

Package: mrmagpie (via r-universe)

October 22, 2026

Type Package

Title madrat based MAgPIE Input Data Library

Version 1.68.0

Date 2026-10-02

Description Provides functions for MAgPIE country and cellular input data generation.

License LGPL-3 | file LICENSE

URL <https://github.com/pik-piam/mrmagpie>,
<https://doi.org/10.5281/zenodo.4319612>

BugReports <https://github.com/pik-piam/mrmagpie/issues>

Depends madrat (>= 2.8.0), magclass (>= 3.17), mrcommons (>= 1.41.0),
mrdrivers (>= 7.1.1), mrland (>= 0.78.0), mrlandcore (>=
1.1.0), mrsoil (>= 2.0.0), mrwater (>= 1.13.0), R (>= 3.5.0)

Imports digest, dplyr, ggplot2, gstat, luplot (>= 3.64.0), magpiesets,
mstools (>= 0.6.0), ncd4, raster, readxl, rlang, sp, stats,
terra (>= 1.7.18), tidyr, withr

Suggests archive, covr, rmarkdown, zip

Encoding UTF-8

LazyData no

Config/Needs/website tidyverse/tidytemplate

Config/roxygen2/version 8.1.0

Config/pak/sysreqs libabsl-dev cmake libgdal-dev gdal-bin libgeos-dev libglpk-dev make libhdf5-
dev libicu-dev libuv1-dev libxml2-dev libnetcdf-dev libssl-dev pari-gp libproj-dev libsqlite3-
dev libudunits2-dev libx11-dev zlib1g-dev

Repository <https://pik-piam.r-universe.dev>

Date/Publication 2026-10-06 13:00:44 UTC

RemoteUrl <https://github.com/pik-piam/mrmagpie>

RemoteRef HEAD

RemoteSha 6a27b478c890412b2778919094f0418adb2bb958

Contents

mrmagpie-package	4
calcAfforestationMask	5
calcAgeClassDistribution	5
calcAreaActuallyIrrigated	6
calcAreaEquippedForIrrigation	7
calcAvlLandSi	8
calcBphEffect	9
calcBphMask	9
calcBphTCRE	10
calcCarbon	11
calcCarbonTests	12
calcCellCountryFraction	13
calcCluster	13
calcClusterBase	14
calcClusterHierarchical	15
calcClusterKMeans	16
calcClusterTreeHierarchical	17
calcDegradationYieldReduction	18
calcEFRRockstroem	19
calcEFRSmakthin	20
calcEnvmtlFlow	21
calcFoodDemandGridded	22
calcGrasslandBiomass	23
calcGrasslandsYields	23
calcGrassyEcoregions	24
calcGridPop	25
calcIrrigation	26
calcLabourProdImpact	27
calcLabourProdImpactEmu	28
calcLuh2SideLayers	29
calcMAPSPAM	29
calcNonLocalProduction	30
calcNpiNdcAdAolcPol	31
calcNpiNdcAffPol	31
calcPackagingMarketingCosts	32
calcPastr_new	33
calcPastrTauHist	34
calcPeatland	34
calcPeatland2	35
calcPotentialForestArea	36
calcRangelandsMaxNew	37
calcRRLayer	38
calcSchulteUebbing	38
calcSOMinitialisationPools	39
calcTopsoilCarbon	40
calcTransportCosts	41

calcTransportDistance	42
calcTransportTime	42
calcTRENDY	43
convertGPD	44
convertGPD2022	44
correctAvlLandSi	45
correctBendingTheCurve	46
correctDinerstein2017	46
correctGAMI	47
correctGFAD	48
correctGPM2	49
correctLabourProdImpactEmu	49
correctLeifeld2018	50
correctMehta2024	51
correctRamankutty	51
correctTransportDistance	52
correctWindisch2021	53
downloadDinerstein2017	54
downloadGAMI	54
downloadMAPSPAM	55
downloadMehta2024	56
downloadRamankutty	56
downloadSchulteUebbing	57
downloadTravelTimeNelson2019	58
fullCELLULARMAGPIE	58
readAvlLandSi	59
readBendingTheCurve	60
readDinerstein2017	61
readGAMI	62
readGFAD	63
readGPD	63
readGPD2022	64
readGPM2	64
readGridPopGao	65
readGridPopIsimip	66
readLabourProdImpactEmu	66
readLabourProdImpactOrlov	67
readLeifeld2018	67
readMAPSPAM	68
readMehta2024	69
readRamankutty	69
readSchulteUebbing	70
readTransportDistance	71
readTravelTimeNelson2019	71
readTRENDY	72
readWindisch2021	73
toolApplyRegionNames	73
toolClusterPerRegion	74

toolClusterPerRegionManual	75
--------------------------------------	----

Index	76
--------------	-----------

mrmagpie-package	<i>mrmagpie: madrat based MAgPIE Input Data Library</i>
------------------	---

Description

Provides functions for MAgPIE country and cellular input data generation.

Author(s)

Maintainer: Kristine Karstens <karstens@pik-potsdam.de>

Authors:

- Kristine Karstens <karstens@pik-potsdam.de>
- Jan Philipp Dietrich <dietrich@pik-potsdam.de>
- David Chen
- Michael Windisch
- Marcos Alves
- Felicitas Beier <beier@pik-potsdam.de>
- Alexandre Köberle <alexkob@pik-potsdam.de>
- Patrick v. Jeetze <vjeetze@pik-potsdam.de>
- Abhijeet Mishra <mishra@pik-potsdam.de>
- Florian Humpenoeder <humpenoeder@pik-potsdam.de>
- Pascal Sauer <pascal.sauer@pik-potsdam.de>
- Patrick Rein <patrick.rein@pik-potsdam.de>

See Also

Useful links:

- <https://github.com/pik-piam/mrmagpie>
- [doi:10.5281/zenodo.4319612](https://doi.org/10.5281/zenodo.4319612)
- Report bugs at <https://github.com/pik-piam/mrmagpie/issues>

calcAfforestationMask *calcAfforestationMask*

Description

Afforestation mask for where afforestation possible

Usage

```
calcAfforestationMask(subtype, cells = "lpjcell")
```

Arguments

subtype	afforestation mask sub type
cells	"magpiecell" or "lpjcell"

Value

magpie object in cellular resolution

Author(s)

David Chen, Florian Humpenoeder

Examples

```
## Not run:
calcOutput("AfforestationMask", subtype = "noboreal", aggregate = FALSE)

## End(Not run)
```

calcAgeClassDistribution *calcAgeClassDistribution*

Description

Forest area in 15 age classes. With dataset = "GFAD" (default) the distribution comes directly from the Global Forest Age Dataset (GFAD v1.1, Poulter et al. 2019): per-cell class fractions times cell area, summed over the four forest types. With dataset = "GAMI" the **age distribution** comes from GAMI v2.1 (Besnard et al. 2024) while the per-cell forest **area** is taken from the GFAD product. GAMI supplies only the within-forest age shares (12 classes, summing to 1); keeping the GFAD forest-area map as the spatial weight conserves each cell's total forest area and isolates the pure age-structure change. GAMI's 12 twenty-year classes are mapped onto the 15 GFAD ten-year classes (each split 50/50 into two adjacent classes; all classes ≥ 140 yr, i.e. GAMI '140-160 ... >299', collapse into 'class15', the mature bin routed to 'acx' in module 28). Where GAMI reports no forest but GFAD does, the GFAD age shape is retained (area-conserving).

Usage

```
calcAgeClassDistribution(
  cells = "lpjcell",
  dataset = "GFAD",
  gamiYear = "y2010"
)
```

Arguments

cells	lpjcell for 67420 cells
dataset	"GFAD" (default) or "GAMI"
gamiYear	GAMI reference year when dataset = "GAMI": "y2010" (default, matches the GFAD vintage) or "y2020"

Value

magpie object in cluster resolution

Author(s)

Abhijeet Mishra, Felicitas Beier, Florian Humpenoeder

Examples

```
## Not run:
calcOutput("AgeClassDistribution", aggregate = FALSE)
calcOutput("AgeClassDistribution", dataset = "GAMI", aggregate = FALSE)

## End(Not run)
```

calcAreaActuallyIrrigated
calcAreaActuallyIrrigated

Description

retrieves irrigated crop area from croparea intialization

Usage

```
calcAreaActuallyIrrigated(aggregationlevel = "iso", selectyears = "y1995")
```

Arguments

aggregationlevel	default is iso
selectyears	select years

Value

magpie object with results on cellular or iso country level

Author(s)

Felicitas Beier

Examples

```
## Not run:
calcOutput("AreaActuallyIrrigated")

## End(Not run)
```

```
calcAreaEquippedForIrrigation
      calcAreaEquippedForIrrigation
```

Description

Calculates the area equipped for irrigation based on LUH3 or Mehta data sets. For LUH3, it assumes, that all cropland irrigated in the last 20 years at least once is equipped for irrigation. Mehta et al. (2022) directly report Global Area Equipped for Irrigation for the years 1900-2015

Usage

```
calcAreaEquippedForIrrigation(cellular = FALSE, selectyears = "past_til2020")
```

Arguments

cellular	if TRUE: 0.5 degree resolution returned
selectyears	default on "past"

Value

List of magpie objects with results on country/cellular level, weight on country level, unit and description.

