**OrgFarm**

**Sample Only**

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ISMT E-130

**Overview**

 This document presents a concise reference guide to the OrgFarm model, listing the most commonly used elements in the model and giving a brief description of these elements. This document is designed to provide a complete understanding of the OrgFarm model and enable easy maintenance. The OrgFarm model consists of two scenarios: growth and hyper-growth. The first scenario incorporates the use of a new fertilizer and improved packaging. The second scenario involves the use of a greenhouse, new fertilizer and improved packaging.

**Business Model and Design**

The vital tools that play an important factor in the OrgFarm model are:

1. Inputs
2. Parameters
3. Base Assumptions
4. Production
5. Revenue
6. Labor
7. Cost of Goods Sold
8. Equipment Owned
9. Equipment Leased
10. Income Statement

 Accordingly, OrgFarm and the reference guide are comprised of ten sections. In addition there is a final exhibit that lists defined names in the model (Exhibit 1).

**Inputs**

The input worksheets contain the following:

* Price – A constant input of $2.50.
* Land Usage – A constant input of 75%.
* Sell-Through – A variable input of: 80%, 86%, 92%, 93%, 95%, and 96%.

**Parameters**

* Labor Productivity – A constant parameter of $1.10.
* Cost of Fertilizer/Acre - A constant parameter of $1.50.
* Packaging Cost per Bag - A constant parameter of $0.45
* Spoilage – A constant parameter of 10%.
* Yield (Bags/Acre) – A constant parameter of 1,100.

**Base Assumptions**

* The size of farm is 1,000 acres.
* The growing cycle is 3 months.
* The growing season is 6 months.
* The green house has 50% usable land and operating all year around.
* OrgFarm is operating with three tractors, three precision planters, three trailers and one plough.
* Under staffing, there are two full time workers such as farm manager and assistant farm manager.

The part-time tier schedules:

* Planting days per quarter is 4 days for maximum land usage (75%).
* Harvesting days per quarter is 5 days.

 For example, the Part-time tier schedule for planting days per quarter/harvesting days per quarter, is as follows: if the land usage is more than or equal to 25% or less than 75%, the planting days is 0.89 and the harvesting days per quarter is 1.11. The number of planters/harvester is 4.

 *The workers hourly rates:*

* Supervisor Hourly Rate is $20.00
* Assistant Manager Hourly Rate is $15.00
* Planter/Harvester Hourly Rate is $10.50
* Hours per day full-time is 8 hours
* Hours per day part-time is 10 hours
* Work days in a quarter is 65 days

*Operating Costs:*

* Gallons Per Acre is 0.5
* Seed Cost (per 1,000) is $3.00
* Seeds Per Acre is 1,200
* Irrigation Cost per Acre is $0.25
* The principal amount of farm mortgage is $750,000.00.
* The equipment maintenance is $2,500 per cycle.

**Production**

 *Land Usage:*

* The total land is constant (1,000 acres).
* Land usage per acre formula is {=LandUsagePercent\*TotalLand}.

*Production:*

* Yield per bags/acre is constant 1,100.
* The production per bags formula is {=LandUsageAcres\*YieldPerAcre}.

**Revenue**

* The spoilage is equal to the parameter spoilage.
* The Bags of Lettuce Available for Sale formula: =Production\*(1-Spoilage)
* The Bags of Lettuce Sold formula: =BagAvailForSale\*SellThroughPercent
* The total revenue formula is =BagsSold\*Price
* The total 12Q revenue Formula: =Sum(Revenue0)

**Labor**

*Labor Schedule:*

* Labor schedule is divided into two segments.
* Planting is scheduled for 4 days.
* The formula is as follows: =IF(LandUsagePercent>=BaseAssumptions!LandUsageTier1,BaseAssumptions!MaxHarvestDaysPerQtr, IF(LandUsagePercent>=BaseAssumptions!LandUsageTier2,(LandUsagePercent/BaseAssumptions!LandUsageTier1)\*BaseAssumptions!MaxHarvestDaysPerQtr,0))
* Harvesting is scheduled for 5 days.
* The formula is as follows: =IF(LandUsagePercent>=BaseAssumptions!LandUsageTier1,BaseAssumptions!MaxHarvestDaysPerQtr IF(LandUsagePercent>=BaseAssumptions!LandUsageTier2,(LandUsagePercent/BaseAssumptions!LandUsageTier1)\*BaseAssumptions!MaxHarvestDaysPerQtr,0))

*Part-Time Labor Cost:*

* Part-time labor cost is created to show the expenses for planting and harvesting days.
* Formula for planting: {=PlantingDays\*BaseAssumptions!Hoursperparttime\*Base

Assumptions!NumberofPlantersHarvesters)\*LaborProductivity}.

