

Crop Rotation Documentation

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Synopsis

The Crop Rotation model attempts to allocate crops to fields such that the consumption needs of the user are satisfied while adhering to a set of constraints, described below.

Elements of the model

There are some basic components of the model that are required for the model to exist. These are:

- A **Farm**, which is a collection of Fields
- **Fields** in the farm. A field is defined, in this model, as the unit of land that will be planted, as a whole, with a single crop. Thus it is the minimal, indivisible, planting unit. The fields can be used in the determination of the rotation or can be set aside. The fields have a *measure*, which is under user control and there is an amount of that *measure* in each field. In a vegetable crop setting, the measure will likely be *length* of row (feet or meters of beds or rows, depending on setup); in a farm crop setting, the measure will likely be *surface* of each field (acres or hectares in each field).

Importing Farm Data

The model accepts its data from an Excel spreadsheet with tab names that identify the elements of the model and tab columns that identify the attributes of the element. Both tab names and column structure must adhere to the standard format that follows. Three tabs are required in the model:

- Farmland
- Demand
- Crops

The spreadsheet must have at least three tabs named with the labels listed; without them the data import will fail.

Farmland

The **Farmland** tab identifies the **Fields** in the **Farm** by name, their *Measure* and how much land is *Available*, and whether or not they should be *Included* in the rotation (acceptable values are Y or N). The contents of the **Farmland** tab looks like this:

Crop Ro...

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number

B2

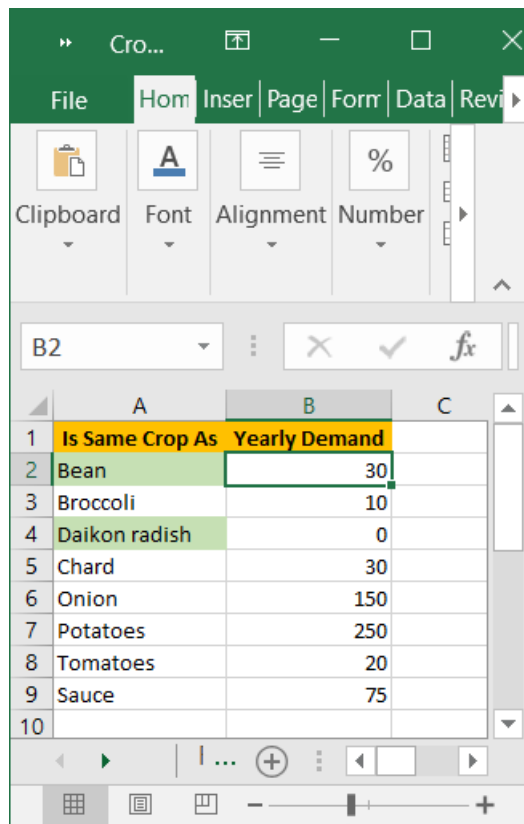
	A	B	C	D
1	Field	Measure	Available	Include?
2	Row 1	Row Feet	25	Y
3	Row 2	Row Feet	25	Y
4	Row 3	Row Feet	25	N
5	Row 4	Row Feet	25	N
6	Row 5	Row Feet	25	N
7	Row 6	Row Feet	25	N
8	Row 7	Row Feet	25	N
9	Row 8	Row Feet	25	N
10	Row 9	Row Feet	25	N
11	Row 10	Row Feet	25	N
12				

Farr ...

80%

Demand

The **Demand** tab identifies the Crop using a measure called **Is Same Crop As** (described under the Crop tab) and the amount of the crop required for a year or **Yearly Demand**. The unit of measure of the **Yearly Demand** is determined by the user and it requires consistency with the measure of yield in the Crop and by reference to the **Field**. The contents of the **Demand** Tab looks like follows:



Crops

File

Home

Insert

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Formulas

Data

Review

View

Team

Tell me what you want to do...

