/Sep | Swerth Sprayer | 216 | 216 | 216 | 432 |
| | Weeding | | Cultivator | 270 | 270 | 270 | 540 |
| | Harvesting | 16/Nov-31/Dec | by hand | 0 | 0 | 22.140 | 22.140 |
| | Carrying | 16/Nov-31/Dec | Tractor50ps/Trailer | 900 | 900 | 540 | 1.440 |
| | Sub-total | | | 2.301 | 2.304 | 24.939 | 27.243 |
| | Total | | | 8.046 | 8.046 | 92.601 | 100.647 |

Table B-18 Labour time of farming on Small Farmer

| Crops | Operation | Jan 1-15 | Jan 16-30 | Feb 1-15 | Feb 16-30 | Mar 1-15 | Mar 16-30 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-30 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-30 | Aug 1-15 | Aug 16-30 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-30 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-30 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wheat | Manure spreading | | | | | | | | | | | | | | | | | | | | | 34 | 34 | | | 68 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 5 | | | | 5 |
| | Fertil. application | | | | | | | | | | | | | | | | | | | | | | 5 | | | 5 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | | | | | | | | | | | | 1 | 1 | 1 | | 12 |
| | Disease control | | | | | | | 4 | | | | | | | | | | | | | | | | | | 4 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | 4 | | | | 4 |
| | Harvesting | | | | | | | | | 2 | | | | | | | | | | | | | | | | 2 |
| | Carrying | | | | | | | | | 23 | | | | | | | | | | | | | | | | 23 |
| | Sub-total | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 1 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 44 | 1 | 1 | 137 |
| Sorghum | Manure spreading | | | | | | | | | 68 | 101 | | | | | | | | | | | | | | | 169 |
| | Plowing | | | | | | | | | 5 | 7 | | | | | | | | | | | | | | | 12 |
| | Fertil. application | | | | | | | | | | 12 | | | | | | | | | | | | | | | 12 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | | | | | | | | | 7 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | | | | | | | | 32 |
| | Weeding | | | | | | | | | | | 4 | | | | | | | | | | | | | | 4 |
| | Disease control | | | | | | | | | | | | 1 | 3 | 3 | 3 | 3 | 3 | | | | | | | | 21 |
| | Cutting | | | | | | | | | | | | 4 | 11 | 11 | 11 | 11 | 11 | | | | | | | | 58 |
| | Carrying | | | | | | | | | | | | 9 | 18 | 18 | 18 | 18 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 326 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 127 | 11 | | | | | | | | 66 | 66 | | | | | 131 |
| Bersee (Short) | Manure spreading | | | | | | | | | | | | | | | | | | | 12 | | | | | | 12 |
| | Plowing | | | | | | | | | | | | | | | | | | | 9 | | | | | | 9 |
| | Fertil. application | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 14 |
| | Water manegment | 2 | 2 | 1 | | | | | | | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 7 |
| | Disease control | | | | | | | | | | | | | | | | | | | | | | | | | 18 |
| | Cutting | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | 0 | 1 | 1 | 1 | 199 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | | | | 53 |
| | Sub-total | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 89 | 74 | 2 | 2 | 2 | 2 | 169 |
| Water melon | Prep. of nursery bed | | | | | | 5 | 15 | 16 | 16 | | | | | | | | | | | | | | | | 12 |
| | Manure spreading | | | | | 84 | 84 | | | | | | | | | | | | | | | | | | | 12 |
| | Plowing | | | | | | | | 12 | | | | | | | | | | | | | | | | | 30 |
| | Fertil. application | | | | | | | | | 18 | | | | | | | | | | | | | | | | 20 |
| | Planting | | | | | | | | | 30 | | | | | | | | | | | | | | | | 10 |
| | Water manegment | | | | | | | | | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | 5 | 5 | | | | | | | | | | | 211 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 192 |
| | Harvesting | | | | | | | | | | | | | | | | | 211 | | | | | | | | 60 |
| | Carrying | | | | | | | | | | | | | | | | | 192 | | | | | | | | 768 |
| | Post-treatment | | | | | | | | | | | | | | | | | | 60 | | | | | | | |
| | Sub-total | 0 | 0 | 0 | 0 | 84 | 90 | 16 | 28 | 66 | 2 | 2 | 2 | 7 | 7 | 2 | 2 | 404 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 54 |
| Tomato | Prep. of nursery bed | | 5 | 16 | 16 | 16 | | | | | | | | | | | | | | | | | | | | 169 |
| | Manure spreading | | | | 169 | | | | | | | | | | | | | | | | | | | | | 12 |
| | Plowing | | | | 12 | | | | | | | | | | | | | | | | | | | | | 12 |
| | Fertil. application | | | | | 12 | | | | | | | | | | | | | | | | | | | | 7 |
| | Planting | | | | | 7 | | | | | | | | | | | | | | | | | | | | 45 |
| | Plastic tunnels culture | | | | | 45 | | | | | | | | | | | | | | | | | | | | 22 |
| | Water manegment | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | 9 |
| | Disease control | | | | | | | | | | | 2 | 2 | 2 | 2 | | | | | | | | | | | 0 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 1,228 |
| | Harvesting | | | | | | | | | | | 413 | 413 | 413 | | | | | | | | | | | | 400 |
| | Carrying | | | | | | | | | | | 133 | 133 | 133 | | | | | | | | | | | | 40 |
| | Post-treatment | | | | | | | | | | | | | | 40 | | | | | | | | | | | 2,007 |
| | Sub-total | 0 | 5 | 16 | 196 | 82 | 2 | 2 | 2 | 2 | 2 | 5 | 551 | 551 | 550 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

-Continuation-

Table B-18 Labour time of farming on Small Farmer

| Crops | Operation | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green pepper | Prep. of nursery bed | | | | | | | | | | | 4 | 11 | 11 | 11 | | | | | | | | | | | 36 |
| | Manure spreading | | | | | | | | | | | | | | 84 | 84 | | | | | | | | | | 168 |
| | Plowing | | | | | | | | | | | | | 12 | | | | | | | | | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | 12 | | | | | | | | | | | 12 |
| | Planting | | | | | | | | | | | | | | 7 | | | | | | | | | | | 7 |
| | Water manegment | | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | | | | 18 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | | | | 9 | | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | | | | 167 | | | | | | | 167 |
| | Carrying | | | | | | | | | | | | | | | | | | 70 | | | | | | | 70 |
| | Post-treatment | | | | | | | | | | | | | | | | | | | 13 | | | | | | 13 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 22 | 117 | 87 | 11 | 3 | 239 | 15 | 2 | 0 | 0 | 0 | 511 |
| Broad bean | Manure spreading | | | | | | | | | | | | | | | | | | | | | 68 | 101 | | | 169 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 5 | 7 | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | 5 | 7 | | | 12 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 2 | 2 | 2 | 2 | 2 | 2 | 1 | | | | | | | | | | | | | | | 2 | 2 | 2 | 23 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | 9 | | | | | | | | | | | | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | 206 | | | | | | | | | | | | | | | | | | 206 |
| | Carrying | | | | | | | 27 | | | | | | | | | | | | | | | | | | 27 |
| | Processing grading | | | | | | | | | | 30 | 30 | | | | | | | | | | | | | | 60 |
| | Sub-total | 2 | 2 | 11 | 2 | 2 | 2 | 233 | 0 | 0 | 30 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77 | 118 | 2 | 2 | 516 |
| Canta loupe | Prep. of nursery bed | | | | | 10 | 15 | 15 | 15 | | | | | | | | | | | | | | | | | 54 |
| | Manure spreading | | | | | | 84 | 84 | | | | | | | | | | | | | | | | | | 168 |
| | Plowing | | | | | | | | 26 | | | | | | | | | | | | | | | | | 26 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Planting | | | | | | | | 175 | | | | | | | | | | | | | | | | | 175 |
| | Water manegment | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | 20 |
| | Disease control | | | | | | | | | | | 5 | 5 | 5 | 5 | | | | | | | | | | | 20 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Harvesting | | | | | | | | | | | | | | | 419 | | | | | | | | | | 419 |
| | Carrying | | | | | | | | | | | | | | | 100 | | | | | | | | | | 100 |
| | Sub-total | 0 | 0 | 0 | 0 | 10 | 99 | 99 | 219 | 3 | 3 | 8 | 8 | 8 | 8 | 3 | 522 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 982 |
| Medical plant | Manure spreading | | | | | | | | | | | | | | | | | | | 38 | 38 | | | | | 75 |
| | Plowing | | | | | | | | | | | | | | | | | | | 12 | | | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | 12 | | | | | 12 |
| | Sowing | | | | | | | | | | | | | | | | | | | | 6 | | | | | 6 |
| | Water manegment | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 25 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | 20 | | | | | | | | | | | | | | | | | | | | | | 20 |
| | Harvesting | | | | | | 325 | | | | | | | | | | | | | | | | | | | 325 |
| | Carrying | | | | | | 22 | | | | | | | | | | | | | | | | | | | 22 |
| | Sub-total(hr) | 2 | 2 | 22 | 2 | 2 | 349 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 58 | 2 | 2 | 2 | 2 | 496 |
| | Total (hr) | 8 | 13 | 52 | 202 | 182 | 544 | 356 | 250 | 138 | 194 | 55 | 573 | 594 | 605 | 180 | 629 | 434 | 79 | 377 | 147 | 121 | 166 | 8 | 8 | 5,933 |
| Labour requirment(man/dav) (1) | | 1 | 2 | 7 | 26 | 23 | 47 | 44 | 53 | 17 | 25 | 7 | 72 | 74 | 97 | 22 | 69 | 54 | 10 | 47 | 22 | 15 | 17 | 1 | 1 | |
| Possibility operation(man/dav)(2) | | 38 | 40 | 38 | 33 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 36 | 40 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | 913 |
| Seasonal labor(dav) (2)-(1)-(3) | | | | | | | 7 | 7 | 16 | | | | 35 | 37 | 57 | | 29 | 17 | | 10 | | | | | | 213 |

