

Package: mrcommons (via r-universe)

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Type Package

Title MadRat commons Input Data Library

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Description Provides useful functions and a common structure to all the input data required to run models like MAgPIE and REMIND of model input data.

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

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calc1stBioDem	<i>calc1stBioDem</i>
---------------	----------------------

Description

Calculates projections of first generation biofuels demand, including biogas, bioethanol and biodiesel, from IEA database. The unit is Petajoule.

Usage

```
calc1stBioDem(subtype = "all")
```

Arguments

subtype	all per default. ethanol_oils for selecting 1st gen crop types relevant for REMIND input.
---------	---

Value

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

Author(s)

Xiaoxi Wang, David Klein

See Also

[calc1stBioenergyPast\(\)](#)

Examples

```
## Not run:  
calcOutput("1stBioDem")  
  
## End(Not run)
```

`calc1stBioenergyPast` *calc1stBioenergyPast*

Description

Calculates first generation biofuels production, imports, exports for biogas, bioethanol and biodiesel from IEA database. The unit is Petajoule.

Usage

```
calc1stBioenergyPast()
```

Value

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

Author(s)

Xiaoxi Wang, Isabelle Weindl

Examples

```
## Not run:  
calcOutput("1stBioenergyPast")  
  
## End(Not run)
```

calcACCMIP

calcACCMIP

Description

reads in the ACCMIP atmospheric deposition database. Speeds up caching

Usage

```
calcACCMIP(glo_incl_oceans = FALSE)
```

Arguments

glo_incl_oceans

if true, a global value will be returned that also includes deposition on oceans and should be equivalent to total emissions.

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcAtmosphericDeposition\(\)](#)

Examples

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

## End(Not run)
```

calcAdjustGrassi2021

calcAdjustGrassi2021

Description

Calculates the carbon emission adjustment factors as derived by Grassi et al. 2021 Adjustment factors are provided in GtCO₂ yr⁻¹. Positive and negative values possible.

Usage

```
calcAdjustGrassi2021()
```

Value

magpie object with emission adjustment factors weighted by country C removals 2000 to 2015.

Author(s)

Michael Windisch, Florian Humpenoeder

Examples

```
## Not run:  
calcOutput("AdjustGrassi2021")  
  
## End(Not run)
```

`calcAgProductionValue` *calcAgProductionValue*

Description

Calculate FAO Value Of Production

Usage

```
calcAgProductionValue(datasource = "FAO")
```

Arguments

datasource Currently available: "FAO"

Value

FAO Value Of Production as a list of MAgPIE objects

Author(s)

Roman Popov, Mishko Stevanovic, Patrick v. Jeetze

See Also

[madrat::calcOutput\(\)](#), [mrfaocore::readFAO\(\)](#), [mrfaocore::convertFAO\(\)](#), [madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- calcOutput("AgProductionValue", datasource = "FAO")  
  
## End(Not run)
```

calcAnimalStocks	<i>calcAnimalStocks</i>
------------------	-------------------------

Description

calculates stocks of animals of different categories.

Usage

```
calcAnimalStocks(grouping = "IPCC")
```

Arguments

grouping	IPCC: Animal grouping of IPCC Guidelines
----------	--

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcExcretionIPCC\(\)](#), [readIPCC\(\)](#)

Examples

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

## End(Not run)
```

calcAtmosphericDeposition	<i>calcAtmosphericDeposition</i>
---------------------------	----------------------------------

Description

Computes Atmospheric (nitrogen) deposition on different land-use types. It distinguishes ammonia (Nh3) and Nitrogen oxides (NOx) as well

Usage

```
calcAtmosphericDeposition(  
  datasource = "ACCMIP",  
  glo_incl_oceans = FALSE,  
  cellular = FALSE,  
  cells = "lpjcell",  
  emission = FALSE,  
  scenario = NULL  
)
```

Arguments

datasource	deposition inventory
glo_incl_oceans	provides global values that include oceans, as oceans are not part of the country mapping
cellular	cellular or country level emissions
cells	magpiecell (59199 cells) or lpjcell (67420 cells)
emission	if TRUE, not the deposition but the cellular emissions are reported
scenario	if dataset contains several scenarios (e.g. ACCMIP), one scenario can be selected.

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenBudgetCropland\(\)](#)

Examples

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

```
calcAtmosphericRedepositionShare  
    calcAtmosphericRedepositionShare
```

Description

Calculates share of volatilised nitrogen emissions that is redeposited on different land types.

Usage

```
calcAtmosphericRedepositionShare(  
  cellular = FALSE,  
  maxshare = 0.8,  
  scenario = "rcp45"  
)
```

Arguments

cellular	cellular or country level
maxshare	the maximum amount of emissions deposited within the same cell or country. The remainder will be handled as global emission
scenario	scenario

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

calcAtmosphericTransboundaryRedepositionShare
calcAtmosphericRedepositionShare

Description

Calculates share of volatilised nitrogen emissions that is redeposited on different land types.

Usage

```
calcAtmosphericTransboundaryRedepositionShare(  
  maxshare = 0.8,  
  scenario = "rcp45"  
)
```

Arguments

maxshare	the maximum amount of emissions deposited within the same cell or country. The remainder will be handled as global emission
scenario	scenario

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

calcAWMSconfShr *calcAWMSconfShr*

Description

calculates the share of manure managed in different animal waste management systems in confinements. Starting with IPCC 2005 values, turning into scenarios for the future.

Usage

```
calcAWMSconfShr(rev = "0.1")
```

Arguments

rev revision number of madrat run

Value

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

Author(s)

Benjamin Leon Bodirsky. Modifications by Edna J. Molina Bacca

See Also

[calcAWMSconfShrPast\(\)](#)

Examples

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

## End(Not run)
```

calcAWMSconfShrPast	<i>calcAWMSconfShrPast</i>
---------------------	----------------------------

Description

calculates the share of manure excreted in different types of animal waste management systems in confinements in the year 2005 using the IPCC Guidelines excretion rates.

Usage

```
calcAWMSconfShrPast(products = "magpie")
```

Arguments

products IPCC: IPCC products. MAgPIE: Magpie products

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcAWMSconfShr\(\)](#), [calcExcretionIPCC\(\)](#)

Examples

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

## End(Not run)
```

calcBiocharAttributes *calcBiocharAttributes*

Description

Provides biochar attributes for different pyrolysis process conditions. Currently covered are Dry Matter (DM), Carbon (C), and Generalizable Energy (GE). Values are assembled from various literature sources.

Usage

```
calcBiocharAttributes(processCond = "default")
```

Arguments

processCond	Selects the pyrolysis process conditions for which data is returned. Options: "all", "default", or subset of: "SP-400", "SP-500", "SP-650", "SP-800", "FP-500", "P-Woolf", "P-Buffi", "P-KonTiki".
-------------	--

Value

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

Author(s)

Isabelle Weindl

See Also

[readPyrolysisConditions\(\)](#)

Examples

```
## Not run:
calcOutput("BiocharAttributes", processCond = "all")

## End(Not run)
```

`calcBiocharEfficiency` *calcBiocharEfficiency*

Description

Calculates biochar conversion efficiencies for different pyrolysis process conditions, using data from multiple literature sources. Yield metrics are expressed as output biochar per biomass input on dry matter, carbon, and energy basis. Output can also cover H/C ratio when available.

Usage

```
calcBiocharEfficiency(processCond = "default", outputType = "default")
```

Arguments

<code>processCond</code>	Selects the pyrolysis process conditions for which data is returned. Options: "all", "default", or subset of: "SP-400", "SP-500", "SP-650", "SP-800", "FP-500", "P-Woolf", "P-Buffi", "P-KonTiki".
<code>outputType</code>	Selects the output metric for which data is returned. Options: "all", "default", or subset of: "dm_yield", "en_yield", "c_yield", "HC_ratio".

Value

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

Author(s)

Isabelle Weindl

See Also

[readPyrolysisConditions\(\)](#)

Examples

```
## Not run:  
calcOutput("BiocharEfficiency", processCond = "all", outputType = "all")  
  
## End(Not run)
```

calcBiomassForNonFood	<i>calcBiomassForNonFood</i>
-----------------------	------------------------------

Description

Calculates the supply of agricultural and forestry based biomass that are used in the energy or industry sector

Usage

```
calcBiomassForNonFood()
```

Value

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

Author(s)

Kristine Karstens

Examples

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

## End(Not run)
```

calcBiomeType	<i>calcBiomeType</i>
---------------	----------------------

Description

Returns fraction of spatial unit (cell) belonging to a biome type of each biogeographic realm. The classification is based on data from 'the nature conservancy' (<https://geospatial.tnc.org/datasets/b1636d640ede4d6ca8f5e369f>) originally developed by Olson et al. (2001), BioScience.

Usage

```
calcBiomeType(cells = "lpjcell")
```

Arguments

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

Value

List with a magpie object

Author(s)

Patrick v. Jeetze

See Also

[readTNC2019](#)

Examples

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

`calcBioplasticToBiomass`

calcBioplasticToBiomass

Description

calculates conversion factors from bioplastic demand to demand of biomass needed for the production, taking into account the average share of different biomass sources (glycerol, starch, sugars, cellulose, oils) for bioplastic production and corresponding content in the different crop types

Usage

```
calcBioplasticToBiomass()
```

Value

List of magpie objects with global conversion factors, unit and description.