Jose Fortuny

Share

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Clipboard

Calibri

11

A

A

Wrap Text

General

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Conditional Formatting

Format as Table

Cell Styles

Insert

Delete

Format

Cells

Σ AutoSum

↓ Fill

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Sort & Filter

Find & Select

Editing

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Font

Alignment

Number

Styles

Cells

Editing

A3

✕

✓

fx

Asparagus

	A	B	C	D	E	F	G	H	I	J	Planting Times												K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Crop	Family	Is Annual or Perennial?	Is Same Crop As	Is Heavy Feeder?	Is Weed Contributor	Is Nitrogen Fixer?	Is Cover Crop?	Years between plantings on same field	Yield per Unit of Field	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Days To Maturity	Plant?												
2	Asparagus	Asparagaceae	P	Asparagus	Y	Y	N	N		0.25				Y										7000	N											
3	Barley	Poaceae/Graminaceae	A	Winter Hardy Grasses	N	N	N	Y												Y	Y	Y		100	N											
4	Beans (bush)	Leguminosae/Fabaceae	A	Bean	N	N	Y	N		0.75					Y	Y								50	Y											
5	Beans (pole)	Leguminosae/Fabaceae	A	Bean	N	N	Y	N		0.75					Y	Y								70	N											
6	Broccoli (early season)	Cruciferae	A	Broccoli	Y	N	N	N	2	0.5			Y	Y										80	Y											
7	Broccoli (late season)	Cruciferae	A	Broccoli	Y	N	N	N	2	0.5									Y					80	Y											
8	Brussels Sprouts	Cruciferae	A	Brussels Sprouts	Y	N	N	N	2	0.5									Y					155	N											
9	Buckwheat	Polygonaceae	A	Frost Kill Grasses	N	N	N	Y										Y	Y					80	N											
10	Clover, Red	Leguminosae/Fabaceae	A	Winter Hardy Legume	N	N	Y	Y												Y	Y	Y		90	N											
11	Daikon radish	Cruciferae	A	Daikon radish	N	N	Y	Y											Y	Y				120	Y											
12	Cabbage (early season)	Cruciferae	A	Cabbage	Y	N	N	N	2	1			Y	Y										100	N											
13	Cabbage (late season)	Cruciferae	A	Cabbage	Y	N	N	N	2	1									Y					100	N											
14	Carrots (early season)	Apiaceae/Umbelliferae	A	Carrot	Y	N	N	N		1			Y	Y										90	N											
15	Carrots (late season)	Apiaceae/Umbelliferae	A	Carrot	Y	N	N	N		1									Y	Y				90	N											

Farmland

Crops

Demand

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Ready

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R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

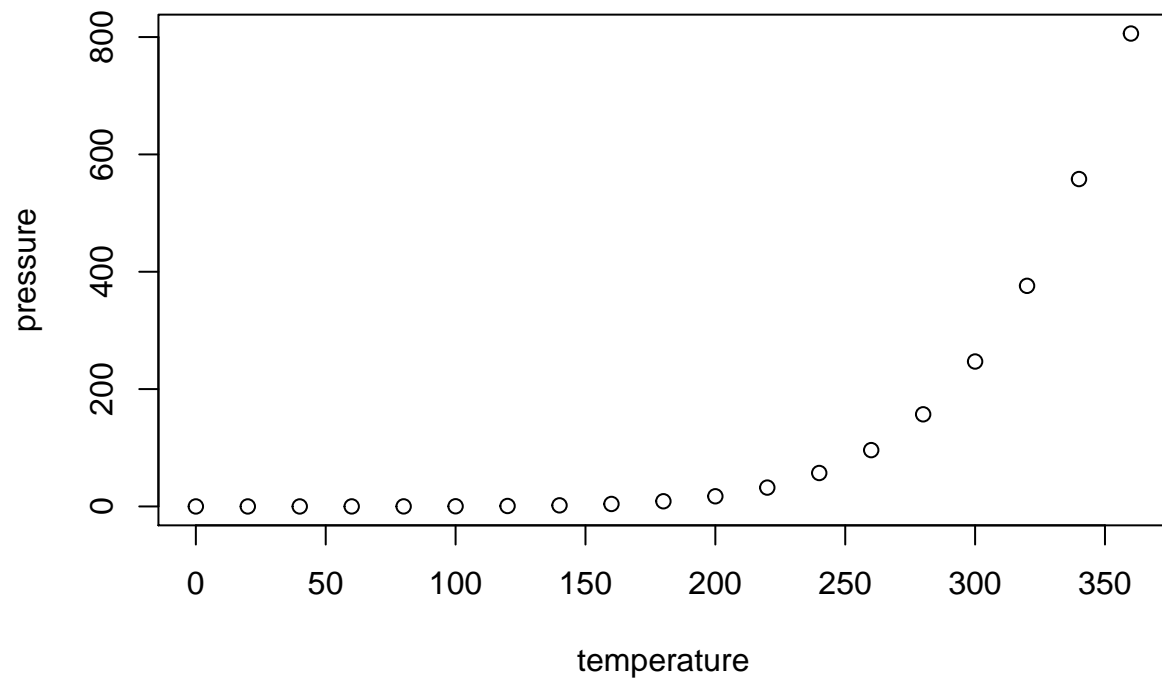
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.    :  2.00
## 1st Qu.:12.0    1st Qu.: 26.00
##  Median:15.0    Median : 36.00
##   Mean  :15.4    Mean    : 42.98
## 3rd Qu.:19.0    3rd Qu.: 56.00
##   Max.  :25.0    Max.     :120.00
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.