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens, Felicitas Beier

See Also

[calcLanduseInitialisation()]

Examples

```
## Not run:
calcOutput("AreaEquippedForIrrigation", source = "LUH3", cellular = TRUE, aggregate = FALSE)

## End(Not run)
```

calcAvlLandSi	<i>calcAvlLandSi</i>
---------------	----------------------

Description

Extracts si0 and nsi0 areas based on Ramankutty dataset

Usage

```
calcAvlLandSi(cells = "lpjcell")
```

Arguments

cells magpiecell (59199 cells) or lpjcell (67420 cells)

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier

Examples

```
## Not run:
calcOutput("AvlLandSi", aggregate = FALSE)

## End(Not run)
```

calcBphEffect	<i>calcBphEffect</i>
---------------	----------------------

Description

Biogeophysical temperature change of afforestation (degree C). File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018

Usage

```
calcBphEffect(cells = "lpjcell")
```

Arguments

cells lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Michael Windisch, Felicitas Beier

Examples

```
## Not run:  
calcOutput("BphEffect", aggregate = FALSE)  
  
## End(Not run)
```

calcBphMask	<i>calcBphMask</i>
-------------	--------------------

Description

Mask of Datapoints of biogeophysical temperature change of afforestation (degree C) to be used as weight. File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018

Usage

```
calcBphMask(cells = "lpjcell")
```

Arguments

cells lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Michael Windisch, Felicitas Beier

Examples

```
## Not run:
calcOutput("BphMask", aggregate = FALSE)

## End(Not run)
```

calcBphTCRE

calcBphTCRE

Description

Transient Climate Response to accumulated doubling of CO₂. File based on CMIP5 +1perc CO₂ per year experiment. To be used in the translation to carbon equivalents of BphEffect

Usage

```
calcBphTCRE(cells = "lpjcell")
```

Arguments

cells lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Michael Windisch, Felicitas Beier

Examples

```
## Not run:
calcOutput("BphTCRE", aggregate = FALSE)

## End(Not run)
```

calcCarbon	<i>calcCarbon</i>
------------	-------------------

Description

This function extracts carbon densities from LPJ to MAgPIE

Usage

```
calcCarbon(  
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =  
    "ggcml_phase3_nchecks_9ca735cb"),  
  climatetype = "GSWP3-W5E5:historical",  
  cells = "lpjcell"  
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different GCM climate scenarios
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

magpie object in cellular resolution

Author(s)

Kristine Karstens, Patrick v. Jeetze

Examples

```
## Not run:  
calcOutput("Carbon", aggregate = FALSE)  
  
## End(Not run)
```

calcCarbonTests	<i>calcCarbonTests</i>
-----------------	------------------------

Description

This function extracts carbon densities from LPJ to MAgPIE

Usage

```
calcCarbonTests(  
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =  
    "ggcml_phase3_nchecks_9ca735cb"),  
  climatetype = "GSWP3-W5E5:historical",  
  stage = "raw"  
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different GCM climate scenarios
stage	Switch for raw data or harmonization

Value

magpie object in cellular resolution

Author(s)

Kristine Karstens, Florian Humpenoeder

Examples

```
## Not run:  
calcOutput("CarbonTests", aggregate = FALSE)  
  
## End(Not run)
```

calcCellCountryFraction	<i>calcCellCountryFraction</i>
-------------------------	--------------------------------

Description

cell fraction belonging to a country based on LanduseInitialisation

Usage

```
calcCellCountryFraction(cells = "lpjcell")
```

Arguments

cells	lpjcell for 67420 cells or magpiecell for 59199 cells
-------	---

Value

Clustered MAgPIE object on requested resolution

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
calcOutput("calcCellCountryFraction", aggregate = FALSE)

## End(Not run)
```

calcCluster	<i>calcCluster</i>
-------------	--------------------

Description

This function calculates the aggregation mapping for a given cluster methodology

Usage

```
calcCluster(
  ctype,
  regionscode = madrat::regionscode(),
  seed = 42,
  weight = NULL,
  lpjml = c(natveg = "LPJmL4", crop = "LPJmL5"),
  clusterdata = "yield_airrig"
)
```

Arguments

ctype	aggregation clustering type, which is a combination of a single letter, indicating the cluster methodology, and a number, indicating the number of resulting clusters. Available methodologies are hierarchical clustering (h), normalized k-means clustering (n), combined hierarchical/normalized k-means clustering (c) and manual setting for clusters per region (m). In the combined clustering hierarchical clustering is used to determine the cluster distribution among regions whereas it is manually set for the m type. Both use normalized k-means for the clustering within a region.
regionscode	regionscode of the regional mapping to be used. Must agree with the regionscode of the mapping mentioned in the madrat config! Can be retrieved via regionscode().
seed	Seed for Random Number Generation. If set to NULL it is chosen automatically, if set to an integer it will always return the same pseudo-random numbers (useful to get identical clusters under identical inputs for n and c clustering)
weight	Should specific regions be resolved with more or less detail? Values > 1 mean higher share, < 1 lower share e.g. <code>cfg\$cluster_weight <- c(LAM=2)</code> means that a higher level of detail for region LAM if set to NULL all weights will be assumed to be 1 (examples: <code>c(LAM=1.5,SSA=1.5,OAS=1.5)</code> , <code>c(LAM=2,SSA=2,OAS=2)</code>)
lpjml	defines LPJmL version for crop/grass and natveg specific inputs
clusterdata	similarity data to be used to determine clusters: <code>yield_airrig</code> (current default) or <code>yield_increment</code>

Value

map from cells to clusters as data.frame

Author(s)

Jan Philipp Dietrich

Examples

```
## Not run:
calcOutput("Cluster", ctype = "c200", aggregate = FALSE)

## End(Not run)
```

calcClusterBase

calcClusterBase

Description

Reads a series of MAgPIE files and combines them to a matrix which is then used for calculating a clustering.

Usage

```
calcClusterBase(
  clusterdata = "yield_airrig",
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb")
)
```

Arguments

clusterdata	similarity data to be used to determine clusters: yield_airrig (current default) or yield_increment
lpjml	defines LPJmL version for crop/grass and natveg specific inputs

Value

A matrix containing the data

Author(s)

Jan Philipp Dietrich, Felicitas Beier

See Also

[calcCluster](#)

calcClusterHierarchical
calcClusterHierarchical

Description

Performs MAgPIE hierarchical clustering and calculates corresponding spam relation matrix

As the creation of a clustering tree is very time consuming the function checks first in the input folder if the corresponding data already exists and if not it stores the tree information in the input folder for later use in the next execution of this function.

Usage

```
calcClusterHierarchical(
  regionscode,
  ncluster,
  lpjml = c(natveg = "LPJmL4", crop = "LPJmL5"),
  clusterdata = "yield_airrig",
  mode = "h",
  weight = NULL
)
```

Arguments

regionscode	regionscode of the regional mapping to be used. Must agree with the region-code of the mapping mentioned in the madrat config! Can be retrieved via regionscode().
ncluster	The desired total number of clusters.
lpjml	defines LPJmL version for crop/grass and natveg specific inputs
clusterdata	similarity data to be used to determine clusters: yield_airrig (current default) or yield_increment
mode	Clustering type. At the moment you can choose between complete linkage clustering (h), single linkage clustering (s) and Ward clustering (w).
weight	named vector with weighting factors for each region for the cluster distribution, e.g. weight=c(AFR=3,EUR=0.5). weight > 1 will grant more cluster to a region and weight < 1 less cluster than by default.

Value

A mapping between regions and clusters

Author(s)

Jan Philipp Dietrich

See Also

[calcCluster](#), [calcClusterKMeans](#)

calcClusterKMeans	<i>calcClusterKMeans</i>
-------------------	--------------------------

Description

Performs MAGPIE kmeans clustering and calculates corresponding spam relation matrix

Usage

```
calcClusterKMeans(
  regionscode,
  ncluster,
  weight = NULL,
  cpr = NULL,
  seed = 42,
  lpjml = c(natveg = "LPJmL4", crop = "LPJmL5"),
  clusterdata = "yield_airrig"
)
```

Arguments

regionscode	regionscode of the regional mapping to be used. Must agree with the regionscode of the mapping mentioned in the madrat config! Can be retrieved via regionscode().
ncluster	The desired total number of clusters.
weight	named vector with weighting factors for each region for the cluster distribution, e.g. weight=c(AFR=3, EUR=0.5). weight > 1 will grant more cluster to a region and weight < 1 less cluster than by default.
cpr	cells-per-region information as returned by toolClusterPerRegionManual. Weight and ncluster are ignored in case that cpr is provided!
seed	a single value, interpreted as an integer, or NULL, to define seed for random calculations
lpjml	defines LPJmL version for crop/grass and natveg specific inputs
clusterdata	similarity data to be used to determine clusters: yield_airrig (current default) or yield_increment

Value

A mapping between regions and clusters

Author(s)

Jan Philipp Dietrich

See Also

[toolClusterPerRegionManual](#), [calcClusterHierarchical](#)

calcClusterTreeHierarchical
calcClusterTreeHierarchical

Description

calculates hierarchical clustering tree

Usage