Author(s)

Debbora Leip

Examples

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

calcBodyHeight	<i>calcBodyHeight</i>
----------------	-----------------------

Description

reads in the Lutz et al dataset. Aggregates the age structure. Population is divided by sex male (M), female (F) and both (B) and divided by 8 age classes: 0-4, 5-9, 10-14, 15-19, AG1 (20-29), AG2 (30-59), AG3(60-79), AG4(80+)

Usage

```
calcBodyHeight(convert = TRUE)
```

Arguments

convert	if TRUE, the convertscript of Lutz et al is activated. Also, the year 1965 is extrapolated using the worldbank population data and sex, age, and education structure of 1970.
---------	---

calcCentralFeedshares	<i>calcCentralFeedshares</i>
-----------------------	------------------------------

Description

Calculates future central feed shares for all livestock categories based on the results of a non-linear regression between historical central feed shares and livestock productivity and using Koeppen-Geiger climate zones

Usage

```
calcCentralFeedshares()
```

Value

Central feed shares and weights as list of two MAgPIE-objects

Author(s)

Isabelle Weindl, Benjamin Bodirsky, Stephen Wirth, Jan Philipp Dietrich

Examples

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

## End(Not run)
```

calcClimateClass	<i>calcClimateClass</i>
------------------	-------------------------

Description

fraction of a cell belonging to a given climate classification based on different climate classification schemes

Usage

```
calcClimateClass(datasource = "koeppen")
```

Arguments

datasource select source from:

- koeppen for Koeppen Geiger Classification <http://koeppen-geiger.vu-wien.ac.at/>
- ipcc, ipccReduced, ipccReduced2019 for IPCC Guideline climate classification

Value

Clustered MAgPIE object on requested resolution

Author(s)

Abhijeet Mishra, Kristine Karstens

Examples

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

## End(Not run)
```

calcClossConfinement	<i>calcClossConfinement</i>
----------------------	-----------------------------

Description

Carbon losses for livestock confinements

Usage

```
calcClossConfinement()
```

Value

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

Author(s)

Kristine Karstens

Examples

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

```
calcConstructionWoodDemand  
      calcConstructionWoodDemand
```

Description

Calculates the demand of construction wood from Galina et al. 2020 data. See

Usage

```
calcConstructionWoodDemand()
```

Value

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

Author(s)

Abhijeet Mishra

See Also

[mrfaocore::calcFA0massbalance_pre\(\)](#)

Examples

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

calcDemography	<i>calcDemography</i>
----------------	-----------------------

Description

Population by age, sex and education.

With version = "WCDE" the data is taken from the Wittgenstein Centre Human Capital Data Explorer: the historical reconstruction (1965-2015) from version 2 (Lutz et al. 2018) is combined with the updated SSP projections (2020-2100) from version 3 (K.C. et al. 2024). Education is aggregated to the six attainment categories plus "Under 15" that are also used in the legacy Lutz2014 data (the finer post-secondary split of the WCDE data is dropped). With version = "Lutz2014" the previous data source is used instead.

Population is divided by sex male (M), female (F) and, before recalibration, both (B), by five-year age groups and by education.

Usage

```
calcDemography(convert = TRUE, education = TRUE, version = "Lutz2014")
```

Arguments

convert	if TRUE, country coverage is completed (convert functions) and the demography is recalibrated to the population scenarios of calcOutput("Population").
education	if FALSE, no education dimension will be provided
version	"WCDE" (default, Wittgenstein Centre v2 history + v3 projections) or "Lutz2014" (legacy data source)

calcDevelopmentState	<i>calc</i>
----------------------	-------------

Description

Provides development state of a country or region. We use worldbank definitions by default: above 12746 USD per capita, its a high-income country, below 1045 its a low-income country, in between its a medium-income country.

Usage

```
calcDevelopmentState(upper = 12746, lower = 1045)
```

Arguments

upper	Change upper limit (default: 12746, i.e. the upper threshold for 2013 in current US\$)
lower	Change lower limit (default: 1045, i.e. the lower threshold for 2013 in current US\$)

Value

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

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens

See Also

`mrdrivers::calcGDPpc()`

Examples

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

## End(Not run)
```

calcEDGAR6

calcEDGAR6

Description

Creates an emission inventory based on the EDGAR5 and EDGAR6 database.

Usage

```
calcEDGAR6(non_country = FALSE, nutrient = TRUE)
```

Arguments

<code>non_country</code>	can alternatively provide SEA and AIR emissions, which are global emissions that cannot be attributed to a country
<code>nutrient</code>	if TRUE, nitrogen is reported as N and CO2 as C

Value

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

Author(s)

Benjamin Leon Bodirsky

calcEF3confinement	<i>calcEF3confinement</i>
--------------------	---------------------------

Description

Emission factors for nitrogenous emissions in livestock confinements

Usage

```
calcEF3confinement(products = "magpie", selection = "n_pollutants_direct")
```

Arguments

products	Either livestock products in MAgPIE or IPCC products
selection	defaults to n_pollutants_direct

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

```
## Not run:
calcOutput("EF3confinement")

## End(Not run)
```

calcEF3prp	<i>calcEF3prp</i>
------------	-------------------

Description

Returns emission factor for manure excreted during pasture range and paddock. Differs depending on the share of small ruminants.

Usage

```
calcEF3prp(select_years = "y2005")
```

Arguments

select_years	if only one year is selected, years is set to NULL
--------------	--

Value

list of magpie object with results on country level, weight on country level, unit and description.

Author(s)

Benjamin Leon Bodirsky

Examples

```
## Not run:  
calcOutput("EF3prp")  
  
## End(Not run)
```

calcEmiMac

Calculate baseline emissions for maccs

Description

Provides REMIND data for baseline emissions for maccs.

Usage

```
calcEmiMac()
```

Value

REMIND data for baseline emissions for maccs and corresponding weights (NULL) as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

See Also

[madrat::calcOutput\(\)](#), [madrat::readSource\(\)](#)

Examples

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

calcEmiMacCEDS	<i>Calculate baseline emissions for maccs (mostly) from CEDS2024 data</i>
----------------	---

Description

Provides REMIND data for baseline emissions for maccs from CEDS2024 Note that this can't fully replace the old EDGAR data, as it doesn't include land use CO2 emissions. These are not currently actually used in REMIND by default as the LUC CO2 MACC is off, but it's still not officially deprecated.

Usage

```
calcEmiMacCEDS(baseyear = 2020)
```

Arguments

baseyear	year to take as a reference from CEDS, ignored for the EDGAR2005 LUC CO2 emissions
----------	--

Details

Therefore, the CO2 from LUC is read from EDGAR with a 2005, a potentially different baseyear than the one chosen in the parameter

Value

REMIND data for baseline emissions for maccs and corresponding weights (NULL) as a list of two MAgPIE objects

Author(s)

Gabriel Abrahao

See Also

[madrat::calcOutput\(\)](#), [madrat::readSource\(\)](#)

```
calcEmisNitrogenAWMSPast  
  calcEmisNitrogenAWMSPast
```

Description

calculates nitrogenous emissions from animal waste management systems in the historical period

Usage

```
calcEmisNitrogenAWMSPast()
```

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

```
calcEmisNitrogenCroplandPast  
  calcEmisNitrogenCroplandPast
```

Description

calculates nitrogenous emissions from croplands in the historical period.

Usage

```
calcEmisNitrogenCroplandPast(method = "IPCC")
```

Arguments

method	IPCC: emissions are calculated according the the IPCC 2006 National Guidelines for Greenhouse Gas Inventories. Nsurplus: Emissions in 2005 are calculated according to IPCC, and the scaled with nitrogen losses from croplands.
--------	--

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

```
calcEmisNitrogenNonaglandPast
      calcEmisNitrogenNonaglandPast
```

Description

Calculates nitrogenous emissions from non-agricultural land for the historical period

Usage

```
calcEmisNitrogenNonaglandPast(method = "Nsurplus")
```

Arguments

method	Method for calculating Atmospheric deposition: Nsurplus2 and Nsurplus are based on deposition rates based on own emission calculations after 2 or after 1 iteration, respectively.
--------	--

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcEmisNitrogenPast\(\)](#), [calcExcretion\(\)](#)

Examples

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

calcEmisNitrogenOceans	
	<i>calcEmisNitrogenOceans</i>

Description

Computes (nitrogen) emissions of Oceans.

Usage

```
calcEmisNitrogenOceans(method = "ACCMIP")
```

Arguments

method	deposition inventory
--------	----------------------

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcAtmosphericDeposition\(\)](#), [calcNitrogenBudgetCropland\(\)](#)

Examples

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

calcEmisNitrogenPast	<i>calcEmisNitrogenPast</i>
----------------------	-----------------------------

Description

Calculates nitrogenous emissions from all emission sources for the historical period. Complements own estimates with Edgar estimates for the historical period.

Usage

```
calcEmisNitrogenPast(method = "IPCC")
```

Arguments

method	IPCC: emissions are calculated according to the IPCC 2006 National Guidelines for Greenhouse Gas Inventories. Nsurplus: Emissions in 2005 are calculated according to IPCC, and the scaled with nitrogen losses from croplands.
--------	---

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

calcEmisNitrogenPasturePast	<i>calcEmisNitrogenPasturePast</i>
-----------------------------	------------------------------------

Description

Calculates nitrogenous emissions from pastures for the historical period

Usage

```
calcEmisNitrogenPasturePast(method = "IPCC")
```

Arguments

method IPCC: emissions are calculated according the the IPCC 2006 National Guidelines for Greenhouse Gas Inventories. Nsurplus: Emissions in 2005 are calculated according to IPCC, and the scaled with nitrogen losses from croplands.

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcEmisNitrogenPast\(\)](#), [calcExcretion\(\)](#)

Examples

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

## End(Not run)
```

calcEmisNitrogenPreagriculture
calcEmisNitrogenPreagriculture

Description

Calculates nitrogenous emissions Nitrogen emissions from soils under 100% natural cover (even for crop and urban) assuming a pre-agricultural time.

Usage

```
calcEmisNitrogenPreagriculture(cellular = FALSE, deposition = TRUE)
```

Arguments

cellular cellular or country outputs
 deposition if TRUE, losses include atmospheric deposition inputs that are lost afterwards. If false, only biological fixation is considered.

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcEmisNitrogenPast\(\)](#), [calcExcretion\(\)](#)

Examples

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

calcEmisNitrogenWater *calcEmisNitrogenWater*

Description

Calculates Nitrogen Budgets for surface Water on country levels.

Usage

```
calcEmisNitrogenWater(method = "Nsurplus")
```

Arguments

method	method for calculating no3_n in groundwater
--------	---

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

`calcEmissionInventory calcEmisNitrogenCroplandPast`

Description

provides an emission inventory for the past, either from external data or own estimates.