Table B-19 Labour time of Farming on Graduates (Vegetable - Beef Cattle)

| Crops | Operation | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 |
| Sorghum | Manure spreading | | | | | | | | | 84 | 84 | | | | | | | | | | | | | | |
| | Plowing | | | | | | | | | 6 | 6 | | | | | | | | | | | | | | |
| | Fertili. application | | | | | | | | | | | 6 | 6 | | | | | | | | | | | | |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | |
| | Water manegment | | | | | | | | | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | | | |
| | Weeding | | | | | | | | | | 7 | | | | | | | | | | | | | | |
| | Disease control | | | | | | | | | | | 7 | | | | | | | | | | | | | |
| | Cutting | | | | | | | | | | | | | 7 | | 7 | | | 7 | | | | | | |
| | Carrying | | | | | | | | | | | | | 23 | | 23 | | | 23 | | | | | | |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 101 | 15 | 10 | 32 | 4 | 33 | 4 | 4 | 33 | 0 | 0 | 0 | 0 | 0 | 0 |
| Berseem | Manure spreading | | | | | | | | | | | | | | | | | 66 | 66 | | | | | | |
| (Short) | Plowing | | | | | | | | | | | | | | | | | | | 12 | | | | | |
| | Fertili. application | | | | | | | | | | | | | | | | | | | 9 | | | | | |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | |
| | Water manegment | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 |
| | Disease control | | | | | | | | | | | | | | | | | | | 4 | 4 | | | | |
| | Cutting | | | | 2 | | | | | | | | | | | | | | | | | 2 | | | 2 |
| | Carrying | | | | 6 | | | | | | | | | | | | | | | | | 5 | | | 6 |
| | Sub-total | 1 | 1 | 1 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 66 | 26 | 5 | 10 | 1 | 1 | 10 |
| Squash | Manure spreading | | | | | | | 75 | 75 | | | | | | | | | | | | | | | | |
| | Plowing | | | | | | | | 12 | | | | | | | | | | | | | | | | |
| | Fertili. application | | | | | | | | | 11 | | | | | | | | | | | | | | | |
| | Sowing | | | | | | | | | 5 | | | | | | | | | | | | | | | |
| | Water manegment | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | |
| | Disease control | | | | | | | | | | 9 | | | | | | | | | | | | | | |
| | Harvesting | | | | | | | | | | | | | | | | | 96 | | | | | | | |
| | Carrying | | | | | | | | | | | | | | | | | 60 | | | | | | | |
| | Post treatment | | | | | | | | | | | | | | | | | | 39 | | | | | | |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 87 | 18 | 11 | 2 | 2 | 2 | 2 | 2 | 2 | 157 | 39 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tomato | Prep. of nursery bed | | 13 | 13 | 13 | 13 | | | | | | | | | | | | | | | | | | | |
| | Manure spreading | | | 84 | 84 | | | | | | | | | | | | | | | | | | | | |
| | Plowing | | | 6 | 6 | | | | | | | | | | | | | | | | | | | | |
| | Fertili. application | | | 6 | 6 | | | | | | | | | | | | | | | | | | | | |
| | Planting | | | | | 7 | | | | | | | | | | | | | | | | | | | |
| | Plastic tunnelse cul. | | | | | 45 | | | | | | | | | | | | | | | | | | | |
| | Water manegment | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | |
| | Weeding | | | | | | | | | 4 | | | | | | | | | | | | | | | |
| | Disease control | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | |
| | Harvesting | | | | | | | | | | | | 413 | 413 | 413 | | | | | | | | | | |
| | Carrying | | | | | | | | | | | | 133 | 133 | 133 | | | | | | | | | | |
| | Post treatment | | | | | | | | | | | | | | | 40 | | | | | | | | | |
| | Sub-total | 0 | 13 | 110 | 110 | 68 | 2 | 2 | 2 | 7 | 2 | 3 | 549 | 549 | 549 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table B-19 Labour time of Farming on Graduates (Vegetable · Beef Cattle)

| Crops | Operation | Month: Jan 1-15 | 16-31 | Feb 1-15 | 16-28 | Mar 1-15 | 16-31 | Apr 1-15 | 16-30 | May 1-15 | 16-31 | Jun 1-15 | 16-30 | Jul 1-15 | 16-31 | Aug 1-15 | 16-31 | Sep 1-15 | 16-30 | Oct 1-15 | 16-31 | Nov 1-15 | 16-30 | Dec 1-15 | 16-31 | Total (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green Pepper | Prep. of nursery bed | | | | | | | | | | | | 9 | 9 | 9 | 9 | | | | | | | | | | 36 |
| | Manure spreading | | | | | | | | | | | | | | 84 | 84 | | | | | | | | | | 169 |
| | Plowing | | | | | | | | | | | | | | | 12 | | | | | | | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | 12 | | | | | | | | | | 12 |
| | Planting | | | | | | | | | | | | | | | 7 | | | | | | | | | | 7 |
| | Water manegment | | | | | | | | | | | | | | | 6 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 18 |
| | Weeding | | | | | | | | | | | | | | | | | 9 | | | | | | | | 9 |
| | Disease control | | | | | | | | | | | | | | | | | | | | 33 | 83 | | | | 167 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | 35 | 35 | | | | 70 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | 13 | | | 13 |
| | Post treatment | | | | | | | | | | | | | | | | | | | | | | 13 | 0 | 0 | 511 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 93 | 127 | 3 | 11 | 3 | 3 | 121 | 121 | 84 | | | 169 |
| Broad bean | Manure spreading | | | | | | | | | | | | | | | | | | | | | 84 | | | | 12 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 12 | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | 2 | 23 |
| | Water manegment | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | 0 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 9 |
| | Disease control | | | 9 | | | | | | | | | | | | | | | | | | | | | | 206 |
| | Harvesting | | | | | | | 206 | | | | | | | | | | | | | | | | | | 27 |
| | Carrying | | | | | | | 27 | | | | | | | | | | | | | | | | | | 60 |
| | Processing, grading | | | | | | | | 60 | | | | | | | | | | | | | | | | | 517 |
| | Sub-total | 2 | 2 | 11 | 2 | 2 | 2 | 235 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 110 | 2 | 2 | 54 |
| Canta-loupe | Prep. of nursery bed | | | | | 13 | 13 | 13 | 13 | | | | | | | | | | | | | | | | | 169 |
| | Manure spreading | | | | | | 84 | 84 | | | | | | | | | | | | | | | | | | 24 |
| | Plowing | | | | | | | | 26 | | | | | | | | | | | | | | | | | 0 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 175 |
| | Planting | | | | | | | | 175 | | | | | | | | | | | | | | | | | 20 |
| | Water manegment | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | 0 |
| | Weeding | | | | | | | | | | | 5 | 5 | 5 | 5 | | | | | | | | | | | 20 |
| | Disease control | | | | | | | | | | | | | | | | 419 | | | | | | | | | 419 |
| | Harvesting | | | | | | | | | | | | | | | | 100 | | | | | | | | | 100 |
| | Carrying | | | | | | | | | | | | | | | | 521 | | | | | | | | | 983 |
| | Sub-total | 0 | 0 | 0 | 0 | 13 | 98 | 98 | 217 | 2 | 2 | 7 | 7 | 7 | 7 | 2 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| Medical plant | Manure spreading | | | | | | | | | | | | | | | | | | 36 | 38 | | | | | | 12 |
| | Plowing | | | | | | | | | | | | | | | | | | | 12 | | | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | 12 | | | | | | 6 |
| | Sowing | | | | | | | | | | | | | | | | | | | | 6 | | | | | 25 |
| | Water manegment | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 0 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 20 |
| | Disease control | | | 20 | | | | | | | | | | | | | | | | | | | | | | 325 |
| | Harvesting | | | | | | 305 | | | | | | | | | | | | | | | | | | | 22 |
| | Carrying | | | | | | 22 | | | | | | | | | | | | | | | | | | | 497 |
| | Sub-total | 2 | 2 | 22 | 2 | 2 | 329 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 61 | 8 | 2 | 2 | 2 | 2 | 5,436 |
| Total(hr) | (1) | 6 | 19 | 144 | 124 | 86 | 452 | 410 | 366 | 117 | 118 | 29 | 527 | 600 | 655 | 204 | 524 | 238 | 177 | 90 | 134 | 217 | 127 | 6 | 14 | 730 |
| Fattening management(hr) | (2) | 30 | 22 | 30 | 26 | 30 | 32 | 30 | 30 | 30 | 32 | 30 | 30 | 30 | 32 | 30 | 32 | 30 | 30 | 30 | 32 | 30 | 30 | 30 | 32 | 6,166 |
| Labour requirment(hr) | (3)=(2)+(3) | 36 | 51 | 174 | 150 | 116 | 484 | 440 | 396 | 147 | 148 | 59 | 607 | 630 | 687 | 234 | 561 | 268 | 207 | 120 | 166 | 247 | 157 | 36 | 46 | 780 |
| Labour requirment(person) | (4) | 5 | 7 | 22 | 19 | 15 | 61 | 55 | 50 | 19 | 19 | 8 | 76 | 79 | 86 | 30 | 71 | 34 | 26 | 15 | 21 | 31 | 20 | 5 | 6 | |
| Possibility Labour(man day) | (5) | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | |
| Seasonal Labour(man day) | (4)-(5)=(3) | | | | | | 21 | 18 | 13 | | | | 39 | 42 | 46 | | 31 | | | | | | | | | 206 |