```
calcClusterTreeHierarchical(
  regionscode,
  mode = "h",
  weight = NULL,
  lpjml = c(natveg = "LPJmL4", crop = "LPJmL5"),
  clusterdata = "yield_airrig"
)
```

Arguments

regionscode	regionscode of the regional mapping to be used. Must agree with the regionscode of the mapping mentioned in the madrat config! Can be retrieved via regionscode().
mode	Clustering type. At the moment you can choose between complete linkage clustering (h), single linkage clustering (s) and Ward clustering (w).
weight	named vector with weighting factors for each region for the cluster distribution, e.g. weight = c(AFR = 3, EUR = 0.5). weight > 1 will grant more cluster to a region and weight < 1 less cluster than by default.
lpjml	defines LPJmL version for crop/grass and natveg specific inputs
clusterdata	similarity data to be used to determine clusters: yield_airrig (current default) or yield_increment

Value

A magpie object

Author(s)

Jan Philipp Dietrich

calcDegradationYieldReduction
calcDegradationYieldReduction

Description

Function creates dummy file for including yield reduction coefficients to represent land degradation

Usage

```
calcDegradationYieldReduction(cells = "lpjcell")
```

Arguments

cells	number of halfdegree grid cells to be returned. Options: "magpiecell" (59199), "lpjcell" (67420)
-------	--

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze

Examples

```
## Not run:
calcOutput("DegradationYieldReduction", aggregate = FALSE)

## End(Not run)
```

calcEFRRockstroem	<i>calcEFRRockstroem</i>
-------------------	--------------------------

Description

This function calculates environmental flow requirements (EFR) for MAgPIE retrieved from LPJmL monthly discharge and water availability following the definition of the planetary boundary in Rockström et al. 2023

Usage

```
calcEFRRockstroem(
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb"),
  climatetype = "GSWP3-W5E5:historical",
  stage = "harmonized2020",
  seasonality = "grper"
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios
stage	Degree of processing: raw, smoothed, harmonized, harmonized2020
seasonality	grper (default): EFR in growing period per year; total: EFR throughout the year; monthly: monthly EFRs

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier, Jens Heinke

Examples

```
## Not run:
calcOutput("EFRRockstroem", aggregate = FALSE)

## End(Not run)
```

calcEFRSmakthin	<i>calcEFRSmakthin</i>
-----------------	------------------------

Description

This function calculates environmental flow requirements (EFR) for MAGPIE retrieved from LPJmL monthly discharge and water availability using the method of Smakthin et al. (2004)

Usage

```
calcEFRSmakthin(
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb"),
  climatetype = "GSWP3-W5E5:historical",
  stage = "harmonized2020",
  LFR_val = 0.1,
  HFR_LFR_less10 = 0.2,
  HFR_LFR_10_20 = 0.15,
  HFR_LFR_20_30 = 0.07,
  HFR_LFR_more30 = 0,
  seasonality = "grper",
  cells = "lpjcell"
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios
stage	Degree of processing: raw, smoothed, harmonized, harmonized2020
LFR_val	Strictness of environmental flow requirements
HFR_LFR_less10	High flow requirements (share of total water for cells) with LFR<10percent of total water
HFR_LFR_10_20	High flow requirements (share of total water for cells) with 10percent < LFR < 20percent of total water
HFR_LFR_20_30	High flow requirements (share of total water for cells) with 20percent < LFR < 30percent of total water
HFR_LFR_more30	High flow requirements (share of total water for cells) with LFR>30percent of total water
seasonality	grper (default): EFR in growing period per year; total: EFR throughout the year; monthly: monthly EFRs
cells	lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier, Abhijeet Mishra

Examples

```
## Not run:
calcOutput("EFRSmakthin", aggregate = FALSE)

## End(Not run)
```

calcEnvmtlFlow

calcEnvmtlFlow

Description

This function calculates environmental flow requirements (EFR) for MAgPIE retrieved from LPJmL monthly discharge and water availability

Usage

```
calcEnvmtlFlow(
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb"),
  climatetype = "GSWP3-W5E5:historical",
  stage = "harmonized2020",
  seasonality = "grper"
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios
stage	Degree of processing: raw, smoothed, harmonized, harmonized2020
seasonality	grper (default): EFR in growing period per year; total: EFR throughout the year; monthly: monthly EFRs

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier

Examples

```
## Not run:
calcOutput("EnvmtlFlow", aggregate = FALSE)

## End(Not run)
```

calcFoodDemandGridded *calcFoodDemandGridded*

Description

Calculates grid-level food demand, note also includes food and feed

Usage

```
calcFoodDemandGridded(
  attribute = "dm",
  prod = "k",
  feed = TRUE,
  cells = "lpjcell"
)
```

Arguments

attribute	dm or calories ("ge") or other massbalance attribute
prod	for memory reasons
feed	whether to include feed demand in the gridded demand
cells	magpiecell or lpjcell (default)

Value

Gridded magpie object of food demand disaggregated by rural urban pop

Author(s)

David M Chen

Examples

```
## Not run:
calcOutput("FoodDemandGridded")

## End(Not run)
```

calcGrasslandBiomass	<i>calcGrasslandBiomass</i>
----------------------	-----------------------------

Description

Calculates pasture biomass demand for the historical period split between rangelands and managed pastures.

Usage

```
calcGrasslandBiomass(cells = "lpjcell")
```

Arguments

cells "magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

Regional biomass demand

Author(s)

Marcos Alves

See Also

[calcOutput](#), [calcFA0massbalance](#), [readSource](#)

Examples

```
## Not run:  
calcOutput("GrasslandBiomass")  
  
## End(Not run)
```

calcGrasslandsYields	<i>calcGrasslandsYields</i>
----------------------	-----------------------------

Description

Calculates rangelands maximum output and managed pastures yields

Usage

```
calcGrasslandsYields(
  lpjml = "lpjml5p2_pasture",
  climatetype = "MRI-ESM2-0:ssp370",
  cells = "lpjcell",
  subtype = "/co2/Nreturn0p5",
  lsu_levels = c(seq(0, 2, 0.2), 2.5),
  past_mngmt = "mdef"
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Global Circulation Model to be used
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells
subtype	Switch between different climate scenarios
lsu_levels	Livestock unit levels in the source folder
past_mngmt	pasture areas management option

Value

magpie object in cellular resolution

Author(s)

Marcos Alves

Examples

```
## Not run:
calcOutput("GrasslandsYields")

## End(Not run)
```

calcGrassyEcoregions *calcGrassyEcoregions*

Description

Per-cell areal cover fraction of the RESOLVE Ecoregions 2017 grassy biomes (Dinerstein et al. 2017): tropical and subtropical, temperate, flooded, and montane grasslands, savannas and shrublands (biomes 7-10). Used to correct the LPJmL-derived potential forest area, which overestimates forest cover in these open ecosystems, where tree planting and forest expansion are ecologically inappropriate (Veldman et al. 2015).

Usage

```
calcGrassyEcoregions()
```

Value

magpie object in cellular resolution (67420 lpjcells)

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
calcOutput("GrassyEcoregions", aggregate = FALSE)

## End(Not run)
```

calcGridPop

calcGridPop

Description

Past and future (SSP1-5) population based on HYDE3.2 and Jones & O'Neill (2016) Data is scaled to match WDI data from calcPopulation NOTE that some scaling factors for the future (for small countries Gambia and Djibouti) are off, data read in is 50

Usage

```
calcGridPop(
  source = "ISIMIP",
  subtype = "all",
  cellular = TRUE,
  cells = "lpjcell",
  FiveYear = TRUE,
  scale = TRUE,
  harmonize_until = 2015,
  urban = FALSE
)
```

Arguments

source	default source (ISIMIP) or Gao data (readGridPopGao) which is split into urban and rural.
subtype	time horizon to be returned. Options: past (1965-2005), future (2005-2010) or all (divergence starts at year in harmonize_until)

cellular	if true: half degree grid cell data returned
cells	number of halfdegree grid cells to be returned. Options: "magpiecell" (59199), "lpjcell" (67420)
FiveYear	TRUE for 5 year time steps, otherwise yearly from source
scale	if true: scales sum of gridded values to match country level totals
harmonize_until	harmonization year until which SSPs diverge (default: 2015)
urban	TRUE to return only urban gridded population based on iso share

Value

Population in millions.