Usage

```
calcEmissionInventory(  
  datasource = "CEDS",  
  targetResolution = "sectoral",  
  from = "CEDS59",  
  to = "Sectors"  
)
```

Arguments

<code>datasource</code>	The Inventory that shall be used. Options are CEDS, combined_CEDS_IPCC (including own estimates where available), IPCC(own estimates), Nsurplus (own estimates)
<code>targetResolution</code>	Specific mapping file to be used.
<code>from</code>	column in mapping
<code>to</code>	column in mapping

Value

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

Author(s)

Benjamin Leon Bodirsky, Michael S. Crawford

Examples

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

calcExcretion

calcExcretion

Description

calculates excretion during grazing, cropland-grazing, confinement and collected for fuel. Based on MAgPIE Feed baskets, slaughter biomass and simple allocation rules.

Usage

```
calcExcretion(cellular = FALSE, cells = "lpjcell", attributes = "npk")
```

Arguments

cellular	if TRUE value is calculate and returned (set aggregate to FALSE!) on cellular level
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)
attributes	npk (default) or npkc (including carbon) can be selected

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcExcretionIPCC\(\)](#)

Examples

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

## End(Not run)
```

calcExcretionIPCC	<i>calcExcretionIPCC</i>
-------------------	--------------------------

Description

calculates excretion in the year 2005 using the IPCC Guidelines excretion rates.

Usage

```
calcExcretionIPCC(products = "IPCC")
```

Arguments

products IPCC: IPCC products. MAGPIE: Magpie products

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcExcretion\(\)](#), [calcAnimalStocks\(\)](#)

Examples

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

## End(Not run)
```

calcFAOIntraYearProd	<i>calcFAOIntraYearProd</i>
----------------------	-----------------------------

Description

Distribute massbalanced or FAOSTAT staple production to monthly or quarterly interval based on GGCM crop calendar. Only national level implemented for now as cellular production only available on 5 year time steps due to memory. Assume rainfed crop calendar date for now.

Usage

```
calcFAOIntraYearProd(
  day = "harvest_day",
  products = "kcr",
  frequency = "monthly",
  attribute = "dm"
)
```

Arguments

day	harvest_day (to market) or maturity_day (first mature)
products	"kcr" or "staples" staples uses FAO production dataset instead of calcProduction to only give maize wheat soy and rice. Allows for more years. A bit of a David-specific subtype
frequency	monthly or quarterly. Daily leads to memory limits.
attribute	dm default. can only select one at a time due to memory #’ @seealso readGGCMICropCalendar

Author(s)

David Chen

calcFAOmassbalance	<i>calcFAOmassbalance</i>
--------------------	---------------------------

Description

Calculates a massbalance dataset of agricultural production, processing and use out of the combined data of calcFAOharmonized(). Covers dry matter (DM), reactive nitrogen (Nr), Phosphorus (P), Generalizable Energy (GE) and wet matter (WM). New products are added to the Food Balance Sheets, and many processing conversions are made more explicit using simple assumptions. The first part of this function is the calcFAOmassbalance_pre.

Usage

```
calcFAOmassbalance(version = "join2010", yearly = FALSE)
```

Arguments

version	whether to use the pre ("pre2010") or post ("post2010") 2010 versions of FAO-STAT Food balances, or "join2010" which joins them at 2010
yearly	whether to calculate yearly data or only magpie 5year timesteps

Value

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

Author(s)

Benjamin Leon Bodirsky, Xiaoxi Wang, David Chen

See Also

`mrfaocore::calcFA0massbalance_pre()`

Examples

```
## Not run:
calcOutput("FA0massbalance")

## End(Not run)
```

calcFAOYield	<i>calcFAOYield</i>
--------------	---------------------

Description

calculates the yield based on FAO data

Usage

```
calcFAOYield(
  physical = TRUE,
  attributes = "dm",
  irrigation = FALSE,
  cellular = FALSE,
  cut = FALSE,
  average = 5,
  areaSource = "FAO"
)
```

Arguments

- | | |
|------------|--|
| physical | physical area or havested area |
| attributes | in dm, wm, ge, nr, p, k |
| irrigation | distinguish irrigation or not |
| cellular | if TRUE value is calculate on cellular level |
| cut | FALSE (default) - do not cut off yields, number between 0 and 1 to define percentile value for cut off |
| average | averaging period in years (if NULL no averaging is used) |
| areaSource | data source for croparea used in calculation: FAO or Toolbox |

Value

MAGPIE object of yields

Author(s)

Debbora Leip, Jan Philipp Dietrich, Kristine Karstens, Felicitas Beier

calcFeedBalanceflow	<i>calcFeedBalanceflow</i>
---------------------	----------------------------

Description

Calculates feed balance flows from MAgPIE-Feed model to meet FAO data

Usage

```
calcFeedBalanceflow(
  per_livestock_unit = FALSE,
  cellular = FALSE,
  cells = "lpjcell",
  products = "kall",
  future = "constant",
  yearly = FALSE
)
```

Arguments

per_livestock_unit	default false
cellular	if TRUE value is calculated on cellular level
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)
products	products in feed baskets that shall be reported
future	if FALSE, only past years will be reported (reduces memory)
yearly	whether to calculate yearly data or only magpie 5year timesteps

Value

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

Author(s)

Isabelle Weindl, Kristine Karstens

Examples

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

## End(Not run)
```

calcFeedBaskets	<i>calcFeedBaskets</i>
-----------------	------------------------

Description

Combines feed baskets of the past with scenario-dependent future feed baskets.

Usage

```
calcFeedBaskets(non_eaten_food = FALSE, fadeout = FALSE, method = "new")
```

Arguments

non_eaten_food if TRUE, non-eaten food is included in feed baskets, if not it is excluded.
 fadeout if TRUE, feed basket calibration fades out till 2050.
 method "new" for additive calibration at end, "old" for multiplicative calibration of cal-Shr and end values.

Value

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

Author(s)

Isabelle Weindl, Benjamin Leon Bodirsky, Stephen Wirth, Jan Philipp Dietrich

Examples

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

## End(Not run)
```

calcFeedBasketsPast	<i>calcFeedBasketsPast</i>
---------------------	----------------------------

Description

Calculate historical feed baskets based on output of MAgPIE_FEED model as DM feed biomass (different types of feed) needed per DM livestock products

Usage

```
calcFeedBasketsPast(
  non_eaten_food = TRUE,
  faoVersion = "join2010",
  yearly = FALSE
)
```

Arguments

non_eaten_food if TRUE, non-eaten food is included in feed baskets, if not it is excluded.
 faoVersion which version of FAO food baskets to use
 yearly whether to calculate yearly data or only magpie 5year timesteps

Value

Historical feed baskets and corresponding weights as a list of two MAgPIE objects

Author(s)

Isabelle Weindl, Benjamin Bodirsky

See Also

`madrat::calcOutput()`, `readFeedModel()`

Examples

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

## End(Not run)
```

calcFeedBasketsSysPast

Calculate historical system-specific feed baskets based on output of MAgPIE_FEED model as DM feed biomass (different types of feed) needed per DM livestock products of respective systems

Description

Calculate historical system-specific feed baskets based on output of MAgPIE_FEED model as DM feed biomass (different types of feed) needed per DM livestock products of respective systems

Usage

```
calcFeedBasketsSysPast(faoVersion = "join2010", yearly = FALSE)
```

Arguments

faoVersion which version of FAO food baskets to use
 yearly whether to calculate yearly data or only magpie 5year timesteps

Value

Historical system-specific feed baskets and corresponding weights as a list of two MAgPIE objects

Author(s)

Isabelle Weindl, Benjamin Bodirsky, Jan Philipp Dietrich

See Also

[madrat::calcOutput\(\)](#), [readFeedModel\(\)](#), [calcFeedBasketsPast\(\)](#)

Examples

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

`calcFeedBasketsUncalibrated`
calcFeedBasketsUncalibrated

Description

Combines uncalibrated feed baskets of the past with scenario-dependent future feed baskets.

Usage

```
calcFeedBasketsUncalibrated()
```

Value

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

Author(s)

Isabelle Weindl, Benjamin Leon Bodirsky, Stephen Wirth, Jan Philipp Dietrich

Examples

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

calcFeedEfficiencyFuture	<i>calcFeedEfficiencyFuture</i>
--------------------------	---------------------------------

Description

Calculates future central feed shares for all livestock categories based on the results of a non-linear regression between historical central feed shares and livestock productivity and using Koeppen-Geiger climate zones

Usage

```
calcFeedEfficiencyFuture()
```

Value

Central feed shares and weights as list of two MAGPIE-objects

Author(s)

Isabelle Weindl, Benjamin Bodirsky, Stephen Wirth

Examples

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

## End(Not run)
```

calcFeedPast	<i>calcFeedPast</i>
--------------	---------------------

Description

Combines feed baskets of the past with livestock production to get total feed demand

Usage

```
calcFeedPast(
  balanceflow = TRUE,
  cellular = FALSE,
  cells = "lpjcell",
  products = "kall",
  nutrients = "all",
  yearly = FALSE
)
```

Arguments

balanceflow	if TRUE, a feed balance flow is included in total feed demand, if not it is excluded.
cellular	if TRUE value is calculated on cellular level with returned data just in dry matter
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)
products	products in feed baskets that shall be reported
nutrients	nutrients like dry matter (DM), reactive nitrogen (Nr), Phosphorus (P), Generalizable Energy (GE) and wet matter (WM).
yearly	whether to calculate yearly data or only magpie 5year timesteps

Value

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

Author(s)

Isabelle Weindl, Benjamin Leon Bodirsky, Kristine Karstens

Examples

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

## End(Not run)
```

calcFertilizerByCrop *calcFertilizerByCrop*

Description

calculates the crop-specific use of different N inputs

Usage

```
calcFertilizerByCrop(
  indicator = "total",
  deposition = "Nsurplus2",
  cellular = FALSE
)
```

Arguments

indicator	total: estimates the inputs per total crop production; by_harvest estimates the inputs per ton harvest; by_area estimates the inputs per area harvested
deposition	if FALSE, deposition is not accounted for in the distribution. Use FALSE to avoid circularities in calcNitrogenBudget
cellular	cellular disaggregation or national values

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenBudgetCropland\(\)](#)

Examples

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

## End(Not run)
```

calcFertN

Calculate Fertilizer of N

Description

Provides FertN data for N.No changes to the content have been done.