Table B-20 Labour time of Farming on Graduates (Vegetable - Fruit)

| Crops | Operation | Month: Jan 1-15 | 16-31 | Feb 1-15 | 16-28 | Mar 1-15 | 16-31 | Apr 1-15 | 16-30 | May 1-15 | 16-31 | Jun 1-15 | 16-30 | Jul 1-15 | 16-31 | Aug 1-15 | 16-31 | Sep 1-15 | 16-30 | Oct 1-15 | 16-31 | Nov 1-15 | 16-30 | Dec 1-15 | 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Squash | Manure spreading | | | | | | | 75 | 75 | | | | | | | | | | | | | | | | | 150 |
| | Plowing | | | | | | | | 12 | | | | | | | | | | | | | | | | | 12 |
| | Fertili. application | | | | | | | | | 11 | | | | | | | | | | | | | | | | 11 |
| | Sowing | | | | | | | | | 5 | | | | | | | | | | | | | | | | 5 |
| | Water manegment | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | 16 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | 9 | | | | | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | | | 96 | | | | | | | | 96 |
| | Carrying | | | | | | | | | | | | | | | | | 60 | | | | | | | | 60 |
| | Post treatment | | | | | | | | | | | | | | | | | | 39 | | | | | | | 39 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 87 | 18 | 11 | 2 | 2 | 2 | 2 | 2 | 2 | 157 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 396 |
| Tomato | Prep. of nursery bed | | 18 | 18 | 18 | 18 | | | | | | | | | | | | | | | | | | | | 54 |
| | Manure spreading | | | 84 | 84 | | | | | | | | | | | | | | | | | | | | | 169 |
| | Plowing | | | 6 | 6 | | | | | | | | | | | | | | | | | | | | | 12 |
| | Fertili. application | | | 6 | 6 | | | | | | | | | | | | | | | | | | | | | 12 |
| | Planting | | | | | 7 | | | | | | | | | | | | | | | | | | | | 7 |
| | Plastic tunnelse cul. | | | | | 25 | | | | | | | | | | | | | | | | | | | | 25 |
| | Water manegment | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | 22 |
| | Weeding | | | | | | | | | 4 | | | | | | | | | | | | | | | | 4 |
| | Disease control | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | | 5 |
| | Harvesting | | | | | | | | | | | | 413 | 413 | 413 | | | | | | | | | | | 1.238 |
| | Carrying | | | | | | | | | | | | 133 | 133 | 133 | | | | | | | | | | | 400 |
| | Post treatment | | | | | | | | | | | | | | 40 | | | | | | | | | | | 40 |
| | Sub-total | 0 | 18 | 110 | 110 | 48 | 2 | 2 | 2 | 7 | 2 | 3 | 549 | 549 | 549 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.987 |
| Green | Prep. of nursery bed | | | | | | | | | | | | 9 | 9 | 9 | 9 | | | | | | | | | | 36 |
| Pepper | Manure spreading | | | | | | | | | | | | | | 84 | 84 | | | | | | | | | | 169 |
| | Plowing | | | | | | | | | | | | | | | 12 | | | | | | | | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | 12 | | | | | | | | | | 12 |
| | Planting | | | | | | | | | | | | | | | 7 | | | | | | | | | | 7 |
| | Water manegment | | | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 18 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | | | | | 9 | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | | | | | 83 | 83 | | | | | 167 |
| | Carrying | | | | | | | | | | | | | | | | | | | 35 | 35 | | | | | 70 |
| | Post treatment | | | | | | | | | | | | | | | | | | | | | 13 | | | | 13 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 93 | 127 | 3 | 11 | 3 | 3 | 121 | 121 | 13 | 0 | 0 | 511 |

-Continuation-

Table B-20 Labour time of Farming on Graduates (Vegetable - Fruit)

| Crops | Operation | Month | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Broad bean | Manure spreading | | | | | | | | | | | | | | | | | | | | | 84 | 84 | | | 189 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | | 12 | | | 12 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | 12 | | | 12 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | 2 | 2 | 2 | 23 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | 9 | | | | | | | | | | | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | | 206 | | | | | | | | | | | | | | | | | 206 |
| | Carrying | | | | | | | | 27 | | | | | | | | | | | | | | | | | 27 |
| | Processing grading | | | | | | | | | 60 | | | | | | | | | | | | | | | | 60 |
| | Sub-total | | 2 | 2 | 11 | 2 | 2 | 2 | 235 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 110 | 2 | 2 | 517 |
| Canta-loupe | Prep. of nursery bed | | | | | | 13 | 13 | 13 | 13 | | | | | | | | | | | | | | | | 54 |
| | Manure spreading | | | | | | | 94 | 94 | | | | | | | | | | | | | | | | | 188 |
| | Plowing | | | | | | | | | 15 | | | | | | | | | | | | | | | | 15 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 35 |
| | Planting | | | | | | | | | 140 | | | | | | | | | | | | | | | | 140 |
| | Water manegment | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | 20 |
| | Weeding | | | | | | | | | | | | 4 | 4 | 4 | 4 | | | | | | | | | | 18 |
| | Disease control | | | | | | | | | | | | | | | | 319 | | | | | | | | | 419 |
| | Harvesting | | | | | | | | | | | | | | | | 113 | | | | | | | | | 113 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Sub-total | | 0 | 0 | 0 | 0 | 13 | 107 | 107 | 170 | 2 | 2 | 7 | 7 | 7 | 7 | 2 | 534 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.000 |
| Medical plant | Manure spreading | | | | | | | | | | | | | | | | | | | 37 | 57 | | | | | 94 |
| | Plowing | | | | | | | | | | | | | | | | | | | | 15 | | | | | 15 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | 13 | | | | | 13 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | 6 | | | | 6 |
| | Water manegment | | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 25 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | 20 | | | | | | | | | | | | | | | | | | | | | 20 |
| | Harvesting | | | | | | | 325 | | | | | | | | | | | | | | | | | | 325 |
| | Carrying | | | | | | | 25 | | | | | | | | | | | | | | | | | | 25 |
| | Sub-total | | 2 | 2 | 22 | 2 | 2 | 352 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 75 | 8 | 2 | 2 | 2 | 522 |
| Peach | Manure spreading | | | | | | | | | | | | | | | | | | | | | | 100 | 100 | | 200 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | 6 | 6 | | 13 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | 38 | 38 |
| | Fruit thinning | | | | | 25 | 25 | | | | | | | | | | | | | | | | | | | 75 |
| | Water manegment | | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 63 |
| | Disease control | | 5 | | | | | | | | | | | | | | | | | | | | | | | 5 |
| | Weeding | | | | | | 12 | | | | | | | | | | | | | | | | | | | 12 |
| | Harvesting | | | | | | | | 16 | 16 | 16 | 16 | 16 | | | | | | | | | | | | | 80 |
| | Carrying | | | | | | | | 10 | 10 | 10 | 10 | 10 | | | | | | | | | | | | | 48 |
| | Sub-total | | 7 | 3 | 3 | 28 | 39 | 28 | 28 | 28 | 28 | 28 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 109 | 109 | 40 | 40 | 544 |
| Total(hr) | | | 12 | 21 | 145 | 142 | 105 | 492 | 447 | 348 | 55 | 43 | 14 | 564 | 564 | 654 | 176 | 541 | 171 | 41 | 80 | 132 | 316 | 234 | 45 | 45 | 5.473 |
| Labour requirement(person) | (1)= | | 2 | 3 | 18 | 18 | 13 | 61 | 56 | 43 | 7 | 5 | 2 | 71 | 71 | 82 | 22 | 68 | 21 | 11 | 10 | 16 | 40 | 29 | 6 | 6 | |
| Possibility labour/man day | (2)= | | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 36 | 40 | 38 | 40 | 38 | 38 | 38 | 40 | 38 | 38 | 38 | 40 | |
| Seasonal Labour/man day | (3)=(1)÷(2)= | | | | | | | 21 | 18 | 6 | | | | 34 | 34 | 42 | | 28 | | | | | 2 | | | | 185 |

Table B-21 Labour Time of Farming on Small Scale Investors(Beef Cattle-Vege.)