Author(s)

David Chen, Felicitas Beier

Examples

```
## Not run:
calcOutput("GridPop", aggregate = FALSE)

## End(Not run)
```

calcIrrigation	<i>calcIrrigation</i>
----------------	-----------------------

Description

This function extracts irrigation water (airrig: water applied additionally to rainfall) from LPJmL for MAGPIE

Usage

```
calcIrrigation(
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb"),
  climatetype = "GSWP3-W5E5:historical",
  cells = "lpjcell",
  rainfedweight = 0.01
)
```

Arguments

lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios
cells	Number of cells to be returned: "magpiecell" for 59199 cells or "lpjcell" for 67420 cells
rainfedweight	For clustering airrig is weighted with cropland_irrigated + rainfedweight * cropland_rainfed (default: 0.01)

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier, Abhijeet Mishra

Examples

```
## Not run:
calcOutput("Irrigation", aggregate = FALSE)

## End(Not run)
```

calcLabourProdImpact *calcLabourProdImpact*

Description

Labour productivity impacts

Usage

```
calcLabourProdImpact(
  timestep = "5year",
  subtype = "Orlov",
  cellular = TRUE,
  cells = "lpjcell"
)
```

Arguments

timestep	5year or yearly
subtype	data source comes from
cellular	cellular is true
cells	"magpiecell" or "lpjcell"

Value

List of magpie objects with results on 0.5deg grid level, weights based on production value, unit (ratio) and description.

Author(s)

David Chen

`calcLabourProdImpactEmu`

calcLabourProdImpactEmu

Description

Spatial and temporal aggr. of labour productivity impacts from climate change emulated by LAMACLIMA based on method of Orlov et al. 2019. Economics of Disasters and Climate Change, 3(3), 191-211.

Usage

```
calcLabourProdImpactEmu(
  timestep = "5year",
  cellular = TRUE,
  subtype = "impact",
  cells = "lpjcell"
)
```

Arguments

timestep	5-year or yearly
cellular	cellular is true
subtype	impact for rcp based laborprod decrease, relief for LCLM based relief of impact
cells	"magpiecell" or "lpjcell"

Value

List of magpie object of gridded (0.5) labour productivity as percentage of full labour prod 1

Author(s)

Michael Windisch, Florian Humpeöder

calcLuh2SideLayers	<i>calcLuh2SideLayers</i>
--------------------	---------------------------

Description

Function extracts biodiversity data for LUH2 land cover types

Usage

```
calcLuh2SideLayers(cells = "lpjcell")
```

Arguments

cells number of cells to be returned: magpiecell (59199), lpjcell (67420)

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze

Examples

```
## Not run:  
calcOutput("Luh2SideLayers", aggregate = FALSE)  
  
## End(Not run)
```

calcMAPSPAM	<i>calcMAPSPAM</i>
-------------	--------------------

Description

MAPSPAM data

Usage

```
calcMAPSPAM(subtype = "physical")
```

Arguments

subtype it can be either "physical" or "harvested" area

Value

magpie object in cellular resolution

Author(s)

Edna J. Molina Bacca

Examples

```
## Not run:
calcOutput("MAPSPAM", subtype = "physical", aggregate = FALSE)

## End(Not run)
```

calcNonLocalProduction

calcNonLocalProduction

Description

Calculates grid-level amount of food that would need to be transported, assuming that food produced in the grid cell is first consumed by local population i.e. amount of food greater than local rural demand, split into that which feeds the local urban population, and that which exceeds total local demand and is available to export

Usage

```
calcNonLocalProduction(cells = "lpjcell")
```

Arguments

cells magpiecell or lpjcell (default)

Author(s)

David M Chen

Examples

```
## Not run:
calcOutput("NonLocalTransport")

## End(Not run)
```

calcNpiNdcAdAolcPol	<i>calcNpiNdcAdAolcPol</i>
---------------------	----------------------------

Description

Function creates dummy NPI/NDC policies

Usage

```
calcNpiNdcAdAolcPol(cells = "lpjcell")
```

Arguments

cells lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze, Michael Windisch

Examples

```
## Not run:  
calcOutput("NpiNdcAdAolcPol", aggregate = FALSE)  
  
## End(Not run)
```

calcNpiNdcAffPol	<i>calcNpiNdcAffPol</i>
------------------	-------------------------

Description

Function creates dummy NPI/NDC policies

Usage

```
calcNpiNdcAffPol(cells = "lpjcell")
```

Arguments

cells lpjcell for 67420 cells or magpiecell for 59199 cells

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze, Michael Windisch

Examples

```
## Not run:  
calcOutput("NpiNdcAffPol", aggregate = FALSE)  
  
## End(Not run)
```

```
calcPackagingMarketingCosts  
      calcPackagingMarketingCosts
```

Description

calculates per-ton marketing and packaging costs for food that leaves a cell. Currently assume expert guess 50 USD / ton of packaging/marketing costs (100 USD/t in model, of which half is already in GTAP)

Usage

```
calcPackagingMarketingCosts()
```

Value

List of magpie objects with results on country level, weight on country level, unit and description.

Author(s)

David M Chen

calcPastr_new

calcPastr_new

Description

Calculates managed pasture yields

Usage

```
calcPastr_new(
  past_mngmt = "me2",
  lpjml = "lpjml5p2_pasture",
  climatetype = "MRI-ESM2-0:ssp370",
  scenario = "/co2/Nreturn0p5/limN",
  cells = "lpjcell"
)
```

Arguments

past_mngmt	pasture areas management option
lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios (default: "CRU_4")
scenario	specify ssp scenario
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

magpie object in cellular resolution

Author(s)

Marcos Alves

Examples

```
## Not run:
calcOutput("Pastr_new", past_mngmt = "me2", lpjml = "LPJmL_pastr", climatetype)

## End(Not run)
```

calcPastrTauHist	<i>calcPastrTauHist</i>
------------------	-------------------------

Description

Calculates managed pastures Tau based on FAO yield trends for 1995.

Usage

```
calcPastrTauHist(past_mngmt = "mdef", cells = "lpjcell")
```

Arguments

past_mngmt	Pasture management reference yield
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

List of magpie objects with results on country level, weight on country level, unit and description.

Author(s)

Marcos Alves

Examples

```
## Not run:
calcOutput("PastrTauHist", past_mngmt)

## End(Not run)
```

calcPeatland	<i>calcPeatland</i>
--------------	---------------------

Description

This function calculates degraded and intact peatland area at cell level. The function takes degraded and intact peatland area from the Global Peatland Database (GPD) at the national level and down-scales the peatland area to grid cell level using gridded potential peatland area. The GPD has been provided by Alexandra Barthelmes. The potential peatland area has been provided by Leifeld_2018 (DOI 10.1038/s41467-018-03406-6).

Usage

```
calcPeatland(subtype = "degraded", cells = "lpjcell")
```

Arguments

subtype	degraded (default) or intact
cells	"magpiecell" or "lpjcell"

Value

magpie object in cellular resolution

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
calcOutput("Peatland", aggregate = FALSE)

## End(Not run)
```

calcPeatland2

calcPeatland2

Description

This function calculates degraded and intact peatland area at cell level. The function takes degraded and intact peatland area from the Global Peatland Database 2022 (GPD2022) at the national level and downscales the peatland area to grid cell level using gridded peatland area from the Global Peatland Map 2.0 (GPM2) The data has been provided by Alexandra Barthelmes.

Usage

```
calcPeatland2(cells = "magpiecell", countryLevel = FALSE)
```

Arguments

cells	number of cells to be returned: magpiecell (59199), lpjcell (67420)
countryLevel	Whether output shall be at country level. Requires aggregate=FALSE in calcOutput.

Value

magpie object in cellular resolution

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
calcOutput("Peatland2", aggregate = FALSE)

## End(Not run)
```

```
calcPotentialForestArea
      calcPotentialForestArea
```

Description

Calculates the area than can be potentially covered by forests, based on environmental conditions.

Usage

```
calcPotentialForestArea(
  refData = "lpj",
  countryLevel = FALSE,
  cells = "lpjcell",
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de"),
  climatetype = "MRI-ESM2-0:ssp370",
  grassyCorrection = TRUE
)
```

Arguments

refData	Determines the reference data that the estimated potential forest area is derived from (currently only "lpj")
countryLevel	Whether output shall be at country level. Requires aggregate=FALSE in calcOutput.
cells	magpiecell (59199 cells) or lpjcell (67420 cells)
lpjml	Defines LPJmL version for crop/grass and natveg specific inputs. Only relevant, if refData = "lpj".
climatetype	Switch between different GCM climate scenarios. Only relevant, if refData = "lpj".
grassyCorrection	If TRUE, the potential forest area is reduced by the grassland-ecoregion cover fraction (RESOLVE 2017 biomes 7-10, calcGrassyEcoregions), correcting the LPJmL overestimation of forest in open grassy ecosystems.