Usage

```
calcFertN(
  appliedto = "total",
  cellular = FALSE,
  deposition = "CEDS",
  max_snupe = 0.85
)
```

Arguments

appliedto	'total' (default), 'crop' or 'past'
cellular	cellular disaggregation or national values
deposition	for disaggregation will be passed on to calcNitrogenBudgetCropland
max_snupe	for disaggregation will be passed on to calcNitrogenBudgetCropland

Value

Fertilizer data for N and corresponding weights as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

See Also

`madrat::calcOutput()`, `readIFA()`, `convertIFA()`, `madrat::readSource()`

Examples

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

## End(Not run)
```

calcFoodSupplyPast	<i>calcFoodSupplyPast</i>
--------------------	---------------------------

Description

Calculates the food supply (as defined by FAO, including intake and household waste) for the past.

Usage

```
calcFoodSupplyPast(
  per_capita = TRUE,
  products = NULL,
  product_aggr = FALSE,
  populationweight = "PopulationPast",
  faoVersion = "join2010",
  attributes = c("kcal", "protein", "wm")
)
```

Arguments

<code>per_capita</code>	if true, calculates per capita demand per day, otherwise total demand per year
<code>products</code>	a set with the products that shall be provided, e.g. kall. If NULL, the products are provided that are in the primary data
<code>product_aggr</code>	if TRUE, all products are summed up, if "maingroups" products are summed over livestock products, staples and vegfruits.
<code>populationweight</code>	datasource of populationweight: FAO can be selected in order to better meet exact values. Normal datasource is PopulationPast
<code>faoVersion</code>	which version of FAO food balances to use in mass balance
<code>attributes</code>	attributes of different products,i.e., kcal,protein,wm

Value

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

Author(s)

Benjamin Leon Bodirsky, Xiaoxi Wang

See Also

[mrfaocore::calcFAOharmonized\(\)](#)

Examples

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

calcFoodWasteAndSewage

calcFoodWasteAndSewage

Description

Calculates food waste and sewage based on the FAO mass balance or future projections from Bodirsky et al. (2018).

Usage

```
calcFoodWasteAndSewage(historic = TRUE)
```

Arguments

historic If set to TRUE only ho

Value

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

Author(s)

Benjamin Leon Bodirsky, Xiaoxi Wang

See Also

[calcFAOmassbalance\(\)](#)

Examples

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

calcGovernanceIndicator	<i>calcGovernanceIndicator</i>
-------------------------	--------------------------------

Description

returns governance indicator from Andrijevic et al. 2019

Usage

```
calcGovernanceIndicator()
```

Value

magpie object at iso-country level

Author(s)

Felicitas Beier

Examples

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

calcGrowingStock	<i>calcGrowingStock</i>
------------------	-------------------------

Description

Calculates the growing stocks on FAO data.

Usage

```
calcGrowingStock()
```

Value

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

Author(s)

Abhijeet Mishra

Examples

```
## Not run:  
calcOutput("GrowingStock", aggregate = TRUE)  
  
## End(Not run)
```

calcGrowingStockNRF	<i>calcGrowingStockNRF</i>
---------------------	----------------------------

Description

Calculates the growing stocks from FAO data for naturally regenerating forests i.e. primary forests and secondary forests.

Usage

```
calcGrowingStockNRF(indicator = "per_ha")
```

Arguments

indicator Either "per_ha" (m3/ha, area-weighted) or "total" (Mm3, absolute).

Value

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

Author(s)

Abhijeet Mishra, Florian Humpenoeder

Examples

```
## Not run:  
calcOutput("GrowingStockNRF", indicator = "per_ha", aggregate = TRUE)  
calcOutput("GrowingStockNRF", indicator = "total", aggregate = TRUE)  
  
## End(Not run)
```

```
calcGrowingStockPlantations
      calcGrowingStockPlantations
```

Description

Calculates the growing stocks from FAO data for planted forests (plantations).

Usage

```
calcGrowingStockPlantations(indicator = "per_ha")
```

Arguments

indicator Either "per_ha" (m3/ha, area-weighted) or "total" (Mm3, absolute).

Value

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

Author(s)

Abhijeet Mishra, Florian Humpenoeder

Examples

```
## Not run:
calcOutput("GrowingStockPlantations", indicator = "per_ha", aggregate = TRUE)
calcOutput("GrowingStockPlantations", indicator = "total", aggregate = TRUE)

## End(Not run)
```

```
calcGTAPTotalTransportCosts
      calcGTAPTotalTransportCosts
```

Description

Calculates iso-level total global transport costs from GTAP for GTAP food commodities

Usage

```
calcGTAPTotalTransportCosts(costType = "transport", version = "9")
```

Arguments

costType	transport or wholesale
version	"81" or "9"

Value

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

Author(s)

David M Chen

Examples

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

calcHistBioplasticProd

calcHistBioplasticProd

Description

calculates historic bioplastic production based on data and linear extrapolation

Usage

```
calcHistBioplasticProd()
```

Value

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

Author(s)

Debbora Leip

Examples

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

calcHistEmissions	<i>historical emissions per sector or mac</i>
-------------------	---

Description

Provides historical emissions values per economic sector or per mac sector. For now it only includes European data.

Usage

```
calcHistEmissions(subtype = "sector")
```

Arguments

subtype	Either "sector" or "MAC"
---------	--------------------------

Value

magpie object of historical emissions data

Author(s)

Renato Rodrigues

Examples

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

## End(Not run)
```

calcIniFoodPrice	<i>calcIniFoodPrice</i>
------------------	-------------------------

Description

provides global prices from the IMPACT model projections for MAgPIE commodities for the initialization of the flexible demand model.

Usage

```
calcIniFoodPrice(datasource = "FA0", year = "y2005", products = "kfo")
```

Arguments

datasource	The datasource specification. Currently available FAO and IMPACT3.2.2World_Price.
year	Specifies the year for the initialization of prices in MAgPIE. Default is y2005.
products	subselection of products to be returned

Value

List with a magpie object with commodity prices on global level in \$17/tDM.

Note

The IMPACT projections start in 2005 and the prices are taken from that year.

Author(s)

Mishko Stevanovic, Benjamin Leon Bodirsky

See Also

[readIMPACT3.2.2World_Price\(\)](#)

Examples

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

## End(Not run)
```

calcIntake

calcIntake

Description

it computes the total intake kcal/day procapita through the population dataset by Lutz 2014, height and BMI data of NCDrisc, and physiscal inactivity levels based on Halal et al.

Usage

```
calcIntake(
  convert = TRUE,
  modelinput = FALSE,
  standardize = FALSE,
  method = "FAO_WHO_UNU1985"
)
```

Arguments

convert	if TRUE, Lutz data is converted (interpolated completed etc)
modelinput	if TRUE, data is aggregated to country totals for model input
standardize	if FALSE, no standardization. if "recommendations", the US recommendations are used. if BMI, a normal BMI is used.
method	method for calculating intake: either FAO_WHO_UNU1985 for estimates based on height and bodyweight, schofield for just bodyweight, or HHS_USDA for recommended values for US-americans

Value

total "healthy" intake kcal/day procap for each countries divided by sex and 8 age groups.

Author(s)

Benjamin Leon Bodirsky

calcIntakeBodyweight *calcIntakeBodyweight*

Description

it computes the food intake pro capita through the bodyweight and the activity level. First it computes the basal metabolic rate (bmr) through the Schofield equation and then the estimated energy required (eer) depending on the activity level by FAO/WHO/UNU tables (Human Energy Requirements, Rome 2004)

Usage

```
calcIntakeBodyweight(  
  bodyweight,  
  bodyheight = NULL,  
  inactivity,  
  tmean = NULL,  
  method = NULL  
)
```

Arguments

bodyweight	bodyweight in kg per capita or "standardized" for assuming standard values
bodyheight	for method FAO_WHO_UNU1985
inactivity	Share of population inactive, provided as magpie object with different age groups
tmean	mean annual temperature
method	method for calculating intake: either FAO_WHO_UNU1985 for estimates based on height and bodyweight, schofield for just bodyweight, or HHS_USDA for recommended values for US-americans

Author(s)

Eleonora Martinelli

calcIPCCefNSoil	<i>calcIPCCefNSoil</i>
-----------------	------------------------

Description

Emission factors for croplands based on IPCC using a country-level leaching fraction

Usage

```
calcIPCCefNSoil()
```

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

calcIPCCfracLeach	<i>calcIPCCfracLeach</i>
-------------------	--------------------------

Description

calculates the leaching rate FRAC_LEACH as defined by the IPCC Guidelines for National Greenhouse Gas Inventories 2006. We use the approach used by Canada, see Velthof, Gerardus Lambertus, and J. Mosquera Losada. 2011. Calculation of Nitrous Oxide Emission from Agriculture in the Netherlands: Update of Emission Factors and Leaching Fraction. Alterra. <http://library.wur.nl/WebQuery/wurpubs/406284>.

Usage

```
calcIPCCfracLeach(cellular = TRUE)
```

Arguments

cellular	if true, returned on cell level
----------	---------------------------------

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

`madrat::calcOutput()`

Examples

```
## Not run:  
a <- calcOutput("IPCCfracLeach", cellular = FALSE)  
  
## End(Not run)
```

calcLandArea

calcLandArea

Description

total land area in a cell

Usage

```
calcLandArea(cells = "lpjcell")
```

Arguments

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

Value

magpie object in cellular resolution

Author(s)

Jan Philipp Dietrich, Felicitas Beier

Examples

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

calcLandEmissions	<i>calcLandEmissions</i>
-------------------	--------------------------

Description

Land emission data. This function was originally called calcValidEmissions and located in mrvalidation.

Usage

```
calcLandEmissions(datasource = "CEDS")
```

Arguments

datasource	The Emission Inventory that shall be used. For further information, best see function calcEmissionInventory. Options are e.g. CEDS, combined_CEDS_IPCC (including own estimates where available), IPCC(own estimates), Nsurplus (own estimates)
------------	---

Value

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

Author(s)

Benjamin Leon Bodirsky, Michael S. Crawford

Examples

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

## End(Not run)
```

calcLanduseIntensity	<i>calcLanduseIntensity</i>
----------------------	-----------------------------

Description

This function prepares total tau values for use. As the source data already provides all required information this function purely removes unrequired data and moves the xref values to the weighting object which is required for aggregation.

