CropData.txt

This file includes variables relating to crops, including irrigation characteristics, and other vegetation. All vegetation is called crops in the text below, e.g. also forest. *CropData.txt* is **only needed for nutrient modelling**. Crops in HYPE have a number of static properties, e.g. sowing and harvesting dates, which are read from *CropData.txt*. Crops are part of the unique combination making up an SLC class, as defined in GeoClass.txt. To allow for modifying properties of a certain crop within the model domain, e.g. to reflect climate gradients, several crop regions can be defined with corresponding variables `region` in GeoData.txt and `reg` in *CropData.txt*.

CropData.txt is a tab-separated text file located in the modeldir folder. The first row contains a column header with variable names. Variable names are not case-sensitive (max. 10 characters, no spaces). The following rows contain variable values for each crop. Columns with headings unknown to HYPE are skipped while reading the file. The first column is often used for a descriptive name of the crop, and not read by HYPE. The columns may be in any order. A value must exist for every column and row, i.e. empty cells are not allowed.

Example for *CropData.txt* file structure:

```
name     nr  cropid reg fn1 fp1 fday1 fdown1 ...
grains   1   1      1   80  5   100   0.1    ...
grains   2   1      2   80  5   120   0.1    ...
grasses  3   2      1   0   0   100   0.1    ...
...      ... ...    ... ... ... ...   ...    ...
```

All crop characteristics are described in the table below. Column **Type** groups variables according to:

- **General**: IDs to connect crop properties to other indata.
- **Fertiliser**: Variables for fertiliser and manure application. ***NOTE:*** parameter `fertdays` in par.txt needs to be set to a value larger than zero for fertiliser and manure to be applied.
- **Turnover**: Crop growth and biomass turnover properties.
- **Irrigation**: Crop irrigation properties.

#	Variable ID	Unit	Type	Description
1	nr	-	General	This column with row numbers is usually given to see the order of the crops, but is not read by the program.
2	cropid	-	General	crop ID number (used in GeoClass.txt)
3	reg	-	General	integer, agricultural region number (e.g. production region from agricultural statistics) (corresponds to region in GeoData.txt)
4	fn1	*kg/(ha yr)*	Fertiliser	amount of N in fertiliser (1st application) (100% IN)
5	fp1	*kg/(ha yr)*	Fertiliser	amount of P in fertiliser (1st application) (100% SP)
6	mn1	*kg/(ha yr)*	Fertiliser	amount of N in manure (1st application) (50% IN)
7	mp1	*kg/(ha yr)*	Fertiliser	amount of P in manure (1st application) (50% SP)
8	fday1	*julian day*	Fertiliser	day number for application of fertiliser (1st application)
9	mday1	*julian day*	Fertiliser	day number for application of manure (1st application)
10	fdown1	-	Fertiliser	fraction of fertiliser that is tilled down to second soil layer (1st application)
11	mdown1	-	Fertiliser	fraction of manure that is tilled down to second soil layer (1st application)

#	Variable ID	Unit	Type	Description
12	fn2	*kg/(ha yr)*	Fertiliser	amount of N in fertiliser (2nd application) (100% IN)
13	fp2	*kg/(ha yr)*	Fertiliser	amount of P in fertiliser (2nd application) (100% SP)
14	mn2	*kg/(ha yr)*	Fertiliser	amount of N manure (2nd application) (50% IN)
15	mp2	*kg/(ha yr)*	Fertiliser	amount of P manure (2nd application) (50% SP)
16	fday2	*julian day*	Fertiliser	day number for application of fertiliser (2nd application)
17	mday2	*julian day*	Fertiliser	day number for application of manure (2nd application)
18	fdown2	-	Fertiliser	fraction of fertiliser that is tilled down to second soil layer (2nd application)
19	mdown2	-	Fertiliser	fraction of manure that is tilled down to second soil layer (2nd application)
20	resn	*kg/(ha yr)*	Turnover	amount of N that is added to the pool stored in the soil from decaying plants
21	resp	*kg/(ha yr)*	Turnover	amount of P that is added to the pool stored in the soil from decaying plants
22	resc	*kg/(ha yr)*	Turnover	amount of organic C that is added to the pool stored in the soil from decaying plants
23	resday	*julian day*	Turnover	day number for application of decaying plants, if set to 0, a uniform application all year round is assumed
24	resdown	-	Turnover	fraction of decaying plants that are tilled down to the second soil layer
25	resfast	-	Turnover	fraction of decaying plants that are added to the fast turnover pool, used for N and P
26	up1	$g/(m^2\ y)$	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 20 g N/m2/year for grains, 40 g N/m2/year for grasses. Note: must be larger than or equal to up2. A value equal to up2 indicates no uptake of nutrients.
27	up2	-	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 1
28	up3	*1/day*	Turnover	parameter for the crop's potential uptake function (logistic growth) - typically 0.12 1/day
29	upupper	-	Turnover	fraction of nutrient uptake in uppermost soil layer
30	pnupr	-	Turnover	P-N relationship for nutrient uptake
31	bd1	*julian day*	Turnover	day number for spring ploughing, give 0 if no spring ploughing.
32	bd2	*julian day*	Turnover	day number for start of growth season in spring (typically sow date or a few days later)
33	bd3	*julian day*	Turnover	day number for harvest (end of growing season)
34	bd4	*julian day*	Turnover	day number for autumn ploughing, 0 if no autumn ploughing
35	bd5	*julian day*	Turnover	day number for autumn crop's grown season start (typically sow date or some days later), 0 if not used
36	ccmax1	-	Turnover	maximum crop cover (fraction between 0 and 1) for all crops in the summer and for year round crops (e.g. forest)
37	ccmax2	-	Turnover	maximum degree of crop cover for autumn crops in autumn and winter
38	gcmax1	-	Turnover	maximum degree of crop cover for all crops in the summer and for year round crops (e.g. forest) whole year, also degree of crop cover for harvested crops
39	gcmax2	-	Turnover	maximum degree of crop cover for autumn crops in autumn and winter
40	plantday	*julian day*	Irrigation	day number for planting

#	Variable ID	Unit	Type	Description
41	lengthini	*days*	Irrigation	number of days for initial crop growth period
42	kcbini	-	Irrigation	basal crop coefficient for initial crop growth period
43	lengthdev	*days*	Irrigation	number of days for development crop growth period
44	lengthmid	*days*	Irrigation	number of days for middle crop growth period
45	kcbmid	-	Irrigation	basal crop coefficient for middle crop growth period
46	lengthlate	*days*	Irrigation	number of days for late crop growth period
47	kcbend	-	Irrigation	basal crop coefficient for end of late crop growth period
48	dlref	-	Irrigation	reference depletion level
49	imm_start	*julian day*	Irrigation	day number for start of immersion period
50	imm_end	*julian day*	Irrigation	day number for end of immersion period (immersion period must be contained in irrigation period)