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze, Florian Humpenoeder

Examples

```
## Not run:
calcOutput("PotentialForestArea", aggregate = FALSE)

## End(Not run)
```

calcRangelandsMaxNew *calcRangelandsMaxNew*

Description

Calculates rangelands maximum output

Usage

```
calcRangelandsMaxNew(
  lsuLevels = c(seq(0, 2.2, 0.2), 2.5),
  lpjml = "lpjml5p2_pasture",
  climatetype = "MRI-ESM2-0:ssp370",
  scenario = "/co2/Nreturn0p5/limN",
  report = "harvest",
  cells = "lpjcell"
)
```

Arguments

lsuLevels	Livestock unit levels in the source folder
lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different climate scenarios (default: "CRU_4")
scenario	specify ssp scenario
report	Either 'harvest' or 'lsu/ha' controlling what values are output by the function.
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

magpie object in cellular resolution

Author(s)

Marcos Alves

calcRRLayer

calcRRLayer

Description

Function extracts range-rarity as used for biodiversity loss

Usage

```
calcRRLayer(cells = "lpjcell")
```

Arguments

cells number of cells to be returned: magpiecell (59199), lpjcell (67420)

Value

magpie object in cellular resolution

Author(s)

Patrick v. Jeetze

Examples

```
## Not run:
calcOutput("RRLayer", aggregate = FALSE)

## End(Not run)
```

calcSchulteUebbing

calcSchulteUebbing

Description

use inverse distance weighted interpolation on critical nitrogen surplus data set of Schulte-Uebbing et al. 2022

Usage

```
calcSchulteUebbing()
```

Value

a magpie object containing critical nitrogen surplus

Author(s)

Michael Crawford

Examples

```
## Not run:  
  calcOutput("SchulteUebbing")  
  
## End(Not run)
```

```
calcSOMinitialisationPools  
  calcSOMinitialisationPools
```

Description

calculates Soil Organic Matter Pool, accounting for the management history as initialisation to magpie

Usage

```
calcSOMinitialisationPools(cells = "lpjcell")
```

Arguments

cells "magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

List of magpie object with results on country or cellular level, weight on cellular level, unit and description.

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens

Examples

```
## Not run:  
  calcOutput("SOMinitialisationPools")  
  
## End(Not run)
```

calcTopsoilCarbon	<i>calcTopsoilCarbon</i>
-------------------	--------------------------

Description

This function extracts topsoil carbon densities from LPJ to MAgPIE

Usage

```
calcTopsoilCarbon(
  cells = "lpjcell",
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =
    "ggcml_phase3_nchecks_9ca735cb"),
  climatetype = "GSWP3-W5E5:historical"
)
```

Arguments

cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells
lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
climatetype	Switch between different GCM climate scenarios

Value

magpie object in cellular resolution

Author(s)

Kristine Karstens

Examples

```
## Not run:
calcOutput("TopsoilCarbon", aggregate = FALSE)

## End(Not run)
```

calcTransportCosts	<i>calcTransportCosts</i>
--------------------	---------------------------

Description

calculates country-level transport costs from GTAP total transport costs, cellular production, and cellular travel time

Usage

```
calcTransportCosts(transport = "all", gtapVersion = "9")
```

Arguments

transport	"all" or "nonlocal". "all" means all production incurs transport costs, while "non-local" sees only production greater than local rural consumption with transport costs
gtapVersion	"9" or "81"

Value

List of magpie objects with results on country level, weight on country level, unit and description.

Author(s)

David M Chen

See Also

[calcTransportTime()], [calcGTAPTotalTransportCosts()]

Examples

```
## Not run:  
calcOutput("TransportCosts_new")  
  
## End(Not run)
```

calcTransportDistance	<i>calcTransportDistance</i>
-----------------------	------------------------------

Description

Function extracts travel time to major cities in minutes This function now deprecated - use calcTransportTime instead

Usage

calcTransportDistance()

Value

magpie object in cellular resolution

Author(s)

David Chen

Examples

```
## Not run:
calcOutput("TransportDistance", aggregate = FALSE)

## End(Not run)
```

calcTransportTime	<i>calcTransportTime</i>
-------------------	--------------------------

Description

Function extracts travel time to major cities in minutes

Usage

calcTransportTime(subtype = "cities50", cells = "lpjcell")

Arguments

- | | |
|---------|---|
| subtype | currently only cities of 5, 20, or 50 thousand people ("cities5", "cities20", "cities50") or ports of various sizes ("portsLarge Medium Small VerySmall Any") |
| cells | number of cells to be returned: magpiecell (59199), lpjcell (67420) |

Value

magpie object in cellular resolution

Author(s)

David Chen

Examples

```
## Not run:
calcOutput("TransportTime", aggregate = FALSE)

## End(Not run)
```

calcTRENDY	<i>calcTRENDY</i>
------------	-------------------

Description

Resample and use inverse distance weighted interpolation to align natural vegetation carbon densities from TRENDY with MAgPIE's input requirements

Usage

```
calcTRENDY(subtype)
```

Arguments

subtype	name of the TRENDY dataset to read. Current options includes: "CABLEPOP", "CARDAMOM", "CLASSIC", "CLM5.0", "DLEM", "ELM", "IBIS", "ISBAC-TRIP", "JSBACH", "LPJ-GUESS", "LPJml", "LPJwsl", "lpxqs", "OCN", "ORCHIDEE", "SDGVM", "VISIT"
---------	--

Value

a magclass object with model, carbon pool in third dimension

Author(s)

Michael Crawford

Examples

```
## Not run:
readSource("TRENDY", subtype = "JSBACH")

## End(Not run)
```

`convertGPD`*convertGPD*

Description

convert GPD

Usage

`convertGPD(x)`

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on iso level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("GPD", convert = TRUE)

## End(Not run)
```

`convertGPD2022`*convertGPD2022*

Description

convert GPD2022

Usage

`convertGPD2022(x)`

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on iso level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("GPD2022", convert = TRUE)

## End(Not run)
```

correctAvlLandSi	<i>correctAvlLandSi</i>
------------------	-------------------------

Description

Read Available Land Si

Usage

```
correctAvlLandSi(x)
```

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

David Chen

See Also

[readAvlLandSi](#)

Examples

```
## Not run:
readSource("AvlLandSi", convert = "onlycorrect")

## End(Not run)
```

correctBendingTheCurve

readBendingTheCurve

Description

Read bending the curve data

Usage

correctBendingTheCurve(x)

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Patrick v. Jeetze, Michael Windisch

Examples

```
## Not run:
readSource("BendingTheCurve", subtype = "rr_layer", convert = "onlycorrect")

## End(Not run)
```

correctDinerstein2017 *correctDinerstein2017*

Description

Sets missing values (cells outside any ecoregion of the selected biome group) to zero.

Usage

correctDinerstein2017(x)

Arguments

x magpie object provided by [readDinerstein2017](#)

Value

magpie object on cellular level

Author(s)

Florian Humpenoeder

See Also

[readDinerstein2017](#)

Examples

```
## Not run:  
readSource("Dinerstein2017", subtype = "grassland", convert = "onlycorrect")  
  
## End(Not run)
```

correctGAMI

correctGAMI

Description

Correct the GAMI v2.1 forest-age dataset: replace missing and negative class-fraction values (ocean / non-forest fill) by 0. The object stays on GAMI's native 0.5-degree grid; the projection onto the 67420 lpj-cell grid happens in `calcAgeClassDistribution`.

Usage

```
correctGAMI(x)
```

Arguments

x magpie object provided by `readGAMI`

Value

magpie object on GAMI's native 0.5-degree grid, cleaned

Author(s)

Florian Humpenoeder

See Also

[readGAMI](#)

Examples

```
## Not run:  
readSource("GAMI", convert = "onlycorrect")  
  
## End(Not run)
```

correctGFAD

<i>correctGFAD</i>

Description

Correct Global Forest Age Dataset

Usage

```
correctGFAD(x)
```

Arguments

x	magpie object provided by the read function
---	---

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Abhijeet Mishra, Felicitas Beier

See Also

[readGFAD](#)

Examples

```
## Not run:  
readSource("GFAD", convert="onlycorrect")  
  
## End(Not run)
```

`correctGPM2`*correctGPM2*

Description

correct peatland area

Usage

`correctGPM2(x)`

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
  readSource("GPM2", convert="onlycorrect")

## End(Not run)
```

`correctLabourProdImpactEmu`*correctLabourProdImpactEmu*

Description

correct labour productivity impacts from climate change emulated by the LAMACLIMA project based on method of Orlov et al. 2019. Economics of Disasters and Climate Change, 3(3), 191-211.

Usage

`correctLabourProdImpactEmu(x)`

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Michael Windisch

See Also

[readLabourProdImpactEmu](#)

Examples

```
## Not run:  
  readSource("LabourProdImpactEmu", convert="onlycorrect")  
  
## End(Not run)
```

correctLeifeld2018	<i>correctLeifeld2018</i>
--------------------	---------------------------

Description

correct potential peatland area from Leifeld2018

Usage

```
correctLeifeld2018(x)
```

Arguments

x	magpie object provided by the read function
---	---

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:  
  readSource("Leifeld2018", convert="onlycorrect")  
  
## End(Not run)
```

correctMehta2024	<i>correctMehta2024</i>
------------------	-------------------------