Usage

```
calcLanduseIntensity(sectoral = "kcr", rescale = TRUE)
```

Arguments

sectoral	"kcr" (default) for MAgPIE crop items and "lpj" for LPJmL crop items, "pasture" for pasture
rescale	TRUE (default), if Tau should be rescaled in a way, that 2010 is always 1

Value

Total tau data and corresponding weights as a list of two MAgPIE objects

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens, Felicitas Beier

See Also

[madrat::calcTauTotal\(\)](#), [madrat::readTau\(\)](#), [madrat::convertTau\(\)](#)

Examples

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

## End(Not run)
```

calcLivestockGridded *calcLivestockGridded*

Description

Distributes crop, pasture and livestock production in space to 0.5 degree

Usage

```
calcLivestockGridded(details = FALSE)
```

Arguments

details	switch, if set to TRUE will lead to reporting of extensive and intensive livestock shares
---------	---

Value

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

Author(s)

Kristine Karstens

Examples

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

calcLivestockProductivity	
	<i>Calculate Yields for Livestock</i>

Description

Provides livestock yields for historical and future years.

Usage

```
calcLivestockProductivity(future = TRUE)
```

Arguments

future	if TRUE calculates constant future and linear trends based on SSP Expert guesses
--------	--

Value

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

Author(s)

Isabelle Weindl, Lavinia Baumstark, Stephen Wirth

See Also

[madrat::calcOutput\(\)](#), [madrat::readSource\(\)](#)

Examples

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

calcMacBaseLandUse	<i>calcMacBase calculate MacBase</i>
--------------------	--------------------------------------

Description

calcMacBase calculate MacBase

Usage

```
calcMacBaseLandUse(subtype)
```

Arguments

subtype	Source of subset of emissions
---------	-------------------------------

Value

magpie object

Author(s)

David Klein, Julian Oeser

See Also

[madrat::calcOutput\(\)](#)

Examples

```
## Not run:
a <- calcOutput(type = "MacBaseLandUse")

## End(Not run)
```

calcMACCsCH4	<i>Calculation of CH4 MAC curves of Energy Industry and Landuse</i>
--------------	---

Description

Calculation of the CH4 relative costcurves (subtypes: Energy Industry and Landuse) weighted by the baseline emissions. Sources: CH4 coal losses/leakages, CH4 oil losses/leakages, CH4 natural gas losses/leakages, CH4 Landfills, CH4 Domestic Sewage, CH4 Wetland rice, CH4 Animals, CH4 Animal waste divided in classes 1-201.

Usage

```
calcMACCsCH4(sector = "all", source = "ImageMacc")
```

Arguments

sector	"all" or "landuse"; "all" includes energy_industry and landuse
source	"ImageMacc" or "PBL_MACC_2019"

Value

MAgPIE object

Author(s)

Nele Steinmetz, Florian Humpenoeder, Michael Windisch

See Also

[madrat::calcOutput\(\)](#), [readImageMacc\(\)](#), [convertImageMacc\(\)](#)

Examples

```
## Not run:
calcOutput("MACCsCH4")

## End(Not run)
```

calcMACCsN2O

Calculation of N2O MAC curves of Energy Industry and Landuse

Description

Calculation of the N2O relative costcurves (subtypes: Energy Industry and Landuse) weighted by the baseline emissions. Sources: N2O Transport, N2O Adipic acid production, N2O Nitric acid production, N2O Fertilizer, N2O Animal waste, N2O Domestic sewage divided in classes 1-201.

Usage

```
calcMACCsN20(sector = "all", source = "ImageMacc")
```

Arguments

sector	"all" or "landuse"; "all" includes energy_industry and landuse
source	"ImageMacc" or "PBL_MACC_2019"

Value

MAgPIE object

Author(s)

Nele Steinmetz, Florian Humpenoeder, Michael Windisch

See Also

[madrat::calcOutput\(\)](#), [readImageMacc\(\)](#), [convertImageMacc\(\)](#)

Examples

```
## Not run:
calcOutput("MACCsN20")

## End(Not run)
```

calcManureFuelShr	<i>calcManureFuelShr</i>
-------------------	--------------------------

Description

calculates the share of Manure excreted during grazing which is collected for fuel. For the future, we assume that with the development, the fuel share reaches 0.

Usage

```
calcManureFuelShr(products = "magpie")
```

Arguments

products IPCC: IPCC products. MAgPIE: Magpie products

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcExcretion\(\)](#)

Examples

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

## End(Not run)
```

calcManureRecyclingCroplandPast

calcManureRecyclingCroplandPast

Description

calculates manure recycling to cropland based on excretions, animal waste management types (and their shares per country) and emission factors for nitrogenous emissions in livestock confinements

Usage

```
calcManureRecyclingCroplandPast(
  products = "sum",
  cellular = FALSE,
  cells = "lpjcell"
)
```

Arguments

products	"sum" (default) or "kli"
cellular	if TRUE value is calculate and returned (set aggregate to FALSE!) on cellular level
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)

Value

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

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens

See Also

[calcExcretion\(\)](#)

Examples

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

## End(Not run)
```

calcNitrogenBNF	<i>calcNitrogenBNF</i>
-----------------	------------------------

Description

calculates fixation from freelifving bacteria and from nitrogen-fixing crops and natural vegetation

Usage

```
calcNitrogenBNF(cellular = FALSE)
```

Arguments

cellular cellular disaggregation or national values

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenFixationPast\(\)](#)

Examples

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

## End(Not run)
```

calcNitrogenBudgetCropland	<i>calcNitrogenBudgetCropland</i>
----------------------------	-----------------------------------

Description

Calculates Nitrogen Budgets for Cropland soils on country levels.

Usage

```
calcNitrogenBudgetCropland(
  cellular = FALSE,
  deposition = "CEDS",
  include_fertilizer = TRUE,
  max_snupe = 0.85
)
```

Arguments

cellular	disaggregated to 0.5 degree grid
deposition	if FALSE, deposition is not accounted for in the distribution. Use FALSE to avoid circularities in calcNitrogenBudget
include_fertilizer	including fertilizer in budget. Use FALSE to avoid circularities in specific cases
max_snupe	NULL or a numeric value. if numeric, an additional N balanceflow is included that takes care that the soil nitrogen uptake efficiency does not exceed the numeric value in balanceflow.

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

```
calcNitrogenBudgetNonagland
  calcNitrogenBudgetNonagland
```

Description

Calculates Nitrogen Budgets for Non-agricultural land.

Usage

```
calcNitrogenBudgetNonagland(
  deposition = "CEDS",
  max_nue = 0.95,
  cellular = FALSE
)
```

Arguments

deposition	if FALSE, deposition is not accounted for in the distribution. Use FALSE to avoid circularities in calcNitrogenBudget
max_nue	NULL or a numeric value. if numeric, an additional N balanceflow is included that takes care that the nitrogen use efficiency does not exceed the numeric value in balanceflow.
cellular	TRUE returns output on 0.5 degree grid

Value

Nitrogen Budgets for Non-agricultural land

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

```
calcNitrogenBudgetOcean
      calcNitrogenBudgetOcean
```

Description

Calculates Nitrogen Budgets for Oceans on global level. Values are placed in Antarctica (ATA)

Usage

```
calcNitrogenBudgetOcean(deposition = "ACCMIP", leaching = "Nsurplus")
```

Arguments

deposition	Method for calculating Atmospheric deposition: Nsurplus2 and Nsurplus are based on deposition rates based on own emission calculations after 2 or after 1 iteration, respectively.
leaching	Method for calculating leaching: Nsurplus2 and Nsurplus are based on deposition rates based on own emission calculations after 2 or after 1 iteration, respectively.

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

calcNitrogenBudgetPasture
<i>calcNitrogenBudgetPasture</i>

Description

Calculates Nitrogen Budgets for Pasture soils on country levels.

Usage

```
calcNitrogenBudgetPasture(
  cellular = FALSE,
  include_fertilizer = TRUE,
  deposition = "CEDS",
  max_nue = 0.9
)
```

Arguments

cellular	cellular disaggreagation or national values
include_fertilizer	including fertilizer in budget. Use FALSE to avoid circularities in specific cases
deposition	if FALSE, deposition is not accounted for in the distribution. Use FALSE to avoid circularities in calcNitrogenBudget
max_nue	NULL or a numeric value. if numeric, an additional N balanceflow is included that takes care that the nitrogen use efficiency does not exceed the numeric value in balanceflow.

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

```
calcNitrogenFixationPast
      calcNitrogenFixationPast
```

Description

calculates fixation from freeliving bacteria and from nitrogen-fixing crops

Usage

```
calcNitrogenFixationPast(
  fixation_types = "both",
  sum_plantparts = TRUE,
  cellular = FALSE,
  irrigation = FALSE
)
```

Arguments

fixation_types either "fixation_crops", "fixation_freeliving", or "both"
sum_plantparts if false, crop residues, belowground residues and harvested organ are reported separately
cellular cellular estimates optional
irrigation if TRUE, distinguishes irrigated and non-irrigated crops

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenFixationPast\(\)](#)

Examples

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

## End(Not run)
```

```
calcNitrogenFixationRateNatural
      calcNitrogenFixationRateNatural
```

Description

calculates fixation rates from natural ecosystems based on evapostranspiration

Usage

```
calcNitrogenFixationRateNatural(cells = "lpjcell")
```

Arguments

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

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenFixationPast\(\)](#) [readHerridge\(\)](#)

Examples

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

## End(Not run)
```

```
calcNitrogenWithdrawalByCrop
      calcNitrogenWithdrawalByCrop
```

Description

calculates the crop-specific withdrawals of nutrients from soils

Usage

```
calcNitrogenWithdrawalByCrop(  
  indicator = "total",  
  cellular = FALSE,  
  irrigation = FALSE  
)
```

Arguments

indicator	total: estimates the inputs per total crop production; by_area estimates the inputs per area harvested
cellular	cellular disaggregation or national values
irrigation	FALSE for the sum of irrigated and rainfed, FALSE for separated categories, 'rainfed' or 'irrigated' for single categories

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenBudgetCropland\(\)](#)

Examples

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

calcNuePasture	<i>calcNuePasture</i>
----------------	-----------------------

Description

calculates the soil nitrogen uptake efficiency of pastures. # This is the nitrogen taken up from the soil (N in crop biomass minus biological fixation minus seed N) divided by the soil N inputs (fertilizer, manure etc). For the future, NUE scenarios are added.