| Crops | Operation | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barley | Manure spreding | | | | | | | | | | | | | | | | | | | | 53 | 53 | | | | 105 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 30 | | | | 30 |
| | Ferti. application | | | | | | | | | | | | | | | | | | | | | | 40 | | | 40 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | 3 | 3 | 3 | 36 |
| | Disease control | | | | | 13 | | | | | | | | | | | | | | | | | | | | 13 |
| | Weeding | | | 12 | | | | | | | | | | | | | | | | | | | | | | 12 |
| | Harvesting | | | | | | | | | 32 | | | | | | | | | | | | | | | | 32 |
| | Carrying | | | | | | | | | 75 | | | | | | | | | | | | | | | | 75 |
| | Sub-total | 3 | 3 | 15 | 3 | 16 | 3 | 3 | 3 | 107 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 83 | 43 | 3 | 3 | 343 |
| | | | | | | | | | | 53 | 53 | | | | | | | | | | | | | | | 105 |
| Sorghum | Manure spreding | | | | | | | | | | | | | | | | | | | | | | | | | 30 |
| | Plowing | | | | | | | | | | | 30 | | | | | | | | | | | | | | 40 |
| | Ferti. application | | | | | | | | | | | 40 | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 24 |
| | Water manegment | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | 18 |
| | Weeding | | | | | | | | | | | | | 13 | | | | | | | | | | | | 48 |
| | Cutting | | | | | | | | | | | | | | 16 | | 16 | | 16 | | | | | | | 75 |
| | Carrying | | | | | | | | | | | | | | 25 | | 25 | | 25 | | | | | | | 335 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 53 | 73 | 3 | 16 | 44 | 3 | 44 | 3 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 105 |
| | | | | | | | | | | | | | | | | | | 53 | 53 | | | | | | | 30 |
| Berseem | Manure spreding | | | | | | | | | | | | | | | | | | | 30 | | | | | | 40 |
| | Plowing | | | | | | | | | | | | | | | | | | | 40 | | | | | | 0 |
| | Ferti. application | | | | | | | | | | | | | | | | | | | | | | | | | 29 |
| | Sowing | | | | | | | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 13 |
| | Water manegment | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | 13 | | | | | 48 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | 16 | | | 75 |
| | Cutting | 16 | | | 16 | | | | | | | | | | | | | | | | | | 25 | | | 340 |
| | Carrying | 25 | | | 25 | | | | | | | | | | | | | | | | | | | | | 476 |
| | Sub-total | 44 | 3 | 3 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 53 | 73 | 16 | 3 | 44 | 3 | 3 |
| | | | | | | | | | | | | | | | | | | | 119 | 119 | 119 | 119 | 119 | | | |
| Cabbage | Prep. of nursery bed | | | | | | | | | | | | | | | | | | | | 53 | 53 | | | | 105 |
| | Manure spreding | | | | | | | | | | | | | | | | | | | | | 30 | | | | 30 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 40 | | | | 40 |
| | Ferti. application | | | | | | | | | | | | | | | | | | | | | 96 | | | | 96 |
| | Planting | | | | | | | | | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 25 |
| | Water manegment | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | 12 |
| | Weeding | | | | | 12 | | | | | | | | | | | | | | | | | | 13 | | 13 |
| | Disease control | | | | | | | | | | | | | | | | | | | | | | | | | 213 |
| | Harvesting | | | | | | 213 | | | | | | | | | | | | | | | | | | | 250 |
| | Carrying | | | | | | 250 | | | | | | | | | | | | | | | | | | | 1,260 |
| | Sub-total | 3 | 3 | 3 | 3 | 15 | 466 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 119 | 119 | 172 | 340 | 3 | 16 | 3 | |

-Continuation-

Table B-21 Labour Time of Farming on Small Scale Investors(Beef Cattle·Vege.)

| Crops | Operation | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soybean | Manure spreding | | | | | | | - | | 53 | 53 | | | | | | | | | | | | | | | 105 |
| | Plowing | | | | | | | | | | 30 | | | | | | | | | | | | | | | 30 |
| | Ferti. application | | | | | | | | | | | 40 | | | | | | | | | | | | | | 40 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | 24 |
| | Weeding | | | | | | | | | | | | 26 | | | | | | | | | | | | | 26 |
| | Disease control | | | | | | | | | | | | | | | 13 | | | | | | | | | | 13 |
| | Harvesting | | | | | | | | | | | | | | | | | | | 31 | | | | | | 31 |
| | Carrying | | | | | | | | | | | | | | | | | | | 23 | | | | | | 23 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 83 | 43 | 29 | 3 | 16 | 3 | 3 | 3 | 3 | 57 | 0 | 0 | 0 | 0 | 292 |
| Tomato | Prep. of nursery bed | | | | | | 476 | | | | | | | | | | | | | | | | | | | 476 |
| | Manure spreding | | | | | | | | | 52 | | | | | | | | | | | | | | | | 52 |
| | Plowing | | | | | | | | | 40 | | | | | | | | | | | | | | | | 40 |
| | Ferti. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Planting | | | | | | | | | | 96 | | | | | | | | | | | | | | | 96 |
| | Water manegment | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | 36 |
| | Weeding | | | | | | | | | | | | | | 24 | | | | | | | | | | | 24 |
| | Disease control | | | | | | | | | | | | | | 4 | 4 | 4 | | | | | | | | | 13 |
| | Harvesting | | | | | | | | | | | | | | | 658 | 658 | 658 | 658 | 658 | 658 | | | | | 3.950 |
| | Carrying | | | | | | | | | | | | | | | 50 | 50 | 50 | 50 | 50 | 50 | | | | | 300 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 476 | 0 | 0 | 92 | 99 | 3 | 3 | 3 | 32 | 716 | 716 | 712 | 711 | 712 | 712 | 0 | 0 | 0 | 0 | 4.987 |
| Poteto | Manure spreding | | | | | | 53 | 53 | | | | | | | | | | | | | | | | | | 105 |
| | Plowing | | | | | | | | 38 | | | | | | | | | | | | | | | | | 38 |
| | Ferti. application | | | | | | | | 53 | | | | | | | | | | | | | | | | | 53 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | | | | | 60 |
| | Weeding | | | | | | | | | | 24 | | | | | | | | | | | | | | | 24 |
| | Harvesting | | | | | | | | | | | | | | | 233 | | | | | | | | | | 233 |
| | Carrying | | | | | | | | | | | | | | | 225 | | | | | | | | | | 225 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 53 | 53 | 99 | 8 | 32 | 8 | 8 | 8 | 8 | 466 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 738 |
| Onion | Prep. of nursery bed | | | | | | | | | | | | | | | | | | 320 | | | | | | | 320 |
| | Manure spreding | | | | | | | | | | | | | | | | | | | 26 | 26 | | | | | 52 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 40 | | | | 40 |
| | Ferti. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | 1.168 | | | | 1.168 |
| | Water manegment | 7 | 7 | 7 | 7 | 7 | 7 | 7 | | | | | | | | | | | | | | 7 | 7 | 7 | 7 | 75 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | 13 | | 13 |
| | Harvesting | | | | | | | 233 | | | | | | | | | | | | | | | | | | 233 |
| | Carrying | | | | | | | 90 | | | | | | | | | | | | | | | | | | 90 |
| | Sub-total | 7 | 7 | 7 | 7 | 7 | 7 | 330 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 320 | 26 | 26 | 1.215 | 7 | 20 | 7 | 1.991 |
| | Total(hr) | 56 | 15 | 27 | 56 | 38 | 1.004 | 386 | 102 | 259 | 236 | 166 | 56 | 55 | 86 | 1.200 | 763 | 770 | 1.250 | 932 | 1.034 | 1.640 | 96 | 41 | 15 | 10.286 |
| Labour requirment(Persons) | (1) | 7 | 2 | 3 | 7 | 5 | 126 | 48 | 13 | 32 | 29 | 21 | 7 | 7 | 11 | 150 | 95 | 96 | 156 | 117 | 129 | 205 | 12 | 5 | 2 | 1.286 |
| Operater'Assistant(man/day) | (2) | 1 | 1 | 1 | 1 | 1 | 8 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 10 | 6 | 6 | 10 | 7 | 8 | 14 | 1 | 1 | 1 | |
| Permanent Labour(man/day) | (3) | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 1 | 1 | 1 | |
| Fattening manegement(man/day) | (4) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Farming maneger/other | (5) | 6 | 6 | 6 | 6 | 6 | 2 | 4 | 6 | 5 | 5 | 6 | 6 | 6 | 6 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | 6 | |
| (3)+(4)+(5)= | (6) | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | |
| Sesonal Labour(man/day)(2)-(3)=(7) | | | | | | | 3 | | | | | | | | | 5 | 1 | 1 | 5 | 2 | 3 | 9 | | | | |
| Sesonal Labour(Persons)(7)×15days | | | | | | | 45 | | | | | | | | | 75 | 15 | 15 | 75 | 30 | 45 | 135 | | | | 435 |

Table B-22 Labour Time of Farming on Small Scale Investors(Fruit/Vege.)