Description

correct Global Area Equipped for Irrigation Dataset 1900-2015 from Mehta et al., 2024

Usage

correctMehta2024(x)

Arguments

x magpie object provided by the read function

Value

magpie object in cellular resolution

Author(s)

Felicitas Beier

Examples

```
## Not run:
  readSource("Mehta2024", convert="onlycorrect")

## End(Not run)
```

correctRamankutty	<i>correctRamankutty</i>
-------------------	--------------------------

Description

Read Available Land Si

Usage

correctRamankutty(x)

Arguments

x magpie object provided by the read function

Value

magpie object

Author(s)

Felicitas Beier

See Also

[readRamankutty](#)

Examples

```
## Not run:  
readSource("Ramankutty", convert="onlycorrect")  
  
## End(Not run)
```

correctTransportDistance

correctTransportDistance

Description

Read transport distance file

Usage

correctTransportDistance(x)

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

David Chen

See Also

[readTransportDistance](#)

Examples

```
## Not run:
readSource("TransportDistance", convert = "onlycorrect")

## End(Not run)
```

correctWindisch2021	<i>correctWindisch2021</i>
---------------------	----------------------------

Description

correct data to calculate BphEffect, BphTCRE or BphMask depending on the chosen subtype. BphEffect: Biogeophysical temperature change of afforestation (degree C). (File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018). BphMask: Mask of Datapoints of biogeophysical temperature change of afforestation (degree C) to be used as weight. (File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018). BphTCRE: Transient Climate Response to accumulated doubling of CO2. (File is based on CMIP5 +1perc CO2 per year experiment. To be used in the translation to carbon equivalents of BphEffect)

Usage

```
correctWindisch2021(x)
```

Arguments

x magpie object provided by the read function

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Felicitas Beier, Michael Windisch

See Also

[readWindisch2021](#)

Examples

```
## Not run:
readSource("Windisch2021", convert="onlycorrect")

## End(Not run)
```

downloadDinerstein2017	<i>downloadDinerstein2017</i>
------------------------	-------------------------------

Description

Downloads the RESOLVE Terrestrial Ecoregions 2017 (Dinerstein et al. 2017), a global map of 846 ecoregions grouped into 14 biomes.

Usage

downloadDinerstein2017()

Author(s)

Florian Humpenoeder

See Also

[readDinerstein2017](#)

downloadGAMI	<i>downloadGAMI</i>
--------------	---------------------

Description

Downloads the Global Age Mapping Integration (GAMI) v2.1 forest-age dataset (Besnard et al. 2024, GFZ Data Services, doi:10.5880/GFZ.1.4.2023.006), the 0.5-degree ‘class_fraction’ product read by [readGAMI](#). GAMI provides the within-forest age distribution (12 age classes, 20-member ensemble) for 2010 and 2020.

Usage

downloadGAMI()

Value

metadata list describing the downloaded GAMI source

Author(s)

Florian Humpenoeder

See Also

[[downloadSource\(\)](#)], [readGAMI](#)

Examples

```
## Not run:  
downloadSource("GAMI")  
  
## End(Not run)
```

downloadMAPSPAM	<i>downloadMAPSPAM</i>
-----------------	------------------------

Description

Downloads the MAP-SPAM (SPAM) data set for harvested and physical croparea

Usage

```
downloadMAPSPAM()
```

Value

raw files for MAPSPAM

Author(s)

Edna J. Molina Bacca

See Also

[downloadSource()]

Examples

```
## Not run:  
a <- download("downloadMAPSPAM")  
  
## End(Not run)
```

downloadMehta2024	<i>downloadMehta2024</i>
-------------------	--------------------------

Description

download Global Area Equipped for Irrigation Dataset 1900-2015 from Mehta et al. (2024). Gridded dataset is created based on (sub-)national statistics from FAOSTAT, AQUASTAT, EUROSTAT and country’s census data downscaled using two alternative gridded irrigation maps (GMIA from Siebert et al. 2013 and Meier et al. 2018)

Usage

```
downloadMehta2024(subtype = "v4_GMIA")
```

Arguments

subtype	data subtype to be downloaded Subtypes available: Combination of version (v3, v4) and data source: 'GMIA': gridded base map for downscaling from Stefan et al. (2013). Global Map of Irrigation Areas version 5. 'Meier2018': gridded base map for downscaling from Meier, et al. (2018). Global Irrigated Areas. Separated by "_" (e.g., subtype = "v4_GMIA")
---------	--

Author(s)

Felicitas Beier

See Also

```
[downloadSource()] [readMehta2024()]
```

Examples

```
## Not run:
a <- downloadSource()

## End(Not run)
```

downloadRamankutty	<i>downloadRamankutty</i>
--------------------	---------------------------

Description

download Ramankutty available land si (Source: Ramankutty N, Foley JA, Norman J and Mc-Sweeney K (2002) The global distribution of cultivable lands: current patterns and sensitivity to possible climate change. Global Ecology and Biogeography, 11, 377-392.)

Usage

```
downloadRamankutty()
```

Author(s)

Felicitas Beier

See Also

[downloadSource](#) [readRamankutty](#)

Examples

```
## Not run: a <- downloadSource()
```

downloadSchulteUebbing

downloadSchulteUebbing

Description

Download the critical nitrogen surplus values of Schulte-Uebbing et al. 2022. This function requires the 'archive' package, which is suggested. If 'archive' is not available, the function will stop with an error.

Usage

```
downloadSchulteUebbing()
```

Value

A list containing metadata from Schulte-Uebbing et al. 2022.

Examples

```
## Not run:  
  downloadSchulteUebbing()  
  
## End(Not run)
```

downloadTravelTimeNelson2019	<i>downloadTravelTimeNelson2019</i>
------------------------------	-------------------------------------

Description	
download Nelson 2019 paper	
Usage	
downloadTravelTimeNelson2019()	
Author(s)	
David M Chen	

fullCELLULARMAGPIE	<i>fullCELLULARMAGPIE</i>
--------------------	---------------------------

Description

Function that produces the complete cellular data set required for running the MAgPIE model.

Usage

```
fullCELLULARMAGPIE(  
  rev = numeric_version("0.1"),  
  dev = "",  
  ctype = "c200",  
  climatetype = "MRI-ESM2-0:ssp370",  
  lpjml = c(natveg = "LPJmL4_for_MAgPIE_44ac93de", crop =  
    "ggcml_phase3_nchecks_9ca735cb", grass = "lpjml5p2_pasture"),  
  isimip = NULL,  
  clusterweight = NULL,  
  emu_id = NULL  
)
```

Arguments

- | | |
|-----|---|
| rev | data revision which should be used as input (numeric_version). |
| dev | development suffix to distinguish development versions for the same data revision. This can be useful to distinguish parallel lines of development. |

ctype	aggregation clustering type, which is a combination of a single letter, indicating the cluster methodology, and a number, indicating the number of resulting clusters. Available methodologies are - hierarchical clustering (h), - normalized k-means clustering (n) and - combined hierarchical/normalized k-means clustering (c). In the latter hierarchical clustering is used to determine the cluster distribution among regions whereas normalized k-means is used for the clustering within a region.
climatetype	Global Circulation Model to be used
lpjml	Defines LPJmL version for crop/grass and natveg specific inputs
isimip	Defines isimip crop model input which replace maiz, tece, rice_pro and soybean
clusterweight	Should specific regions be resolved with more or less detail? Values > 1 mean higher share, < 1 lower share e.g. <code>cfg\$clusterweight <- c(LAM=2)</code> means that a higher level of detail for region LAM if set to NULL all weights will be assumed to be 1. Examples: <code>c(LAM=1.5,SSA=1.5,OAS=1.5)</code> or <code>c(LAM=2,SSA=2,OAS=2)</code> setConfig (e.g. for setting the mainfolder if not already set properly).
emu_id	Pasture Soil carbon emulator ID

Author(s)

Kristine Karstens, Jan Philipp Dietrich

See Also

[readSource](#), [getCalculations](#), [calcOutput](#), [setConfig](#)

Examples

```
## Not run:
retrieveData("CELLULARMAGPIE", rev = numeric_version("12"),
             mainfolder = "pathtowhereallfilesarestored")

## End(Not run)
```

readAvlLandSi

readAvl_Land_Si

Description

Read si0 and nsi0 areas based on Ramankutty dataset"

Usage

```
readAvlLandSi()
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

David Chen

Examples

```
## Not run:
  readSource("AvlLandSi", convert="onlycorrect")

## End(Not run)
```

readBendingTheCurve	<i>readBendingTheCurve</i>
---------------------	----------------------------

Description

Read bending the curve data

Usage

```
readBendingTheCurve(subtype)
```

Arguments

subtype	Data used in the Bending the Curve initiative. Type "rr_layer" for the range-size rarity layer and "luh2_side_layers" for the LUH2 Side Layers.
---------	---

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Patrick v. Jeetze

Examples

```
## Not run:
  readSource("BendingTheCurve", subtype="rr_layer", convert="onlycorrect")