Usage

```
calcNuePasture(cellular = FALSE, macabase = TRUE)
```

Arguments

cellular	cellular disaggregation or national values
maccbase	whether future scenarios should be expressed as base efficiency, excluding additional macc improvements (new default)

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcSNUPE\(\)](#) [calcNitrogenBudgetPasture\(\)](#)

Examples

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

## End(Not run)
```

calcNutrientBudgetSewage

calcNutrientBudgetSewage

Description

Nutrient Budget for Wastewater treatment and sewage

Usage

```
calcNutrientBudgetSewage(historic = TRUE)
```

Arguments

historic	when TRUE only for the historic period, otherwise including future scenarios
----------	--

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[calcNitrogenBudgetCropland\(\)](#)

Examples

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

## End(Not run)
```

```
calcPhysicalInactivity
      calcPhysicalInactivity
```

Description

physical inactivity level estimate based on Hallal, Pedro C, Lars Bo Andersen, Fiona C Bull, Regina Guthold, William Haskell, and Ulf Ekelund. 2012. "Global Physical Activity Levels: Surveillance Progress, Pitfalls, and Prospects." *The Lancet* 380 (9838):247-57. [https://doi.org/10.1016/S0140-6736\(12\)60646-1](https://doi.org/10.1016/S0140-6736(12)60646-1).

Usage

```
calcPhysicalInactivity(update = TRUE)
```

Arguments

update	WHO estimates from http://apps.who.int/gho/data/view.main.2487?lang=en seem to have updated. TRUE provides the results as they were online on 27.2.2024
--------	---

```
calcPlantationCellular
      calcPlantationCellular
```

Description

Calculates the cellular plantation area based on carbon densities

Usage

```
calcPlantationCellular()
```

Value

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

Author(s)

Abhijeet Mishra

Examples

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

calcPlantEstablishCalib

calcPlantEstablishCalib

Description

Calculates the calibration factors for plantation establishment globally

Usage

```
calcPlantEstablishCalib()
```

Value

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

Author(s)

Abhijeet Mishra

Examples

```
## Not run:  
calcOutput("PlantEstablishCalib", aggregate = TRUE)  
  
## End(Not run)
```

calcPriceAgriculture *calcPriceAgriculture*

Description

provides global prices from the IMPACT model projections, World Bank observations, and FAO observations for MAgPIE commodities in \$/tDM

Usage

```
calcPriceAgriculture(datasource = "IMPACT3.2.2World_Price", unit = "US$17/tDM")
```

Arguments

datasource	Options of the source of data: IMPACT3.2.2World_Price, FAO, FAOp and WBGEM
unit	A string with the unit that should be returned. Options are: • "current LCU" • "current Int\$PPP" • "current US\$MER" • "constant YYYY LCU" • "constant YYYY Int\$PPP" • "constant YYYY US\$MER"

Value

List with a magpie object with commodity prices

Author(s)

Mishko Stevanovic, Xiaoxi Wang, Felicitas Beier

See Also

[readIMPACT3.2.2World_Price\(\)](#), [calcWBGEM\(\)](#), [readWBGEM\(\)](#)

Examples

```
## Not run:
calcOutput("PriceAgriculture", datasource = "IMPACT3.2.2World_Price", aggregate = FALSE)
calcOutput("PriceAgriculture", datasource = "FAO")
calcOutput("PriceAgriculture", datasource = "WBGEM", aggregate = FALSE)

## End(Not run)
```

calcProdSysRatioPast	<i>Calculate historical distribution of livestock production across different systems based on output of MAgPIE_FEED model</i>
----------------------	--

Description

Calculate historical distribution of livestock production across different systems based on output of MAgPIE_FEED model

Usage

```
calcProdSysRatioPast(faoVersion = "join2010", yearly = FALSE)
```

Arguments

faoVersion	which version of FAO food balances to use in mass balance
yearly	whether to calculate yearly data or only magpie 5year timesteps

Value

Historical distribution of livestock production across different systems and corresponding weights as a list of two MAgPIE objects

Author(s)

Isabelle Weindl

See Also

`madrat::calcOutput()`, `readFeedModel()`

Examples

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

## End(Not run)
```

calcProduction	<i>calcProduction</i>
----------------	-----------------------

Description

Distributes crop, pasture and livestock production in space to 0.5 degree

Usage

```
calcProduction(
  products = "kcr",
  cellular = FALSE,
  cells = "lpjcell",
  calibrated = TRUE,
  attributes = "all",
  irrigation = FALSE
)
```

Arguments

products	setname of products ("kcr", "kli", "pasture")
cellular	if TRUE production is calculate on cellular level
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)
calibrated	if FALSE, lpj yields will be used uncalibrated, if true, calibrated on FAP production on country level
attributes	"All" for all crop attributes, or specify e.g. DM (dry matter), Nr (nitrogen) for memory reduction
irrigation	if TRUE, additional information on irrigated and rainfed production is provided

Value

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

Author(s)

Benjamin Leon Bodirsky

See Also

[mrlandcore::calcLanduseInitialisation\(\)](#), [mrlandcore::calcCroparea\(\)](#)

Examples

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

## End(Not run)
```

```
calcRegressionParameters
      calcRegressionParameters
```

Description

Writes down the equation parameters from various data sources

Usage

```
calcRegressionParameters(regression = "bmi_shr")
```

Arguments

regression	bmi_shr: Shares of BMI within a population. schofield or FAO_WHO_UNU1985: calculates intake based on anthropometrics
------------	--

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

```
calcResBiomass      calcResBiomass
```

Description

Provides MAgPIE-FEED data for aboveground and belowground residues biomass

Usage

```
calcResBiomass(
  cellular = FALSE,
  cells = "lpjcell",
  plantparts = "both",
  irrigation = FALSE,
  attributes = "all"
)
```

Arguments

cellular	If TRUE calculation and output on cellular level
cells	Switch between "magpiecell" (59199) and "lpjcell" (67420)
plantparts	both, ag (aboveground) or belowground (bg). Both can have memory problems for cellular outputs
irrigation	if TRUE, distinguishes irrigated and non-irrigated crops
attributes	in dm, wm, ge, nr, p, k

Value

MAGPIE-FEED data for ProdResAg and corresponding weights as a list of two MAGPIE objects

Author(s)

Lavinia Baumstark, Isabelle Weindl, Benjamin Bodirsky

See Also

[madrat::calcOutput\(\)](#), [madrat::readSource\(\)](#)

Examples

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

## End(Not run)
```

calcResDemand	<i>calcResDemand</i>
---------------	----------------------

Description

Calculates the demand for Crop Residues

Usage

```
calcResDemand(cellular = FALSE, yearly = FALSE)
```

Arguments

cellular	If TRUE calculation and output on cellular level
yearly	whether to calculate yearly data or only magpie 5 year time steps

Value

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

Author(s)

Benjamin Leon Bodirsky, Kristine Karstens

See Also

[calcResBiomass\(\)](#)

Examples

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

calcResFieldBalancePast

calcResFieldBalancePast

Description

Calculates data for aboveground and belowground residues production with other usage

Usage

```
calcResFieldBalancePast(cellular = FALSE, products = "sum")
```

Arguments

cellular	If TRUE calculation and output on cellular level
products	"sum" (default) or "kres"

Value

data

Author(s)

Benjamin Bodirsky

See Also

[madrat::calcOutput\(\)](#), [madrat::readSource\(\)](#)

Examples

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

`calcResFor2ndBioengery`*calcResFor2ndBioengery*

Description

Calculates the supply potential of Crop Residues for 2nd generation bioenergy for future and different ssp scenarios

Usage

```
calcResFor2ndBioengery(products = "all", product_aggr = TRUE, add_off = FALSE)
```

Arguments

<code>products</code>	categorie (set) that should be reported, switch between "kres", "res_crop" (sum over all "kres"), "res_wood" and "all"
<code>product_aggr</code>	boolean, if product set should be summed up
<code>add_off</code>	add a column with empty supply for no residues available for 2nd gen BE

Value

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

Author(s)

Kristine Karstens

See Also

[calcResFor2ndBioengery\(\)](#)

Examples

```
## Not run:  
calcOutput("ResFor2ndBioengery")  
  
## End(Not run)
```

calcRockNWeathering	<i>calcRockNWeathering</i>
---------------------	----------------------------

Description

calculates amount of yearly N from rock weathering by country or global total, disaggregated by land use type (6 classes from LanduseInitialisation)

Usage

calcRockNWeathering()

Value

MAGPIE object of amount of N (Mt)

Author(s)

David M Chen

calcSeed	<i>calcSeed</i>
----------	-----------------

Description

Calculates Seed demand

Usage

```
calcSeed(  
  cellular = FALSE,  
  cells = "lpjcell",  
  products = "kall",  
  irrigation = FALSE,  
  attributes = "all"  
)
```

Arguments

- | | |
|------------|---|
| cellular | cellular or regional level |
| cells | Switch between "magpiecell" (59199) and "lpjcell" (67420) |
| products | kcr or also kall, which includes seeds for eggs and fish |
| irrigation | if TRUE, distinguishes irrigated and non-irrigated crops |
| attributes | in dm, wm, ge, nr, p, k |

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

calcSNUPE	<i>calcSNUPE</i>
-----------	------------------

Description

calculates the soil nitrogen uptake efficiency. This is the nitrogen taken up from the soil (N in crop biomass minus biological fixation minus seed N) divided by the soil N inputs (fertilizer, manure etc). For the future, SNUPE scenarios are added.

Usage

```
calcSNUPE(max_snupe = 0.85, cellular = FALSE, rev = 0.1, maccbase = TRUE)
```

Arguments

max_snupe	Maximum realistic SNUPE. All values above will be limited to this value. Only holds for past values; future scenario values can exceed this number.
cellular	disaggregated to 0.5 degree grid
rev	revision number of madrat run
maccbase	whether future scenarios should be expressed as base efficiency, excluding additional macc improvemetns (new default)

Value

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

Author(s)

Benjamin Leon Bodirsky, Xiaoxi Wang

See Also

[calcNitrogenBudgetCropland\(\)](#)

Examples

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

## End(Not run)
```

calcSOCLossShare	<i>calcSOCLossShare</i>
------------------	-------------------------