* Formula for harvesting: {=HarvestingDays\*BaseAssumptions!Hoursperdayparttime\*

BaseAssumptions!PlanterHarvesterRate\*BaseAssumptions!NumberofPlanters\*Labor

Productivity}

*Full-Time Labor Cost:*

* Full-time labor cost is expense for Supervisor and Assistant Manager. This labor cost is computed by formula as indicated below:
* Formula for supervisor {=BaseAssumptions!Daysinquarter\*BaseAssumptions!

SupervisorRate\*BaseAssumptions!Hoursperdayfulltime}

* Formula for Assistant Manager {=BaseAssumptions!Daysinquarter\*BaseAssumptions!

AsstManagerRate\*BaseAssumptions!Hoursperdayfulltime}

**Cost of Goods Sold (COGS)**

 Cost of Goods Sold is a major expense item consisting seed cost, irrigation cost per acre, fuel cost per acre, labor cost, packaging cost and cost of fertilizer. It is directly related to sales revenue.

*Seed Cost:*

* The cost of seeds per acre multiplied by the land usage.

 Formula: =SeedCost\*SeedsPerAcre\*LandUsageAcres

*Irrigation Cost per Acre:*

* Utilization of irrigation per acre multiplied by the land usage per acre.

Formula: =IrrigationCostPerAcre\*LandUsageAcres

*Fuel Cost per Acre:*

* Fuel consumption per gallon based on the gallons per acre and land usage per acres.

Formula: =FuelPricePerGallon\*(GallonsPerAcre\*LandUsageAcres)

*Labor Cost:*

* The total workers’ salary based on the total time period (Three years).

Formula: =TotalLaborCost

*Packaging Cost:*

* The cost of packaging goods under the new packaging process.

Formula: =PackagingCostPerBag\*Production

*Cost Fertilizer:*

* The cost of new improved fertilizer is very reasonable and it gives a better satisfying taste to the produce.

 Formula: =FertilizerCostPerAcre\*LandUsageAcres

**Equipment Owned**

Depreciation expense is driven by the historical characteristics of the owned equipment and land usage. The expense is calculated based on land usage, a modified method for accounting purposes. There are three types of equipment owned (Tractor & Trailer, Precision Planter and Plough). Four tables were developed to show the historical data and the calculation of the depreciation expense.

*Table 1 - Owned Capital Equipment:*

* Under table 1, historical data are listed as (a) beginning model period, (b) purchase date,

(c ) No. of Qtrs depreciated, (d) value, (e) scrap value

 Formula-Ending Value Percent: =ScrapValue/Cost

*Table 2 – DepPercentAnalysis:*

* The amount of land usage determines the depreciation percentage. This is consider a modified depreciation method.
* Thresholds are determined by land usage

*Table 3 – DepExpAnalysis:*

* Using the percentages calculated in the above table, an actually expense is derived.
* Formula: (Cost\*DepPercentAnalysis)

*Table 5 – DepLevelAnalysis:*

* This is a helper array that will work in depreciation calculation methodology.

*Table 6 – TestBookValue:*

* This table is a running difference beginning with the book value of the equipment and subtracting the quarterly depreciation expense.
* It allows the book value to become negative

*Table 7 – TestBookAnalysis:*

* Uses the TestBookValue array as a helper array to either continue to depreciate the asset or stop at the scrap value.
* Formula:={If(TestBookValue>Transpose(ScrapValue),TestBookValue,Transpose(ScrapeValue))}

*Table 8 – DepExpPerQtr:*

* The final table on this sheet calculates the quaterly depreciation expense by taking the quaterly difference from the TestBookAnalysis.
* The quarterly depreciation is summed at the bottom of this sheet.
* Formula:{=BookValueAnalysis-Offset(BookValueAnalysis,0,1)}

**Equipment Leased**

The equipment lease initiates if there is a land usage number in one of the off-season quarters (1 & 4). This section reflects the lease and depreciation expense associated with the lease of a greenhouse. The max greenhouse cost is fixed ($300,000) and the max land usage percent constant (75%). The base cost is variable depending on the user. If the land usage associated with the greenhouse is less than 75% the cost of the greenhouse lease will adjust accordingly, also changing the lease payments and the depreciaton.