## End(Not run)
```

readDinerstein2017	<i>readDinerstein2017</i>
--------------------	---------------------------

Description

Reads the RESOLVE Terrestrial Ecoregions 2017 (Dinerstein et al. 2017) and returns the areal cover fraction of a biome group per 0.5 degree cell.

Usage

```
readDinerstein2017(subtype = "grassland")
```

Arguments

subtype	Biome group whose areal cover fraction is returned. Currently only "grassland" = RESOLVE biomes 7 (tropical and subtropical grasslands, savannas and shrublands), 8 (temperate grasslands, savannas and shrublands), 9 (flooded grasslands and savannas) and 10 (montane grasslands and shrublands).
---------	--

Value

magpie object (67420 cells) with the cover fraction of the selected biome group. Cells outside any ecoregion of that group are NA and set to zero in [correctDinerstein2017](#).

Author(s)

Florian Humpenoeder

See Also

[correctDinerstein2017](#)

Examples

```
## Not run:  
readSource("Dinerstein2017", subtype = "grassland", convert = "onlycorrect")  
  
## End(Not run)
```

readGAMI

readGAMI

Description

Read the Global Age Mapping Integration (GAMI) v2.1 forest-age dataset (Besnard et al. 2024, GFZ Data Services, doi:10.5880/GFZ.1.4.2023.006), 0.5-degree 'class_fraction' product. GAMI provides the **within-forest** age distribution: for every grid cell the fraction of the forested area in each of 12 age classes (sums to 1 where forest exists), as a 20-member ensemble for 2010 and 2020. This read returns the ensemble mean on GAMI's native 0.5-degree grid (720 x 360 cells) x 2 years x 12 age classes. Cleaning (fill / NA to 0) is done in `correctGAMI`; the projection onto the 67420 lpj-cell grid, the forest-area weighting and the mapping onto the 15 GFAD-style MAgPIE age classes are done in `calcAgeClassDistribution`.

GAMI's 'forest_age' is a five-dimensional variable (time, longitude, latitude, age_class, 20-member ensemble). terra/GDAL flattens the three non-spatial dimensions into unlabelled layers - every age class is exposed as 'age_class=0' and the member order is scrambled - so the ensemble mean cannot be grouped reliably from the layer names. ncdf4 addresses the named dimensions explicitly and is therefore used here instead of the usual terra reader.

Usage

```
readGAMI()
```

Value

magpie object on GAMI's native 0.5-degree grid: cells x 2 years (2010, 2020) x 12 age classes

Author(s)

Florian Humpenoeder

See Also

[calcAgeClassDistribution](#), [readGFAD](#)

Examples

```
## Not run:
readSource("GAMI", convert = "onlycorrect")

## End(Not run)
```

`readGFAD`*readGFAD*

Description

Read GLObal Forest Age Dataset derived from MODIS and COPENICUS satellite data

Usage

```
readGFAD()
```

Value

magpie object in cellular resolution

Author(s)

Abhijeet Mishra, Felicitas Beier

Examples

```
## Not run:  
readSource("GFAD", convert = "onlycorrect")  
  
## End(Not run)
```

`readGPD`*readGPD*

Description

read GPD Data from the Global Peatland Database provided by Alexandra Barthelmes. The original xls file has been clean-up manually (country names). Turkey had two identical entries in the original xls file. Sources: "Inventory Reports and National Communications UNFCCC 2014", "soil and peatland science", "European Mires Book", "own estimates (incl. GIS data)",

Usage

```
readGPD()
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("GPD", convert = "onlycorrect")

## End(Not run)
```

readGPD2022

readGPD2022

Description

read x Data from the Global Peatland Database provided by Alexandra Barthelmes. The original xls file has been clean-up manually (country names). Turkey had two identical entries in the original xls file. Sources: "Inventory Reports and National Communications UNFCCC 2014", "soil and peatland science", "European Mires Book" , "own estimates (incl. GIS data)",

Usage

```
readGPD2022()
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("x", convert = "onlycorrect")

## End(Not run)
```

readGPM2

readGPM2

Description

read peatland area from GPM2

Usage

```
readGPM2(subtype = "1km")
```

Arguments

subtype resolution ("1km" or "500m")

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("GPM2", convert = "onlycorrect")

## End(Not run)
```

readGridPopGao	<i>readGridPopGao</i>
----------------	-----------------------

Description

Read gridded population, by urban and rural, from Gao O'Neill and Jones dataset, see <https://www.cgd.ucar.edu/iam/modeling/population-scenarios.html> <https://doi.org/10.7927/m30p-j498>

Usage

```
readGridPopGao(subtype = "future")
```

Arguments

subtype only "future" post-2000 available for this source

Author(s)

David Chen, Felicitas Beier

readGridPopIsimip	<i>readGridPopIsimip</i>
-------------------	--------------------------

Description

Reads in past and future (SSP1-5) gridded population data, from ISIMIP database, Past data is based on HYDE3.2, while future SSPs are based on projections from Jones & O'Neill 2016

Usage

```
readGridPopIsimip(subtype)
```

Arguments

subtype past (1965-2005) or future (2010-2100)

Value

A MAgPIE object, cellular 0.5deg resolution, of population (millions)

Author(s)

David Chen, Marcos Alves, Felicitas Beier

readLabourProdImpactEmu	<i>readLabourProdImpactEmu</i>
-------------------------	--------------------------------

Description

read in labour productivity impacts from climate change emulated by the LAMACLIMA project based on method of Orlov et al. 2019. Economics of Disasters and Climate Change, 3(3), 191-211.

Usage

```
readLabourProdImpactEmu()
```

Value

magpie object of gridded productivity loss in percent (0-100)

Author(s)

Michael Windisch, Florian Humpenöder, Felicitas Beier

See Also

[readSource](#)

```
readLabourProdImpactOrlov
      readLabourProdImpactOrlov
```

Description

read in labour productivity impacts from climate change from Orlov (see Orlov et al. 2019. Economic Losses of Heat-Induced Reductions in Outdoor Worker Productivity: a Case Study of Europe. Economics of Disasters and Climate Change, 3(3), 191-211.)

Usage

```
readLabourProdImpactOrlov(
  subtype = "IPSL-CM5A-LR_rcp85_wbgtod_hothaps_400W.nc"
)
```

Arguments

subtype	subtype of choice between indoor outdoor work, GCM, work intensnity (300W medium, 400W high, rcp)
---------	---

Value

magpie object of gridded productivity as share of 1 (full productivity)

Author(s)

David Chen

See Also

[readSource](#)

```
readLeifeld2018      readLeifeld2018
```

Description

read potential peatland area from Leifeld2018

Usage

```
readLeifeld2018()
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Florian Humpenoeder

Examples

```
## Not run:
readSource("Leifeld2018", convert = "onlycorrect")

## End(Not run)
```

readMAPSPAM

readMAPSPAM

Description

Reads the MAP-SPAM crop data per year (mapping each year different)

Usage

```
readMAPSPAM(subtype = "harvested")
```

Arguments

subtype It can be either "harvested" or "physical" area

Value

magpie object with croparea data in ha

Author(s)

Edna J. Molina Bacca, Felicitas Beier

See Also

[readSource()]

Examples

```
## Not run:
a <- readSource("MAPSPAM")

## End(Not run)
```

readMehta2024

readMehta2024

Description

reads in Global Area Equipped for Irrigation for years 1900-2015 from Mehta et al. (2022)

Usage

```
readMehta2024(subtype = "v4_GMIA")
```

Arguments

subtype	data subtype to be downloaded Subtypes available: Combination of version (v3, v4) and data source: 'GMIA': gridded base map for downscaling from Stefan et al. (2013). Global Map of Irrigation Areas version 5. 'Meier2018': gridded base map for downscaling from Meier, et al. (2018). Global Irrigated Areas. Separated by "_" (e.g., subtype = "v4_GMIA")
---------	--

Author(s)

Felicitas Beier

See Also

[correctMehta2024()]

Examples

```
## Not run:
a <- readSource("Mehta2024")

## End(Not run)
```

readRamankutty

readRamankutty

Description

Read in data of Ramankutty dataset (Source: Ramankutty N, Foley JA, Norman J and McSweeney K (2002) The global distribution of cultivable lands: current patterns and sensitivity to possible climate change. Global Ecology and Biogeography, 11, 377-392.). Link to data: <https://www.nelson.wisc.edu/sage/data-and-models/global-land-use/grid.php>

Usage

```
readRamankutty()
```

Value

magpie object

Author(s)

Felicitas Beier

Examples

```
## Not run:  
readSource("Ramankutty", convert = "onlycorrect")  
  
## End(Not run)
```

readSchulteUebbing	<i>readSchulteUebbing</i>
--------------------	---------------------------

Description

read the critical nitrogen surplus dataset of Schulte-Uebbing et al. 2022

Usage

```
readSchulteUebbing()
```

Value

a magpie object containing critical nitrogen surplus

Author(s)

Michael Crawford

Examples

```
## Not run:  
readSource("SchulteUebbing")  
  
