**Steps for CLEANED**

1 Data preparation

Parameter data

Spatial data

2 Loading the data

3 User definition (for BFA this is where the land change is computed)

4 Feedbasket (for TZA this is where the land change is computed)

The following might not follow any sequence

5 Water pathway

6 Greenhouse gas pathway

7 Soil pathway

8 Biodiversity pathway

**Inputs**

*Spatial Layers*

|  |  |  |  |
| --- | --- | --- | --- |
| Layer | Name | Source | Derived layers used in CLEANED (in 1-input) |
| Study area |  | GADM |  |
| Land use | Land Cover 2010 Scheme II | RCMRD    Or  any other land cover | Cropland (annual and perennial)  Grazing land  Forests (planted, mangrove, dense, moderate, sparse, woodland ) Grassland (open and closed)  Bushland (open and closed)  Wetland and waterbodies |
|  |  |  | Settlement |
| Evapotran spiration | Lowland, highland and temperate maize Pulses  Grassland with legumes Grassland | GAEZ  <http://gaez.fao.org/> | Evapotranspiration maize  Evapotranspiration pulses  Evapotranspiration grassland  Evapotranspiration legumes  Evapotranspiration grassland |
| Yield | Maize Pulses  Rice | GAEZ | Yield maize  Yield pulses  Yield rice |
| Suitability | Cereals Legumes | GAEZ | Suitability cereals Suitability legumes |
| Rainfall | Baseline precipitation | GAEZ | Rain |
| climate | IPCC climatic zones | JRC [http://esdac.jrc.ec.europa .eu/projects/renewableenergy-directive](http://esdac.jrc.ec.europa.eu/projects/renewable-energy-directive) | Tropical (montane, wet, moist, dry)  Warm temperate (moist, dry)  Cool temperate(moist, dry) |
| Soil | IPCC soil type classification | JRC (same than above) | Soilref (combined with climate) |

*Feed basket parameters*

|  |  |
| --- | --- |
| Parameter | Source |
| Metabolizing energy for   * Grass * Cereal residue (maize stover) * Legume residue * Planted fodder | ILRI feed database  http://192.156.137.110/feeddb/FeedDB.html |
| Yield :   * Grass * Planted fodder | ILRI feed database |
| Dry matter content : - Grass   * Cereal residue * Legume residue * Oil seed cake * Cereal concentrate | ILRI feed database |
| Digestibility | ILRI feed database |
| * Grass * Cereal * Legumes * Planted fodder * Soil seed cake * Cereal concentrate |  |
| Crop residue factor   * Grass * Maize * Legume * Planted fodder | This is a factor that computes the relation between the reported yield (grain yield) and fodder, taking the harvest index and post-harvest loss  Computed in the tab ‘area\_requirement’ of sheet  ‘parameters’ in 0-raw input folder |

*Greenhouse gas parameters*

|  |  |  |
| --- | --- | --- |
| File name | Variables |  |
| ghg\_soil\_reference\_carbon | SOCREF | From IPCC 2006, Volume 4, Table 2.3. All values in tonnes C ha-1 in 030 cm depth. |
| ghg\_soil\_stock\_change | FLU, FMG, FI | From IPCC 2006, Volume 4, Table 5.5 |
| GlobalForestResourcesAssessment2010 | Dead organic matter forest (gfrdom) | Global Forest Resources Assessment 2010: http://www.fao.org/forestry/fra/fra 2010/en/ |
| MMS\_Nloss | Nitrogen loss | From IPCC 2006, Volume 10, Table  10.22 |
| MMS\_Nrate | Excretion rate | From IPCC 2006, Volume 10, Table  10.19 |
| MMSn2oEF | Emission factor for enteric fermentation | From IPCC 2006, Volume 10, Table  10.11 |
| MMSparams | Manure management parameters for Equation 10.23 and percentage in each manure management system | From IPCC 2006, Volume 10, Table 10A-5 |
| MMSspeciesTemp | Manure management methane emission  factor | From IPCC 2006, Volume 10, Table  10.14 |