*Table – Schedule of Lease Payments, Net Asset Value, Net Lease Liability:*

* This sheet projects the lease payments, both interest and principal, depreciation, accumulated depreciation, net asset value, accumulated principal payments and net lease liability.
* Output varies depending on the user. The standard acronym for Greenhouse is GH.
* Lease Payments - Formula: =PMT(IntRate/CompoundPeriod,NoLeasePeriods,

-GHBaseCost)

* Interest Payments – Formula: =IPMT(IntRate/CompoundPeriod,NoLeasePeriods

-RemQtrs+1,NoLeasePeriods,-GHBaseCost)

* Principal Payments – Formula: =PPMT(IntRate/CompoundPeriod,NoLeasePeriods

-RemQtrs+1,NoLeasePeriods,-GHBaseCost)

* Depreciation - Formula: {=IF(RemQtrs>=0,DepExp,0)}
* Net Asset Value – Formula: {=GHBaseCost-GHAccumDep}
* Net Lease Liability – Formula: {=GHBaseCost-GHAccumPrincipalPmts}

**Income Statement**

 The accounting period covered by this income statement is three years. The income statement (Revenue, Cost of Goods Sold, Gross profit and Operating Expenses) reports the accountant’s primary measure of performance of a business, the revenues less the expenses for the accounting period. The operating profit is used widely as the measure of performance, while net income capture a complete cost picture.

*Revenue:*

* In this project, revenue is normally reported in the period in which produce (Lettuce) are sold.
* COGS is a major expense item for this project and is directly related to sales revenues.

*Gross Profit:*

* Gross profit (Gross Margin) is a net sales less cost of goods sold. The equation for this Gross profit is the Revenue - Cost of Goods Sold.

*Operating Expenses:*

* Mortgage – Formula: =BaseAssumptions!FarmMortgage
* Sales & Marketing – Formula: =IF(Production>0,BaseAssumptions!Mkting,0)
* Equipment Maintenance – Formula: =IF(Production>0,BaseAssumptions!EqptMaint,0)
* Lease Payments – Formula: =Sum(C14:N14)
* Depreciation – Formula: =EqptOwned!OwnedDepExp+EqptLeased!GHDepExp
* Total Operating Expense is the sum of (Mortgage, Sales & Marketing, Equipment Maintenance, Lease Payments, and Depreciation).
* Operating Profit is described in equation as Gross Profit minus Total Operating Expenses.

*Taxes*

* Formula: =(Sum(C8:F8)-Sum(C17:F17))\*BaseAssumptions!TaxRate

*Net Income:*

* The net income equation: (Operating Profit – Taxes).