## End(Not run)
```

readTransportDistance *readTransportDistance*

Description

Read transport distance

Usage

```
readTransportDistance()
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

David Chen

Examples

```
## Not run:
  readSource("TransportDistance", convert="onlycorrect")

## End(Not run)
```

readTravelTimeNelson2019
 readTravelTimeNelson2019

Description

Read minimum travel time to cities and ports and ports of various size, see metadata file in source folder

Usage

```
readTravelTimeNelson2019(subtype = "cities50")
```

Arguments

subtype	currently only cities of 5, 20, or 50 thousand people ("cities5", "cities20", "cities50") or ports of various sizes ("portsLarge Medium Small VerySmall Any")
---------	---

Value

gridded magpie object for 2015, minimum travel time to cities in minutes

Author(s)

David M Chen

readTRENDY

readTRENDY

Description

read a TRENDY dataset

Usage

```
readTRENDY(subtype)
```

Arguments

subtype name of the TRENDY dataset to read. Current options include: "CABLE-POP", "CLASSIC", "CLM5.0", "DLEM", "ED", "ELM", "IBIS", "ISAM", "IS-BACTRIP", "JSBACH", "JULES", "LPJ-GUESS", "LPJml", "LPJwsl", "lpxqs", "OCN", "ORCHIDEE", "SDGVM", "VISIT", "YIBS"

Value

a named list of terra::rast objects

Author(s)

Michael Crawford

Examples

```
## Not run:
readSource("TRENDY", subtype = "JSBACH")

## End(Not run)
```

readWindisch2021	<i>readWindisch2021</i>
------------------	-------------------------

Description

Reads in data to calculate BphEffect, BphTCRE or BphMask depending on the chosen subtype. BphEffect: Biogeophysical temperature change of afforestation (degree C). (File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018). BphMask: Mask of Datapoints of biogeophysical temperature change of afforestation (degree C) to be used as weight. (File is based on observation datasets of Bright et al. 2017 and Duveiller et al. 2018). BphTCRE: Transient Climate Response to accumulated doubling of CO2. (File is based on CMIP5 +1perc CO2 per year experiment. To be used in the translation to carbon equivalents of BphEffect)

Usage

```
readWindisch2021(subtype)
```

Arguments

```
subtype          refordefor_BPHonly_05_new, annmean_pertCha_05_EW1, annstd_diff_pertCha_05_EW1
```

Value

List of magpie objects with results on cellular level, weight, unit and description.

Author(s)

Felicitas Beier, Michael Windisch, Patrick v. Jeetze

Examples

```
## Not run:
  readSource("Windisch2021", convert="onlycorrect")

## End(Not run)
```

toolApplyRegionNames	<i>Apply region names</i>
----------------------	---------------------------

Description

This tool function replaces country names with region names in the spatial dimension of the object. To avoid mixing up of cache files with different regional aggregation the regioncode needs to be supplied and checked as well. Only if the supplied regions code agrees with the region mapping currently chosen the function will return the data.

Usage

```
toolApplyRegionNames(cdata, regionscode)
```

Arguments

cdata	a cluster data file as produced by cluster_base
regionscode	regionscode of the regional mapping to be used. Must agree with the region-code of the mapping mentioned in the madrat config! Can be retrieved via regionscode().

Value

the cluster data file with region names in spatial dimension rather than country names

Author(s)

Jan Philipp Dietrich, Felicitas Beier

See Also

[calcClusterKMeans](#), [calcClusterBase](#)

toolClusterPerRegion *toolClusterPerRegion*

Description

This function calculates an appropriate number of clusters per region as it is needed for ClusterK-Means

Usage

```
toolClusterPerRegion(cells, ncluster, weight = NULL)
```

Arguments

cells	spatial names as returned by getCells
ncluster	The desired total number of clusters.
weight	named vector with weighting factors for each region for the cluster distribution, e.g. weight=c(AFR=3,EUR=0.5). weight > 1 will grant more cluster to a region and weight < 1 less cluster than by default.

Value

A matrix with regions in rows and number of cells and clusters in columns

Author(s)

Jan Philipp Dietrich

See Also

[calcClusterKMeans](#), [calcClusterBase](#)

toolClusterPerRegionManual

toolClusterPerRegionManual

Description

This function translates weights into number of clusters per region as it is needed for ClusterK-Means. Weights have to sum up to total number of clusters.

Usage

```
toolClusterPerRegionManual(cells, ncluster, ncluster2reg)
```

Arguments

cells	spatial names as returned by getCells
ncluster	The desired total number of clusters.
ncluster2reg	named vector with numbers per region

Value

A matrix with regions in rows and number of cells and clusters in columns

Author(s)

Kristine Karstens

See Also

[calcClusterKMeans](#), [calcClusterBase](#)

Index

calcAfforestationMask, [5](#)
calcAgeClassDistribution, [5](#), [62](#)
calcAreaActuallyIrrigated, [6](#)
calcAreaEquippedForIrrigation, [7](#)
calcAvlLandSi, [8](#)
calcBphEffect, [9](#)
calcBphMask, [9](#)
calcBphTCRE, [10](#)
calcCarbon, [11](#)
calcCarbonTests, [12](#)
calcCellCountryFraction, [13](#)
calcCluster, [13](#), [15](#), [16](#)
calcClusterBase, [14](#), [74](#), [75](#)
calcClusterHierarchical, [15](#), [17](#)
calcClusterKMeans, [16](#), [16](#), [74](#), [75](#)
calcClusterTreeHierarchical, [17](#)
calcDegradationYieldReduction, [18](#)
calcEFRRockstroem, [19](#)
calcEFRSmakthin, [20](#)
calcEnvmtlFlow, [21](#)
calcFAOmassbalance, [23](#)
calcFoodDemandGridded, [22](#)
calcGrasslandBiomass, [23](#)
calcGrasslandsYields, [23](#)
calcGrassyEcoregions, [24](#)
calcGridPop, [25](#)
calcIrrigation, [26](#)
calcLabourProdImpact, [27](#)
calcLabourProdImpactEmu, [28](#)
calcLuh2SideLayers, [29](#)
calcMAPSPAM, [29](#)
calcNonLocalProduction, [30](#)
calcNpiNdcAdAolcPol, [31](#)
calcNpiNdcAffPol, [31](#)
calcOutput, [23](#), [59](#)
calcPackagingMarketingCosts, [32](#)
calcPastr_new, [33](#)
calcPastrTauHist, [34](#)
calcPeatland, [34](#)
calcPeatland2, [35](#)
calcPotentialForestArea, [36](#)
calcRangelandsMaxNew, [37](#)
calcRRLayer, [38](#)
calcSchulteUebbing, [38](#)
calcSOMinitialisationPools, [39](#)
calcTopsoilCarbon, [40](#)
calcTransportCosts, [41](#)
calcTransportDistance, [42](#)
calcTransportTime, [42](#)
calcTRENDY, [43](#)
convertGPD, [44](#)
convertGPD2022, [44](#)
correctAvlLandSi, [45](#)
correctBendingTheCurve, [46](#)
correctDinerstein2017, [46](#), [61](#)
correctGAMI, [47](#)
correctGFAD, [48](#)
correctGPM2, [49](#)
correctLabourProdImpactEmu, [49](#)
correctLeifeld2018, [50](#)
correctMehta2024, [51](#)
correctRamankutty, [51](#)
correctTransportDistance, [52](#)
correctWindisch2021, [53](#)

downloadDinerstein2017, [54](#)
downloadGAMI, [54](#)
downloadMAPSPAM, [55](#)
downloadMehta2024, [56](#)
downloadRamankutty, [56](#)
downloadSchulteUebbing, [57](#)
downloadSource, [57](#)
downloadTravelTimeNelson2019, [58](#)

fullCELLULARMAGPIE, [58](#)

getCalculations, [59](#)

mrmagpie (mrmagpie-package), [4](#)

mrmagpie-package, 4

readAvlLandSi, [45](#), [59](#)
readBendingTheCurve, [60](#)
readDinerstein2017, [46](#), [47](#), [54](#), [61](#)
readGAMI, [47](#), [54](#), [62](#)
readGFAD, [48](#), [63](#)
readGPD, [63](#)
readGPD2022, [64](#)
readGPM2, [64](#)
readGridPopGao, [65](#)
readGridPopIsimip, [66](#)
readLabourProdImpactEmu, [50](#), [66](#)
readLabourProdImpactOrlov, [67](#)
readLeifeld2018, [67](#)
readMAPSPAM, [68](#)
readMehta2024, [69](#)
readRamankutty, [52](#), [57](#), [69](#)
readSchulteUebbing, [70](#)
readSource, [23](#), [59](#), [66](#), [67](#)
readTransportDistance, [52](#), [71](#)
readTravelTimeNelson2019, [71](#)
readTRENDY, [72](#)
readWindisch2021, [53](#), [73](#)

setConfig, [59](#)

toolApplyRegionNames, [73](#)
toolClusterPerRegion, [74](#)
toolClusterPerRegionManual, [17](#), [75](#)