Description

Calculates soil organic carbon loss share on cellular level

Usage

```
calcSOCLossShare(
  subsystems = FALSE,
  rate = "change",
  factor = "ipccReduced",
  cells = "lpjcell"
)
```

Arguments

subsystems	if FALSE just generic values will be used per climate zone , if TRUE crop specific values will be reported, if aggregated crop specific factors will be aggregated using crop area
rate	if change, change rates will be reported; if loss, loss rates will be reported
factor	switch for different ipcc versions (ipccReduced, ipccReduced2019)
cells	"magpiecell" for 59199 cells or "lpjcell" for 67420 cells

Value

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

Author(s)

Kristine Karstens

Examples

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

## End(Not run)
```

calcSOM

*calcSOM***Description**

calculates Soil Organic Matter Pool, accounting for the management history. We assume carbon Stocks from LPJml natural vegetation as a starting point. Here we use the upper 30cm soil layer (0-20cm of + 1/3 of 30-50 cm). We then correct carbon pools by lost c-share depending on the climate region, using default factors of IPCC Guidelines 2006 table 5.5. We assume that this IPCC-corrected value is the target long-term equilibrium value for the soil stocks. Because soil decline and build-up slowly, we assume that in every year, the carbon pools move 15% towards this new equilibrium. This assumption is in line with IPCC saying that the process will take 20 years: with our assumption, after 5 years 44% of the carbon pool is gone, after 10 years 80% and after 20 years 96%. We determine a carbon stock for cropland soils and non-cropland soils in every cell. If the cropland area expands, the carbon stock of noncropland is proportionally assigned to the cropland pool and vice versa. The outputs of the function are the soilc stocks for cropland and non-cropland. Relevant for the release of N by SOM loss is also the change in carbon stocks per ha, as this releases or binds N. This is done in delta cropland soilc.

Usage

```
calcSOM(climatetype = "historical", subtype = "stock", cells = "lpjcell")
```

Arguments

climatetype	Switch between different climate scenarios (default on "historical")
subtype	"stock" (default) for absolute values, "density" for per hectare values
cells	(deprecated) Only option "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("SOM2")

## End(Not run)
```

calcSOMlossN	<i>calcSOMlossN</i>
--------------	---------------------

Description

calculates effect on N from Soil Organic Matter loss

Usage

```
calcSOMlossN(cellular = FALSE, cells = "lpjcell")
```

Arguments

- cellular if TRUE cellular level is returned
- 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,

Examples

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

## End(Not run)
```

calcTemperature	<i>calcTemperature</i>
-----------------	------------------------

Description

calculates average monthly temperature on different landuse types

Usage

```
calcTemperature(landusetypes = "all", months = FALSE, convert = TRUE)
```

Arguments

landusetypes	all or only one (to save computation memory)
months	FALSE for yearly average, TRUE for monthly values
convert	FALSE for raw values of temperature, TRUE add temperature of 15 degrees for countries without observations or land mass.

Value

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

Author(s)

Benjamin Leon Bodirsky

Examples

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

## End(Not run)
```

calcTimberDemand	<i>calcTimberDemand</i>
------------------	-------------------------

Description

Calculates the demand of timber from FAO data (including intermediate products).

Usage

```
calcTimberDemand()
```

Value

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

Author(s)

Abhijeet Mishra

See Also

[mrfaocore::calcFAOmassbalance_pre\(\)](#)

Examples

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

## End(Not run)
```

calcTimberTradeBilateral	<i>calcTimberTradeBilateral</i>
--------------------------	---------------------------------

Description

A very rough disaggregation of timber demand to bilateral trade flows

Usage

```
calcTimberTradeBilateral(products = "magpie")
```

Arguments

products	if "magpie" do UNIT (m3 -> MT) and name conversion of the 2 magpie wood products, else "FAO" gives original ones
----------	--

Value

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

Author(s)

David M Chen

See Also

[mrfaocore::calcFA0massbalance_pre\(\)](#)

Examples

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

## End(Not run)
```

calcWBGEM	<i>calcWBGEM</i>
-----------	------------------

Description

recover world price of commodity in terms of real 2005 USD per metric ton

Usage

```
calcWBGEM()
```

Value

magpie object of time series of world price of commodities

Author(s)

Xiaoxi Wang

See Also

[madrat::readSource\(\)](#), [readWBGEM\(\)](#)

Examples

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

## End(Not run)
```

calcWoodDensity

calcWoodDensity

Description

Calculates country-level basic wood density (tDM per m3) based on IPCC 2006 Vol 4 Chapter 12 Table 12.4 values and Koeppen-Geiger climate classification. Density values: Tropical (A) = 0.59, Arid (B) = 0.52, Temperate (C) = 0.45, Continental (D) = 0.45, Polar (E) = 0.45.

Usage

```
calcWoodDensity()
```

Value

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

Author(s)

Florian Humpenoeder

Examples

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

## End(Not run)
```

convertACCMIP	<i>convertACCMIP</i>
Description	
function to convert ACCMIP data to isocountry resolution	
Usage	
convertACCMIP(x)	
Arguments	
x	MAGPIE object
Value	
MAGPIE object	
Author(s)	
Roman Popov, Felicitas Beier	
Examples	
<pre>## Not run: readSource("ACCMIP", subtype = "nhx_1850") ## End(Not run)</pre>	
convertBodirsky2018	<i>convertBodirsky2018</i>

Description	
Reads in regression parameters estimated using mrregression, and reads in some scenario based on Bodirsky et al not yet published	
Usage	
convertBodirsky2018(x, subtype)	
Arguments	
x	magpie object from read function
subtype	bmi_share, demand_regression, intake_regression or bodyheight_regression for the estimated regression paramters of different regressions. scenarios for scenario projections.

Value

magpie object

See Also

[readBodirsky2018\(\)](#)

convertCEDS2021	<i>convertCEDS2021</i>
-----------------	------------------------

Description

converts emission data from the CEDS database

Usage

```
convertCEDS2021(x)
```

Arguments

x magpie object from source function

Value

MAGPIE object

Author(s)

Benjamin Leon Bodirsky, David Klein

convertCEDS2025	<i>convertCEDS2025</i>
-----------------	------------------------

Description

converts emission data from the CEDS database

Usage

```
convertCEDS2025(x)
```

Arguments

x magpie object from source function

Value

MAGPIE object

Author(s)

Benjamin Leon Bodirsky, David Klein

convertCMIP7_CEDS	<i>convertCMIP7_CEDS</i>
-------------------	--------------------------

Description

converts harmonized emission data used for CMIP7, global data is removed here, use readSource(CMIP7_CEDS, convert = FALSE) to obtain it.

Usage

```
convertCMIP7_CEDS(x)
```

Arguments

x	magpie object from source function
---	------------------------------------

Value

MAGPIE object

Author(s)

Pascal Weigmann

convertDomingues	<i>convertDomingues</i>
------------------	-------------------------

Description

fills missing countries in Domingues data with NA, and transforms cost units from 2018 US\$/GJ to 2017 US\$/GJ

Usage

```
convertDomingues(x)
```

Arguments

x	unconverted magpie object from read-script
---	--

Value

Data as MAgPIE object with common country list

Author(s)

Eva Bleidorn

`convertExpertGuessSSPLivestockProduction`
convertExpertGuessSSPLivestockProduction

Description

convert the Expert Guesses for future Livestock Production for the SSP Scenarios

Usage

`convertExpertGuessSSPLivestockProduction(x)`

Arguments

x MAgPIE-Object containing data to convert

Value

magpie object containing converted expert guesses

Author(s)

Stephen Wirth

Examples

```
## Not run:  
a <- readSource("ExpertGuessSSPLivestockProduction","ssp1")  
  
## End(Not run)
```

convertFeedModel	<i>Convert FeedModel data</i>
------------------	-------------------------------

Description

Convert production system distribution and feed basket data to ISO country level.

Usage

```
convertFeedModel(x, subtype = "FeedBaskets")
```

Arguments

x	MAGPIE object containing production system distribution and feed basket data.
subtype	Available subtypes: "ProdSysRatio", "FeedBaskets" and "FeedBasketsDetailed"

Value

Production system distribution and feed basket data as MAGPIE object on ISO country level

Author(s)

Isabelle Weindl, Jan Philipp Dietrich

convertGTAPv8v9	<i>convertGTAPv8v9</i>
-----------------	------------------------

Description

disaggregates country groups from GTAP according to GDP share

Usage

```
convertGTAPv8v9(x, subtype)
```

Arguments

x	unconverted magpie object from read-script
subtype	GTAP header that should be read

Value

Data as MAGPIE object with common country list

Author(s)

Debbora Leip, David M. Chen

Examples

```
## Not run:  
a <- readSource("convertGTAPv8v9", "81:SF01", convert = TRUE)  
  
## End(Not run)
```

convertHerridge	<i>convertHerridge</i>
-----------------	------------------------

Description

Converts the Data from Herridge et al. to fit the common country list. Source: Herridge D. F., Peoples M. B., Boddey R. M.: Global inputs of biological nitrogen fixation in agricultural systems

Usage

```
convertHerridge(x)
```

Arguments

x	MAGPIE object to be converted
---	-------------------------------

Value

A MAGPIE object containing the share of Nr derived from fixation for each country and each commodity.

Author(s)

Stephen Wirth

Examples

```
## Not run:  
x <- readSource("Herridge")  
  
## End(Not run)
```

 convertICP2017

 convertICP2017

Description

converts data of World Bank ICP round, downloaded from here: <https://databank.worldbank.org/source/icp-2017> mainly a currency conversion to MER2017. Assume that in the original dataset, 2011 values are in 2011MER and 2017 in 2017MER, given the ICP rounds

Usage

```
convertICP2017(x, subtype = "per_cap_expMER")
```

Arguments

x	MAGPIE object containing original values
subtype	data subtype needed. Either "priceLevel", or "per_cap_exp"

Value

maggpie object of relative price levels (world = 100) or per capita expenditure (USD17 MER)

Author(s)

David M Chen

Examples

```
## Not run:
a <- convertSource("ICP2017", "per_cap_exp")

## End(Not run)
```

 convertIEA_EEI

Convert IEA End Uses and Efficiency Indicators data to data on ISO country level.

Description

Convert IEA End Uses and Efficiency Indicators data to data on ISO country level.