Exhibit 1

|  |  |  |  |
| --- | --- | --- | --- |
| **OrgFarm Ranges** |   |   |   |
|   |  |  |  |   |
|   |  | **RangeName** | **RangeReference** | **Global/Local** |
|   |  |  |  |   |
|   |  | BegModelPeriod | BaseAssumptions!$B$4 | Global |
|   |  | TotalLand | BaseAssumptions!$B$6 | Global |
|   |  | MaxLandUsagePercent | BaseAssumptions!$B$7 | Global |
|   |  | MaxPlantingDaysPerQtr | BaseAssumptions!$C$20 | Local |
|   |  | MaxHarvestDaysPerQtr | BaseAssumptions!$D$20 | Local |
|   |  | LandUsageTier1 | BaseAssumptions!$B$20 | Local |
|   |  | LandUsageTier2 | BaseAssumptions!$B$21 | Local |
|   |  | NumberofPlantersHarvesters | BaseAssumptions!$B$23 | Local |
|   |  | SupervisorRate | BaseAssumptions!$B$24 | Local |
|   |  | AsstManagerRate | BaseAssumptions!$B$25 | Local |
|   |  | PlanterHarvesterRate | BaseAssumptions!$B$26 | Local |
|   |  | Hoursperdayfulltime | BaseAssumptions!$B$27 | Local |
|   |  | Hoursperdayparttime | BaseAssumptions!$B$28 | Local |
|   |  | Daysinaquarter | BaseAssumptions!$B$29 | Local |
|   |  | FuelPricePerGallon | BaseAssumptions!$B$33 | Global |
|   |  | GallonsPerAcre | BaseAssumptions!$B$34 | Global |
|   |  | SeedCost | BaseAssumptions!$B$35 | Global |
|   |  | SeedsPerAcre | BaseAssumptions!$B$36 | Global |
|   |  | IrrigationCostPerAcre | BaseAssumptions!$B$37 | Global |
|   |  | Mkting | BaseAssumptions!$B$38 | Local |
|   |  | FarmMortgage | BaseAssumptions!$B$42 | Local |
|   |  | EqptMaint | BaseAssumptions!$B$43 | Local |
|   |  | TaxRate | BaseAssumptions!$B$56 | Local |
|   |  | COGS | COGS!$C$13:$N$13 | Global |
|   |  | MaxGHBaseCost | EqptLeased!$B$6 | Local |
|   |  | GHBaseCost | EqptLeased!$B$9 | Local |
|   |  | IntRate | EqptLeased!$B$10 | Local |
|   |  | CompoundPeriod | EqptLeased!$B$11 | Local |
|   |  | NoLeasePeriods | EqptLeased!$B$12 | Local |
|   |  | Life | EqptLeased!$B$13 | Local |
|   |  | DepExp | EqptLeased!$B$14 | Local |
|   |  | HighThreshold | EqptOwned!$B$29 | Local |
|   |  | Thresholds | EqptOwned!$B$29:$B$31 | Local |
|   |  | MedThreshold | EqptOwned!$B$30 | Local |
|   |  | LowThreshold | EqptOwned!$B$31 | Local |
|   |  | PurchaseDate | EqptOwned!$C$10:$I$10 | Local |
|   |  | NoQtrsDepreciated | EqptOwned!$C$11:$I$11 | Local |
|   |  | AccumDepPercent | EqptOwned!$C$12:$I$12 | Local |
|   |  | BegBookValue | EqptOwned!$C$13:$I$13 | Local |
|   |  | Cost | EqptOwned!$C$14:$I$14 | Local |
|   |  | ScrapValue | EqptOwned!$C$15:$I$15 | Local |
|   |  | EndValuePercent | EqptOwned!$C$16:$I$16 | Local |
|   |  | DepPercentAnalysis | EqptOwned!$C$22:$I$24 | Local |
|   |  | DepExpAnalysis | EqptOwned!$C$29:$I$31 | Local |
|   |  | DepLevelAnalysis | EqptOwned!$C$39:$N$41 | Local |
|   |  | TestDepExpAnalysis | EqptOwned!$C$48:$N$54 | Local |
|   |  | TestBookValue | EqptOwned!$C$59:$N$65 | Local |
|   |  | BookValueAnalysis | EqptOwned!$C$70:$N$76 | Local |
|   |  | DepExpPerQtr | EqptOwned!$C$81:$N$87 | Local |
|   |  | Eqpt | EqptOwned!$C$9:$I$9 | Local |
|   |  | Price | Inputs!$C$6:$N$6 | Global |
|   |  | LandUsagePercent | Inputs!$C$8:$N$8 | Global |
|   |  | SellThroughPercent | Inputs!$C$10:$N$10 | Global |
|   |  | PlantingDays | Labor!$C$6:$N$6 | Local |
|   |  | PlantingHarvestingDays | Labor!$C$6:$N$8 | Local |
|   |  | HarvestingDays | Labor!$C$7:$N$7 | Local |
|   |  | PlantingHarvestingCost | Labor!$C$13:$N$13 | Local |
|   |  | SupervisorAsstMngrCost | Labor!$C$19:$N$19 | Local |
|   |  | TotalLaborCost | Labor!$C$21:$N$21 | Global |
|   |  | LaborProductivity | Parameters!$B$5 | Global |
|   |  | FertilizerCostPerAcre | Parameters!$B$6 | Global |
|   |  | PackagingCostPerBag | Parameters!$B$7 | Global |
|   |  | Spoilage | Parameters!$B$8 | Global |
|   |  | YieldPerAcre | Parameters!$B$9 | Global |
|   |  | LandUsageAcres | Production!$C$9:$N$9 | Global |
|   |  | Production | Production!$C$13:$N$13 | Global |
|   |  | BagsAvailForSale | Revenue!$C$8:$N$8 | Local |
|   |  | BagsSold | Revenue!$C$9:$N$9 | Local |
|   |  | Revenue | Revenue!$C$10:$N$10 | Global |
|   |  | GrossProfit | IncomeStatement!$C$8:$N$8 | Local |
|  |  | OperExp | IncomeStatement!$C$11:$N$15 | Local |
|  |  | TotOperExp | IncomeStatement!$C$16:$N$16 | Local |
|  |  | OperProfit | IncomeStatement!$C$18:$N$18 | Local |
|  |  | Taxes | IncomeStatement!$C$20:$N20 | Local |
|  |  | Net Income | IncomeStatement!$C$22:$N22 | Local |
|  |  | GrossProfit | IncomeStatement!$C$9 | Local |
|  |  | Total12QGrossProfit | IncomeStatement!$O$9 | Local |
|  |  | Total12QNetIncome | IncomeStatement!$O$24 | Local |
|  |  | Total12QRev | IncomeStatement!$O$7 | Local |
|   |   |   |   |   |