| Crops | Operation | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cabbage | Prep.of nursery bed | | | | | | | | | | | | | | | | | | 38 | 111 | 114 | 114 | | | | 380 |
| | Manure spreading | | | | | | | | | | | | | | | | | | | | 84 | | | | | 84 |
| | Plowing | | | | | | | | | | | | | | | | | | | | 24 | | | | | 24 |
| | Fertili.application | | | | | | | | | | | | | | | | | | | | | 32 | | | | 32 |
| | Planting | | | | | | | | | | | | | | | | | | | | | 76 | | | | 76 |
| | Water management | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 28 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | 19 | | 19 |
| | Harvesting | | | | | | 600 | | | | | | | | | | | | | | | | | | | 600 |
| | Carrying | | | | | | 200 | | | | | | | | | | | | | | | | | | | 200 |
| | Sub-total | 3 | 3 | 3 | 3 | 3 | 803 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 111 | 222 | 225 | 3 | 22 | 3 | 1.443 |
| Soybean | Manure spreading | | | | | | | | | | | 42 | | | | | | | | | | | | | | 42 |
| | Plowing | | | | | | | | | | | 12 | | | | | | | | | | | | | | 12 |
| | Fertili.application | | | | | | | | | | | | 16 | | | | | | | | | | | | | 16 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | | | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | | | | | 12 |
| | Weeding | | | | | | | | | | | | 10 | | | | | | | | | | | | | 10 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | 25 | | | | | 25 |
| | Carrying | | | | | | | | | | | | | | | | | | | | 30 | | | | | 30 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 27 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 56 | 0 | 0 | 0 | 0 | 147 |
| Sesame | Manure spreading | | | | | | | | | | 42 | | | | | | | | | | | | | | | 42 |
| | Plowing | | | | | | | | | | 12 | | | | | | | | | | | | | | | 12 |
| | Fertili.application | | | | | | | | | | | 16 | | | | | | | | | | | | | | 16 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 12 |
| | Weeding | | | | | | | | | | | | | 9 | | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | | | | | 42 | | | | | | 42 |
| | Carrying | | | | | | | | | | | | | | | | | | | 30 | | | | | | 30 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 17 | 1 | 11 | 1 | 1 | 1 | 1 | 1 | 73 | 0 | 0 | 0 | 0 | 0 | 163 |
| Tomato | Prep.of nursery bed | | | | | | 190 | | | | | | | | | | | | | | | | | | | 190 |
| | Manure spreading | | | | | | | | | 21 | | | | | | | | | | | | | | | | 21 |
| | Plowing | | | | | | | | | 16 | | | | | | | | | | | | | | | | 16 |
| | Fertili.application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Planting | | | | | | | | | | 38 | | | | | | | | | | | | | | | 38 |
| | Water management | | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | | | | | | | 18 |
| | Disease,pest control | | | | | | | | | | | | 3 | | 2 | | | | | | | | | | | 5 |
| | Weeding | | | | | | | | | | | | | | 9 | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | 263 | 263 | 263 | 263 | 263 | 263 | | | | | 1.580 |
| | Carrying | | | | | | | | | | | | | | | 20 | 20 | 20 | 20 | 20 | 20 | | | | | 120 |
| | Sub total | 0 | 0 | 0 | 0 | 0 | 190 | 0 | 0 | 37 | 40 | 2 | 4 | 2 | 13 | 285 | 285 | 285 | 231 | 283 | 283 | 0 | 0 | 0 | 0 | 1.998 |
| Potato | Manure spreading | | | | | | | 11 | | | | | | | | | | | | | | | | | | 11 |
| | Plowing | | | | | | | 15 | | | | | | | | | | | | | | | | | | 15 |
| | Fertili.application | | | | | | | | 0 | | | | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | | | | | | | | | | 12 |
| | Weeding | | | | | | | | | | | 9 | | | | | | | | | | | | | | 9 |
| | Harvesting | | | | | | | | | | | | | | | 23 | | | | | | | | | | 23 |
| | Carrying | | | | | | | | | | | | | | | 90 | | | | | | | | | | 90 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 2 | 2 | 2 | 11 | 2 | 2 | 2 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 |
| Onion | Prep.of nursery bed | | | | | | | | | | | | | | | | | | 252 | | | | | | | 252 |
| | Manure spreading | | | | | | | | | | | | | | | | | | | | | 21 | | | | 21 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | | 32 | | | 32 |
| | Fertili.application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Planting | | | | | | | | | | | | | | | | | | | | | | 504 | | | 504 |
| | Water management | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | | | | | | | | | | | | | | 3 | 3 | 3 | 30 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | 11 | | 11 |
| | Harvesting | | | | | | | 1387 | | | | | | | | | | | | | | | | | | 1.387 |
| | Carrying | | | | | | | 220 | | | | | | | | | | | | | | | | | | 220 |
| | Sub-total | 3 | 3 | 3 | 3 | 3 | 3 | 1609 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 21 | 539 | 14 | 3 | 2.456 |

-Continuation-

Table B-22 Labor time of farming on Small-scale Investors(Fruit+Vege.)

| Crops | Operation | Month | Jan | | | Feb | | | Mar | | | Apr | | | May | | | Jun | | | Jul | | | Aug | | | Sep | | | Oct | | | Nov | | | Dec | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | |
| Grapes | Manure spreding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 32 | 32 | | | | | 63 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 21 | 21 | | | | | 42 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 480 | | | | 480 |
| | Water manegment | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 73 |
| | Disease control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 48 |
| | Weeding | | | | | | | | | | | | | | 30 | 30 | | | | | | | | | | | | | | | | | | | | | 60 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | 403 | 403 | 403 | 403 | 403 | | | | | | | | | | | | 2.016 |
| | Carrying | | | | | | | | | | | | | | | | | | | | 35 | 35 | 35 | 35 | 35 | | | | | | | | | | | | 173 |
| | Sub-total | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 33 | 33 | 3 | 3 | 441 | 441 | 441 | 441 | 441 | | 3 | 3 | 56 | 56 | 483 | 3 | 2.955 | | | | | | |
| Olive | Manure spreding | | | | | | | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 63 |
| | Fertili. application | | | | | | | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 42 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 73 |
| | Disease control | | | | | | | | | | | | | | | | | | 24 | | | | | 24 | | | | | | | | | | | | | | 48 |
| | Weeding | | | | | | | | | | | | | | | | 9 | 9 | | | | | | | | | | | | | | | | | | | | 19 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | | | | | | | | | 670 | 670 | 670 | 670 | | | | | 2.680 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | | | | | | | 38 | 38 | 38 | 38 | | | | | 150 |
| | Sub-total | | 3 | 3 | 3 | 3 | 108 | 3 | 3 | 3 | 3 | 3 | 3 | 12 | 36 | 3 | 3 | 3 | 27 | 3 | 3 | 3 | 711 | 711 | 711 | 711 | 3 | 3 | 3.075 | | | | | | | | |
| Orange | Manure spreding | | | | | | | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 63 |
| | Fertili. application | | | | | | | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 42 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 168 |
| | Water manegment | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 73 |
| | Disease control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 19 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 820 | 820 | 820 | | 2.460 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 53 | 53 | 53 | | 160 |
| | Sub-total | | 3 | 3 | 3 | 3 | 3 | 108 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 10 | 6 | 3 | 3 | 3 | 876 | 876 | 876 | 2.995 | | | | | |
| Total(hr) | | | 15 | 15 | 15 | 15 | 120 | 1110 | 1643 | 11 | 48 | 134 | 132 | 77 | 25 | 464 | 873 | 735 | 742 | 1027 | 1188 | 1278 | 1015 | 2184 | 1398 | 888 | 15.391 | | | | | | | | | | | |
| Labour requirment(Person) (1) | | | 2 | 2 | 2 | 2 | 15 | 139 | 206 | 2 | 6 | 17 | 17 | 10 | 4 | 59 | 110 | 92 | 93 | 129 | 149 | 160 | 127 | 273 | 175 | 111 | 1.902 | | | | | | | | | | | |
| Operater Assistant(man/day)(2) | | | 1 | 1 | 1 | 1 | 1 | 10 | 15 | 1 | 1 | 2 | 2 | 1 | 1 | 4 | 8 | 7 | 7 | 9 | 10 | 11 | 9 | 19 | 12 | 8 | 2.130 | | | | | | | | | | | |
| Permanent Labour(man/day) (3) | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | |
| Orchard manegement(man/day)(4) | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | |
| Farming maneger/other (5) | | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | | | |
| (3)+(4)+(5) =(6) | | | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | | | |
| Seasonal Labour (2)-(3) =(7) | | | | | | | | 8 | 13 | | | | | | | 2 | 6 | 5 | 5 | 7 | 8 | 9 | 7 | 17 | 10 | 6 | 1.545 | | | | | | | | | | |

Table B-23 Labour Time of Farming on Large Scale Investors(Land Use Crops)

| Crops | Operation | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | |
| Wheat | Manure spreading | | | | | | | | | | | | | | | | | | | | | 283.5 | 283.5 | | | 567 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | | 216 | | | 216 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | 378 | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | | | | | 9 | 9 | 9 | 108 |
| | Disease control | | | | | | 92 | | | | | | | | | | | | | | | | | | | 92 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | 169 | | | 169 |
| | Harvesting | | | | | | | | | | 227 | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | | | | 162 | | | | | | | | | | | | | | | 162 |
| | Sub-total | 9 | 9 | 9 | 9 | 9 | 101 | 9 | 9 | 9 | 389 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 1056 | 9 | 9 | 1.919 |
| Maize | Manure spreading | | | | | | | | | | 284 | 284 | | | | | | | | | | | | | | 567 |
| | Plowing | | | | | | | | | | | 216 | | | | | | | | | | | | | | 216 |
| | Fertili. application | | | | | | | | | | | 378 | | | | | | | | | | | | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | | | | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | 72 |
| | Disease control | | | | | | | | | | | | | | | 92 | | | | | | | | | | 92 |
| | Weeding | | | | | | | | | | 169 | | | | | | | | | | | | | | | 169 |
| | Harvesting | | | | | | | | | | | | | | | | | | | 340 | | | | | | 340 |
| | Carrying | | | | | | | | | | | | | | | | | | | 972 | | | | | | 972 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 453 | 886 | 8 | 8 | 8 | 100 | 8 | 8 | 8 | 1320 | 0 | 0 | 0 | 0 | 0 | 2.806 |
| Barley | Manure spreading | | | | | | | | | | | | | | | | | | | | 284 | 284 | | | | 567 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 216 | | | | 216 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | 378 | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | 6 | 6 | 6 | 67 |
| | Disease control | | | | | | 92 | | | | | | | | | | | | | | | | | | | 92 |
| | Weeding | | | | | | | | | 227 | | | | | | | | | | | | | 169 | | | 169 |
| | Harvesting | | | | | | | | | 162 | | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | | | 389 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 500 | 553 | 6 | 6 | 162 |
| | Sub-total | 6 | 6 | 6 | 6 | 6 | 98 | 6 | 6 | | 284 | 284 | | | | | | | | | | | | | | 1.877 |
| Soy bean | Manure spreading | | | | | | | | | | | | 216 | | | | | | | | | | | | | 567 |
| | Plowing | | | | | | | | | | | | 286 | | | | | | | | | | | | | 216 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 286 |
| | Sowing | | | | | | | | | | | | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | 0 |
| | Water manegment | | | | | | | | | | | | 92 | | | | | | | | | | | | | 81 |
| | Weeding | | | | | | | | | | | | | | | 92 | | | | | | | | | | 92 |
| | Disease control | | | | | | | | | | | | | | | | | | | | 162 | | | | | 92 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | 432 | | | | | 162 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | | | 1080 | | 432 |
| | Processing, grading | | | | | | | | | | | | | | | | | | | | | | | | | 1.080 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 284 | 603 | 9 | 9 | 101 | 9 | 9 | 9 | 9 | 603 | 0 | 0 | 1080 | 0 | 3.008 |

-Continuation-

Table B-23 Labour time of farming on Large Investor( Land use crops )

| Crops | Operation | Jan 1-15 | Jan 16-31 | Feb 1-15 | Feb 16-28 | Mar 1-15 | Mar 16-31 | Apr 1-15 | Apr 16-30 | May 1-15 | May 16-31 | Jun 1-15 | Jun 16-30 | Jul 1-15 | Jul 16-31 | Aug 1-15 | Aug 16-31 | Sep 1-15 | Sep 16-30 | Oct 1-15 | Oct 16-31 | Nov 1-15 | Nov 16-30 | Dec 1-15 | Dec 16-31 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sesame | Manure spreading | | | | | | | | 284 | 284 | | | | | | | | | | | | | | | | 567 |
| | Plowing | | | | | | | | | | | 216 | | | | | | | | | | | | | | 216 |
| | Fertili. application | | | | | | | | | | | 286 | | | | | | | | | | | | | | 286 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | | | | | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | 72 |
| | Weeding | | | | | | | | | | | 169 | | | | | | | | | | | | | | 169 |
| | Disease control | | | | | | | | | | | | | 92 | | | | | | | | | | | | 92 |
| | Harvesting | | | | | | | | | | | | | | | | | | | 2268 | | | | | | 2.268 |
| | Carrying | | | | | | | | | | | | | | | | | | | 324 | | | | | | 324 |
| | Post-treatment | | | | | | | | | | | | | | | | | | | | 306 | 306 | | | | 612 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 284 | 0 | 679 | 8 | 100 | 8 | 8 | 8 | 8 | 8 | 2600 | 306 | 306 | 0 | 0 | 0 | 4.606 |
| Potato | Manure spreading | | | | | | 284 | 284 | | | | | | | | | | | | | | | | | | 567 |
| | Plowing | | | | | | | | 324 | | | | | | | | | | | | | | | | | 324 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | 378 | | | | | | | | | | | | | | | | | 378 |
| | Water manegment | | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | | | | | 63 |
| | Weeding | | | | | | | | 92 | | | | | | | | | | | | | | | | | 92 |
| | Disease control | | | | | | | | 92 | | | | | | | | | | | | | | | | | 92 |
| | Harvesting | | | | | | | | | | | | | | | 1678 | | | | | | | | | | 1.678 |
| | Carrying | | | | | | | | | | | | | | | 2880 | | | | | | | | | | 2.880 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 284 | 284 | 893 | 8 | 8 | 8 | 8 | 8 | 8 | 4558 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.073 |
| Onion | Prep. of nursery bed | | | | | | | | | | | | | | | | | | 65 | | | | | | | 65 |
| | Manure spreading | | | | | | | | | | | | | | | | | | | | 284 | 284 | | | | 567 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | | 324 | | | 324 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Planting | | | | | | | | | | | | | | | | | | | | | | 9000 | | | 9.000 |
| | Water manegment | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | | | | | | | | | | 8 | 8 | 8 | 81 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | 92 | | 92 |
| | Harvesting | | | | | | | 1678 | | | | | | | | | | | | | | | | | | 1.678 |
| | Carrying | | | | | | | 1764 | | | | | | | | | | | | | | | | | | 1.764 |
| | Processing | | | | | | | | 2160 | | | | | | | | | | | | | | | | | 2.160 |
| | Sub-total | 8 | 8 | 8 | 8 | 8 | 8 | 3450 | 2160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 284 | 284 | 9332 | 100 | 8 | 15.730 |
| Cabbage | Prep. of nursery bed | | | | | | | | | | | | | | | | | | 869 | 869 | 869 | 869 | | | | 3.474 |
| | Manure spreading | | | | | | | | | | | | | | | | | | | 284 | 284 | | | | | 567 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 216 | | | | 216 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | 270 | | | | 270 |
| | Planting | | | | | | | | | | | | | | | | | | | | | 702 | | | | 702 |
| | Water manegment | 7 | 7 | 7 | 7 | 7 | 7 | | | | | | | | | | | | | | | 7 | 7 | 7 | 7 | 72 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | 92 | | | 92 |
| | Disease control | | | | | | | | | | | | | | | | | | | | | | | 92 | | 92 |
| | Harvesting | | | | | | 5040 | | | | | | | | | | | | | | | | | | | 5.040 |
| | Carrying | | | | | | 4032 | | | | | | | | | | | | | | | | | | | 4.032 |
| | Post-treatment | | | | | | | 324 | | | | | | | | | | | | | | | | | | 324 |
| | Sub-total | 7 | 7 | 7 | 7 | 7 | 9079 | 324 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 869 | 1152 | 1152 | 2064 | 99 | 99 | 7 | 14.881 |
| Total(hr) | | 30 | 30 | 30 | 30 | 30 | 9.569 | 4.072 | 3.352 | 689 | 1.133 | 1.856 | 627 | 125 | 33 | 4.774 | 25 | 25 | 958 | 5.081 | 2.628 | 3.436 | 11.040 | 1.294 | 30 | 50.900 |
| Labour requirment(person) | (1)× | 4 | 4 | 4 | 4 | 4 | 1.196 | 509 | 419 | 86 | 142 | 232 | 78 | 16 | 4 | 597 | 3 | 3 | 120 | 635 | 329 | 430 | 1.380 | 162 | 4 | 6.868 |
| Operater Assistant(man/day) | (2)× | 1 | 1 | 1 | 1 | 1 | 75 | 34 | 28 | 6 | 9 | 15 | 6 | 2 | 1 | 40 | 1 | 1 | 8 | 42 | 22 | 29 | 92 | 11 | 1 | |
| Permanent Labour(man/day) | (3)× | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 21 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| Farming manager/other | (4)× | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| (3)-(4)= | (5)× | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | |
| Seasonal Labour (2)-(3)= | (6)× | | | | | | 55 | 14 | 8 | | | | | | | 20 | | | | 22 | 2 | 9 | 72 | | | 3.019 |

Table B-24 labour Time of Farming on Large Scale Investors(Dairy)

| Crops | Operation | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | | Labour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | Total |
| Wheat | Manure spreading | | | | | | | | | | | | | | | | | | | | 284 | 284 | | | | 568 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 216 | | | | 216 |
| | Fertili. application | | | | | | | | | | | | | | | | | | | | | | 378 | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | 0 | | | 0 |
| | Water management | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | | | | | 9 | 9 | 9 | 108 |
| | Weeding | | | 85 | | | | | | | | | | | | | | | | | | | | | | 85 |
| | Disease control | | | | | | 92 | | | | | | | | | | | | | | | | | | | 92 |
| | Harvesting | | | | | | | | | | 227 | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | | | | 81 | | | | | | | | | | | | | | | 81 |
| | Sub total | 9 | 9 | 94 | 9 | 9 | 101 | 9 | 9 | 9 | 308 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 500 | 387 | 9 | 9 | 1.754 |
| Maize | Manure spreading | | | | | | | 378 | 378 | 378 | | | | | | | | | | | | | | | | 1.134 |
| | Plowing | | | | | | | 216 | 216 | | | | | | | | | | | | | | | | | 432 |
| | Fertili application | | | | | | | | | 378 | 378 | | | | | | | | | | | | | | | 756 |
| | Sowing | | | | | | | | | 0 | 0 | | | | | | | | | | | | | | | 0 |
| | Water management | | | | | | | | | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | | | | | | | | 144 |
| | Weeding | | | | | | | | | | | | 169 | | | | | | | | | | | | | 169 |
| | Disease control | | | | | | | | | | | | | | | 183 | | | | | | | | | | 183 |
| | Harvesting | | | | | | | | | | | | | | | | | 310.5 | 310.5 | | | | | | | 621 |
| | Carrying | | | | | | | | | | | | | | | | | 486 | 486 | | | | | | | 972 |
| | Sub total | 0 | 0 | 0 | 0 | 0 | 0 | 594 | 594 | 772 | 394 | 16 | 185 | 16 | 16 | 199 | 16 | 812.5 | 826.5 | 0 | 0 | 0 | 0 | 0 | 0 | 4.471 |
| Barley | Manure spreading | | | | | | | | | | | | | | | | | | | | 284 | 284 | | | | 567 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 216 | | | | 216 |
| | Fertili application | | | | | | | | | | | | | | | | | | | | | | 378 | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | 0 | | | 0 |
| | Water management | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | 6 | 6 | 6 | 67 |
| | Weeding | | 31 | | | | | | | | | | | | | | | | | | | | | | | 31 |
| | Disease control | | | | | 170 | | | | | | | | | | | | | | | | | | | | 170 |
| | Harvesting | | | | | | | 227 | | | | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | 81 | | | | | | | | | | | | | | | | | | 81 |
| | Sub total | 6 | 37 | 6 | 6 | 176 | 6 | 314 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 500 | 384 | 6 | 6 | 1.737 |
| Sorghum | Manure spreading | | | | | | | | | 378 | 378 | 378 | | | | | | | | | | | | | | 1.134 |
| | Plowing | | | | | | | | | | | 216 | 216 | | | | | | | | | | | | | 432 |
| | Fertili application | | | | | | | | | | | 287 | 287 | | | | | | | | | | | | | 573 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | | | | | | | | | | | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | | | | | | 144 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | | | 122 | | | | | | | | | | 122 |
| | Cutting | | | | | | | | | | | | | | 54 | 54 | 54 | 54 | 54 | 54 | | | | | | 324 |
| | Carrying | | | | | | | | | | | | | | 1080 | 1080 | 1080 | 1080 | 1080 | 1080 | | | | | | 5.400 |
| | Sub-total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 378 | 378 | 897 | 519 | 16 | 1150 | 1272 | 1150 | 1150 | 1150 | 1150 | 0 | 0 | 0 | 0 | 0 | 9.209 |
| Potato | Manure spreading | | | | | | | | | | | | | | | | | 284 | | | | | | | | 567 |
| (short | Plowing | | | | | | | | | | | | | | | | | | 284 | | | | | | | 216 |
| | Fertili application | | | | | | | | | | | | | | | | | | 216 | 286 | | | | | | 286 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | 7 | 7 | 7 | 7 | | | | | | | | | | | | | | | 7 | 7 | 7 | 7 | 7 | 7 | 72 |
| | Weeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | | | | | | | | 170 | | | | | 170 |
| | Cutting | | | 454 | 454 | 454 | | | | | | | | | | | | | | | | | 454 | | 454 | 2.268 |
| | Carrying | | | 594 | 594 | 594 | | | | | | | | | | | | | | | | | 594 | | 594 | 2.970 |
| | Sub total | 7 | 1055 | 1055 | 1055 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 500 | 293 | 177 | 7 | 1055 | 7 | 1055 | 6.519 |
| Fodder | Manure spreading | | | | | | | | | | | | | | | | | | 189 | 189 | 189 | | | | | 567 |
| Beet | Plowing | | | | | | | | | | | | | | | | | | | | 324 | | | | | 324 |
| | Fertili application | | | | | | | | | | | | | | | | | | | | 378 | | | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water management | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | | | | | 5 | 5 | 5 | 5 | 5 | 63 |
| | Weeding | | 92 | | | | | | | | | | | | | | | | | | | | | | | 92 |
| | Disease control | | | 92 | | | | | | | | | | | | | | | | | | | | | | 92 |
| | Harvesting | | | | | 280 | 280 | 280 | 280 | 280 | 280 | | | | | | | | | | | | | | | 1.672 |
| | Carrying | | | | | 1670 | 1670 | 1670 | 1670 | 1670 | 1670 | | | | | | | | | | | | | | | 8.820 |
| | Sub total | 5 | 97 | 97 | 5 | 1755 | 1755 | 1755 | 1750 | 1750 | 1750 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 189 | 189 | 896 | 5 | 5 | 5 | 5 | 12.813 |
| | Total(hr) | 28 | 1.198 | 1.252 | 1.075 | 1.940 | 1.862 | 2.832 | 2.359 | 2.909 | 2.830 | 993 | 704 | 32 | 1.066 | 611 | 1.166 | 2.226 | 2.665 | 1.632 | 1.640 | 1.011 | 1.831 | 28 | 1.075 | 35.733 |
| | above equipment(persons) (1) | 3 | 150 | 157 | 134 | 242 | 233 | 354 | 295 | 364 | 354 | 124 | 88 | 4 | 146 | 101 | 146 | 285 | 333 | 204 | 205 | 126 | 229 | 3 | 134 | 4.467 |
| | operator/Assistant(man/day) (2) | 1 | 10 | 11 | 11 | 17 | 15 | 23 | 20 | 25 | 23 | 8 | 6 | 1 | 10 | 13 | 10 | 19 | 23 | 14 | 13 | 9 | 16 | 1 | 9 | 4.620 |
| | permanent labour(man/day) (3) | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | |
| | attching management(man/day)(4) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| | driving manager(man/day) (5) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | (3)+(4)+(5)= (6) | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | |

Table B-25 Labour Time of Farming on Large Scale Investors(Beef Cattle)

| Crops | Operation | Jan 1 | Jan 15 | Feb 1 | Feb 15 | Mar 1 | Mar 15 | Apr 1 | Apr 15 | May 1 | May 15 | Jun 1 | Jun 15 | Jul 1 | Jul 15 | Aug 1 | Aug 15 | Sep 1 | Sep 15 | Oct 1 | Oct 15 | Nov 1 | Nov 15 | Dec 1 | Dec 15 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meat | Manure spreading | | | | | | | | | | | | | | | | | | | | 281 | 281 | | | | 562 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | | 216 | | | 216 |
| | Ferti.application | | | | | | | | | | | | | | | | | | | | | | 378 | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water managment | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | | | | | 9 | 9 | 9 | 108 |
| | Disease control | | | | | | 92 | | | | | | | | | | | | | | | | | | | 92 |
| | Feeding | | | | | | | | | | | | | | | | | | | | | | 169 | | | 169 |
| | Harvesting | | | | | | | | | 227 | | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | | | 81 | | | | | | | | | | | | | | | | 81 |
| | Sub total | 9 | 9 | 9 | 9 | 9 | 101 | 9 | 9 | 9 | 308 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 281 | 772 | 9 | 9 | 1,838 |
| Maize | Manure spreading | | | | | | | | | 281 | 281 | | | | | | | | | | | | | | | 562 |
| | Plowing | | | | | | | | | | 216 | | | | | | | | | | | | | | | 216 |
| | Ferti.application | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Sowing | | | | | | | | | | 270 | | | | | | | | | | | | | | | 270 |
| | Water managment | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | 72 |
| | Feeding | | | | | | | | | | 169 | | | | | | | | | | | | | | | 169 |
| | Disease control | | | | | | | | | | | | | | 92 | | | | | | | | | | | 92 |
| | Cutting | | | | | | | | | | | | | | | | | | | 310 | | | | | | 310 |
| | Carrying | | | | | | | | | | | | | | | | | | | 186 | | | | | | 486 |
| | Sub total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 967 | 0 | 0 | 0 | 180 | 0 | 0 | 0 | 834 | 0 | 0 | 0 | 0 | 0 | 2,252 |
| Barley | Manure spreading | | | | | | | | | | | | | | | | | | | | 281 | 281 | | | | 562 |
| | Plowing | | | | | | | | | | | | | | | | | | | | | 216 | | | | 216 |
| | Ferti.application | | | | | | | | | | | | | | | | | | | | | 378 | | | | 378 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water managment | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | | 6 | 6 | 60 |
| | Disease control | | | | | | 92 | | | | | | | | | | | | | | | | | | | 92 |
| | Feeding | | | | | | | | | | | | | | | | | | | | | | 169 | | | 169 |
| | Harvesting | | | | | | | | | 227 | | | | | | | | | | | | | | | | 227 |
| | Carrying | | | | | | | | | 81 | | | | | | | | | | | | | | | | 81 |
| | Sub total | 6 | 6 | 6 | 6 | 6 | 98 | 6 | 6 | 308 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 1,042 | 0 | 6 | 6 | 1,796 |
| Sorghum | Manure spreading | | | | | | | | | 281 | 281 | | | | | | | | | | | | | | | 562 |
| | Plowing | | | | | | | | | | 216 | | | | | | | | | | | | | | | 216 |
| | Ferti.application | | | | | | | | | | 286 | | | | | | | | | | | | | | | 286 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water managment | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 72 |
| | Feeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | 92 | | | | | | | | | | | | | | 92 |
| | Cutting | | | | | | | | | | | | 81 | | 81 | | 81 | | 81 | | | | | | | 162 |
| | Carrying | | | | | | | | | | | | 810 | | 810 | | 810 | | 810 | | | | | | | 3,240 |
| | Sub total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 | 786 | 92 | 855 | 0 | 859 | 0 | 859 | 0 | 859 | 0 | 0 | 0 | 0 | 0 | 0 | 4,635 |
| Cassava | Manure spreading | | | | | | | | | | | | | | | | | | 281 | 281 | | | | | | 562 |
| (short) | Plowing | | | | | | | | | | | | | | | | | | | 216 | | | | | | 216 |
| | Ferti.application | | | | | | | | | | | | | | | | | | | 286 | | | | | | 286 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water managment | 7 | 7 | 7 | 1 | | | | | | | | | | | | | | | 7 | 7 | 7 | 7 | 7 | 7 | 72 |
| | Disease control | | | | | | | | | | | | | | | | | | | | 92 | | | | | 92 |
| | Feeding | | | | | | | | | | | | | | | | | | | 169 | | | | | | 169 |
| | Cutting | 282 | | 376 | 376 | | | | | | | | | | | | | | | | | | 282 | 282 | 282 | 1,880 |
| | Carrying | 446 | | 594 | 594 | | | | | | | | | | | | | | | | | | 446 | 446 | 446 | 2,970 |
| | Sub total | 735 | 7 | 977 | 977 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 962 | 99 | 735 | 735 | 7 | 735 | 6,953 |
| Cassava | Manure spreading | | | | | | | | | | | | | | | | | 281 | 281 | | | | | | | 562 |
| (long) | Plowing | | | | | | | | | | | | | | | | | | | 321 | | | | | | 321 |
| | Ferti.application | | | | | | | | | | | | | | | | | | | 286 | | | | | | 286 |
| | Sowing | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water managment | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | 9 | 9 | 9 | 9 | 9 | 9 | 144 |
| | Feeding | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Disease control | | | | | | | | | | | | | | | | | | | | 92 | | | | | 92 |
| | Harvesting | | | | | | | | 294 | 621 | 293 | | | | | | | | | | | | 158 | 158 | 158 | 1,682 |
| | Carrying | | | | | | | | 294 | 565 | 293 | | | | | | | | | | | | 158 | 158 | 158 | 1,682 |
| | Sub total | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 1,082 | 2,158 | 1,082 | 0 | 0 | 0 | 0 | 0 | 0 | 281 | 281 | 616 | 101 | 825 | 825 | 825 | 9 | 7,373 |
| Total(ha) | | 969 | 31 | 1,001 | 1,001 | 31 | 260 | 25 | 1,162 | 2,199 | 2,161 | 1,039 | 867 | 15 | 867 | 196 | 867 | 990 | 1,431 | 2,421 | 775 | 2,620 | 2,118 | 842 | 359 | 24,307 |
| Labor supply(person) | (1) | 95 | 4 | 125 | 125 | 3 | 26 | 3 | 139 | 350 | 308 | 130 | 108 | 2 | 108 | 13 | 108 | 22 | 179 | 503 | 97 | 326 | 261 | 81 | 35 | 2,038 |
| Supervisor/Assistant(man/day) | (2) | 7 | 1 | 8 | 10 | 1 | 2 | 1 | 14 | 21 | 20 | 9 | 8 | 1 | 7 | 1 | 7 | 1 | 12 | 21 | 7 | 23 | 16 | 6 | 6 | |
| Milking manager(man/day) | (3) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | |
| Calving manager/other(man/day) | (4) | 22 | 20 | 20 | 18 | 21 | 22 | 20 | 18 | 9 | 9 | 20 | 21 | 20 | 22 | 21 | 22 | 26 | 11 | 8 | 22 | 6 | 11 | 22 | 21 | |
| Total(Sum) | (5) | 64 | 61 | 63 | 61 | 61 | 61 | 61 | 64 | 65 | 61 | 64 | 61 | 61 | 63 | 61 | 64 | 61 | 61 | 64 | 61 | 63 | 64 | 61 | 61 | |

Table B-26 Labor time of farming on Large-scale Investors(Fruit)

| Crops | Operation | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | |
| Almond | Manure spreding | 284 | 284 | | | | | | | | | | | | | | | | | | | | | | | 567 |
| | Fertili. application | | 378 | | | | | | | | | | | | | | | | | | | | | | | 378 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 657 |
| | Disease control | | | | | 648 | | | | | | | | | | | | | | | | | | | | 648 |
| | Weeding | | | | | 270 | 270 | | | | | | | | | | | | | | | | | | | 540 |
| | Harvesting | | | | | | | | | 4455 | 4455 | 4455 | 4455 | | | | | | | | | | | | | 17.820 |
| | Carrying | | | | | | | | | 387 | 387 | 387 | 387 | | | | | | | | | | | | | 1.548 |
| | Sub-total | 311 | 689 | 27 | 27 | 945 | 297 | 27 | 27 | 4869 | 4869 | 4869 | 4869 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 22.158 |
| Grapes | Manure spreding | 189 | 189 | 189 | | | | | | | | | | | | | | | | | | | | | | 567 |
| | Fertili. application | 189 | 189 | | | | | | | | | | | | | | | | | | | | | | | 378 |
| | Pruning | | | 540 | 540 | | | | | | | | | | | | | | | | | | | | | 1.080 |
| | Water manegment | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 657 |
| | Disease control | | | | | | | | | | | 648 | | | | | | | | | | | | | | 648 |
| | Weeding | | | | | | | 270 | 270 | | | | | | | | | | | | | | | | | 540 |
| | Harvesting | | | | | | | | | | | | | 3629 | 3629 | 3629 | 3629 | 3629 | | | | | | | | 18.144 |
| | Carrying | | | | | | | | | | | | | 310 | 310 | 310 | 310 | 310 | | | | | | | | 1.548 |
| | Sub-total | 405 | 405 | 756 | 567 | 27 | 27 | 297 | 297 | 27 | 27 | 675 | 27 | 3966 | 3966 | 3966 | 3966 | 3966 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 23.562 |
| Olive | Manure spreding | | | | 189 | 189 | 189 | | | | | | | | | | | | | | | | | | | 567 |
| | Fertili. application | | | 189 | 189 | | | | | | | | | | | | | | | | | | | | | 378 |
| | Pruning | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | Water manegment | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 657 |
| | Disease control | | | | | | | | | | | | | | 216 | 216 | | | | | | | | | | 432 |
| | Weeding | | | | | | | | | 180 | | | | | | | | | | | | | | | | 180 |
| | Harvesting | | | | | | | | | | | | | | | | | | 6030 | 6030 | 6030 | 6030 | | | | 24.120 |
| | Carrying | | | | | | | | | | | | | | | | | | 338 | 338 | 338 | 338 | | | | 1.350 |
| | Sub-total | 27 | 27 | 216 | 405 | 216 | 216 | 27 | 27 | 207 | 27 | 27 | 27 | 27 | 27 | 243 | 243 | 27 | 6395 | 6395 | 6395 | 6395 | 27 | 27 | | 27.684 |
| Orange | Manure spreding | | | | | | 189 | 189 | 189 | | | | | | | | | | | | | | | | | 567 |
| | Fertili. application | | | | | 189 | 189 | | | | | | | | | | | | | | | | | | | 378 |
| | Pruning | 540 | 540 | | | | | | | | | | | | | | | | | | | | | | | 1.080 |
| | Water manegment | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 666 |
| | Disease control | | | | | | | | | | | | | | | | | 216 | 216 | | | | | | | 432 |
| | Weeding | | | | | | | | | | 270 | 270 | | | | | | | | | | | | | | 540 |
| | Harvesting | | | | | | | | | | | | | | | | | | | | | 7380 | 7380 | 7380 | | 22.140 |
| | Carrying | | | | | | | | | | | | | | | | | | | | | 430 | 430 | 430 | | 1.440 |
| | Sub-total | 568 | 568 | 28 | 28 | 217 | 406 | 217 | 217 | 28 | 298 | 298 | 28 | 28 | 28 | 28 | 28 | 244 | 244 | 28 | 28 | 7838 | 7838 | 7838 | | 27.243 |
| | Total(hr) | 1.311 | 1.689 | 1.028 | 1.028 | 1.406 | 947 | 569 | 569 | 5.132 | 5.222 | 5.870 | 4.952 | 110 | 4.048 | 4.264 | 4.264 | 4.264 | 4.264 | 6.477 | 6.477 | 6.477 | 14.337 | 7.970 | 7.970 | 100.647 |
| Labour requirment(Persons) | (1) | 164 | 211 | 128 | 128 | 176 | 118 | 71 | 71 | 641 | 653 | 734 | 619 | 14 | 506 | 533 | 533 | 533 | 533 | 810 | 810 | 810 | 1.792 | 996 | 996 | 12.581 |
| Operater Assistant(man day) | (2) | 11 | 14 | 9 | 9 | 12 | 8 | 5 | 5 | 43 | 41 | 49 | 42 | 1 | 32 | 36 | 34 | 36 | 36 | 54 | 54 | 54 | 120 | 67 | 68 | |
| Permanent Labour(man day) | (3) | 13 | 17 | 10 | 10 | 14 | 10 | 6 | 6 | 50 | 51 | 58 | 48 | 2 | 39 | 41 | 41 | 41 | 41 | 53 | 53 | 53 | 53 | 53 | 53 | |
| Farming management,other(man day) | (4) | 54 | 50 | 57 | 57 | 53 | 57 | 61 | 61 | 17 | 16 | 14 | 19 | 65 | 28 | 26 | 26 | 26 | 26 | 14 | 14 | 14 | 14 | 14 | 14 | |
| (3)+(4)= | (5) | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | |
| Seasonal laborer(Man-day)(2)-(3)=(6) | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 67 | 14 | 10 | |
| Seasonal laborer(Persons) | (7) | | | | | | | | | | | | | | | | | | | 15 | 15 | 15 | 1005 | 210 | 150 | 1.410 |