Usage

```
convertIEA_EEI(x)
```

Arguments

x MAgPIE object to be converted

Author(s)

Falk Benke

convertIFA

Convert IFA

Description

Convert IFADavies (2013) data to ISO country level.

Usage

convertIFA(x)

Arguments

x MAgPIE object containing IFA data region resolution

Value

MAgPIE object of the IFA data disaggregated to country level

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
a <- convertIFA(x)  
  
## End(Not run)
```

convertImageMacc	<i>Convert subtypes of the ImageMacc data</i>
------------------	---

Description

Convert subtypes from ImageMacc to data on ISO country level. Correct values for N2O of the subtype "baseline_sources" from N to N2O (factor: 44/28).

Usage

```
convertImageMacc(x, subtype)
```

Arguments

x	MAGPIE object containing ImageMacc data mixed on region level
subtype	data subtype. Either "CH4_Energy_Industry", "CH4_Landuse", "N2O_Energy_Industry", "N2O_Landuse", "HFC_tot", "SF6_tot", "PFC_tot" or "baseline_sources"

Value

ImageMacc data as MAGPIE object for all subtypes aggregated to country level

Author(s)

Nele Steinmetz

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("ImageMacc", "CH4_Energy_Industry")
a <- readSource("ImageMacc", "CH4_Landuse")
a <- readSource("ImageMacc", "N2O_Energy_Industry")
a <- readSource("ImageMacc", "N2O_Landuse")
a <- readSource("ImageMacc", "HFC_tot")
a <- readSource("ImageMacc", "SF6_tot")
a <- readSource("ImageMacc", "PFC_tot")
a <- readSource("ImageMacc", "baseline_sources")

## End(Not run)
```

convertIPCC*Convert subtypes of the IPCC data*

Description

Convert subtypes on ISO country level.

Usage

```
convertIPCC(x, subtype)
```

Arguments

x	MAGPIE object containing IPCC data on region level
subtype	data subtype. Either "awmsShr", "awmsEfCh4", "awmsParCh4", "nExcrRate"

Value

IPCC data as MAGPIE object for all subtypes on country level

Author(s)

Nele Steinmetz

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("IPCC", "awmsShr")
a <- readSource("IPCC", "awmsEfCh4")
a <- readSource("IPCC", "awmsParCh4")
a <- readSource("IPCC", "nExcrRate")

## End(Not run)
```

convertISIMIP	<i>convertISIMIP</i>
---------------	----------------------

Description

convert data to ISO country level

Usage

```
convertISIMIP(x, subtype)
```

Arguments

x	MAGPIE object on cellular level
subtype	data subtype

Value

MAGPIE object on country level

Author(s)

Jan Philipp Dietrich, Felicitas Beier

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource("ISIMIP", convert = TRUE)  
  
## End(Not run)
```

convertKoeppen	<i>convertKoeppen</i>
----------------	-----------------------

Description

Convert Koeppen climate zones on iso-country level

Usage

```
convertKoeppen(x, subtype = "iso")
```

Arguments

x	magpie object provided by the read function
subtype	Switch between different levels

Value

List of magpie objects with results on country level

Author(s)

Kristine Karstens

Examples

```
## Not run:
readSource("Koeppen", subtype = "iso", convert = TRUE)

## End(Not run)
```

convertLassaletta2014 *convertLassaletta2014*

Description

converts the dataset of Lassaletta, L., G. Billen, B. Grizzetti, J. Angalde, and J. Garnier. 2014. 50 Year Trends in Nitrogen Use Efficiency of World Cropping Systems: The Relationship between Yield and Nitrogen Input to Cropland. Environmental Research Letters. into a dataset including all countries. Replacing Soviet Union by Russia and Yugoslavia by Serbia without detailed disaggregation.

Usage

```
convertLassaletta2014(x, subtype)
```

Arguments

x	data object that gets provided by wrapper function readSource
subtype	budget provides the nr cropland budgets, fert_to_cropland the share of inorganic fertilizers being applied to croplands

Value

Magpie object with results on country level.

Author(s)

Benjamin Leon Bodirsky

See Also

```
readLassaletta2014(), madrat::readSource()
```

Examples

```
## Not run:  
readSource("Lassaletta2014", convert = TRUE)  
  
## End(Not run)
```

```
convertLotzeCampenBiofuel  
      convertLotzeCampenBiofuel
```

Description

Converts the Data from Lotze Campen et al. 2014. to fit the common country list. Source: Lotze Campen et al. 2014. "Impacts of increased bioenergy demand on global food markets: an AgMIP economic model intercomparison" Agricultural Economics 45 (103-116). doi:10.1111/agec.12092.

Usage

```
convertLotzeCampenBiofuel(x)
```

Arguments

x MAgPIE object to be converted

Value

A MAgPIE object containing future trends in first generation bioenergy demand in Petajoules as magpie object for each country for biodiesel and ethanol.

Author(s)

Ewerton Araujo

Examples

```
## Not run:  
x <- readSource("LotzeCampenBiofuel")  
  
## End(Not run)
```

convertLutz2014	<i>convertLutz2014</i>
-----------------	------------------------

Description

It fills the missing values of the output of readLutz2014 through the weighted average of the values of two countries with similar characteristics to the one that has na values.

Usage

convertLutz2014(x)

Arguments

x magpie object provided by the read function

See Also

[readLutz2014\(\)](#)

convertMAGPIE	<i>Convert MAgPIE data</i>
---------------	----------------------------

Description

Convert MAgPIE data to country-level.

Usage

convertMAGPIE(x, subtype)

Arguments

x input MAgPIE data on region-level
subtype Either "EmiAirPoll", "macBase", "co2tax", "supplyCurve_magpie_40", "abat-param_co2"

Value

magpie object

Author(s)

David Klein, Felix Schreyer

<code>convertNCDrisc</code>	<i>convertNCDrisc</i>
-----------------------------	-----------------------

Description

Converts data from the NCD risc consortium body height: Collaboration (NCD-RisC), NCD Risk Factor. 2016. "A Century of Trends in Adult Human Height." ELife 5 (July):e13410. <https://doi.org/10.7554/eLife.13410>.

Usage

```
convertNCDrisc(x, subtype)
```

Arguments

x	unconverted magpie object from read-script
subtype	"height" for body height data. Missing data is replaced by non-population weighted global average

Value

magpie object with a completed dataset.

See Also

[convertNCDrisc\(\)](#)

<code>convertPBL_MACC_2019</code>	<i>Convert subtypes of the PBL_MACC_2019 data</i>
-----------------------------------	---

Description

Convert subtypes from PBL_MACC_2019 to data on ISO country level.#'

Usage

```
convertPBL_MACC_2019(x, subtype)
```

Arguments

x	MAGPIE object containing PBL_MACC_2019 data on region level
subtype	data subtype. "ch4coal","ch4oil","ch4gas","ch4wstl","ch4wsts","ch4rice","ch4animals","ch4anmlwst", "n2otrans","n2oadac","n2onitac","n2ofert","n2oanwst","n2owaste", "HFC_tot", "SF6_tot", "PFC_tot" or "baseline_sources"

Value

PBL_MACC_2019 data as MAgPIE object for all subtypes aggregated to country level

Author(s)

Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

`convertPBL_MACC_2022` *Convert subtypes of the PBL_MACC_2022 data*

Description

Convert subtypes from PBL_MACC_2022 to data on ISO country level.#'

Usage

```
convertPBL_MACC_2022(x)
```

Arguments

x MAgPIE object containing PBL_MACC_2022 data on region level

Value

PBL_MACC_2022 data as MAgPIE object for all subtypes aggregated to country level

Author(s)

Michael Windisch, Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

`convertPBL_MACC_SSP2_2022`*Convert subtypes of the PBL_MACC_SSP2_2022 data*

Description

Convert subtypes from PBL_MACC_SSP2_2022 to data on ISO country level.

Usage

```
convertPBL_MACC_SSP2_2022(x)
```

Arguments

x MAgPIE object containing PBL_MACC_SSP2_2022 data on region level

Value

PBL_MACC_SSP2_2022 data as MAgPIE object for all subtypes aggregated to country level

Author(s)

Gabriel Abrahão

`convertPRIMAPHist`*convertPRIMAPHist*

Description

function to convert PRIMAP-hist data to isocountry resolution

Usage

```
convertPRIMAPHist(x)
```

Arguments

x MAgPIE object

Value

MAgPIE object

Author(s)

Roman Popov

Examples

```
## Not run:
readSource("PRIMAPHist", subtype = "hist")

## End(Not run)
```

convertResFor2ndBE	<i>convertResFor2ndBE</i>
--------------------	---------------------------

Description

Convert old ReMIND use of residues for 2nd generation bioenergy to country level data

Usage

```
convertResFor2ndBE(x, subtype = subtype)
```

Arguments

x	MAGPIE object containing original values
subtype	oldReMIND, newAgriSupply

Value

List of magpie objects with results on country level

Author(s)

Kristine Karstens

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("ResFor2ndBE", subtype = "oldReMIND", convert = TRUE)

## End(Not run)
```

convertSoilGrids	<i>convertSoilGrids</i>
------------------	-------------------------

Description

Convert SoilGrids content

Usage

```
convertSoilGrids(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)

Kristine Karstens

See Also

[readSoilGrids\(\)](#)

Examples

```
## Not run:  
readSource("SoilGrids", subtype = "cstock_0_30", convert = TRUE)  
  
## End(Not run)
```

convertSSPResults	<i>convertSSPResults</i>
-------------------	--------------------------

Description

Disaggregates from SSP regions to ISO countries

Usage

```
convertSSPResults(x)
```

Arguments

x	object coming from read function
---	----------------------------------

Value

MAGPIE object with ISO countries with all indicators for which disaggregation weight was found

Author(s)

Abhijeet Mishra, Benjamin Leon Bodirsky, Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
readSource("SSPResults", aggregate = TRUE)

## End(Not run)
```

convertVanDrecht2009 *convertVanDrecht2009*

Description

Reads a dataset containing values for sewage

Usage

```
convertVanDrecht2009(x)
```

Arguments

x MAGPIE object containing incomplete country-region resolution

Value

A MAGPIE object containing sewage quantities and losses

Author(s)

Benjamin Leon Bodirsky

Examples

```
## Not run:
x <- readSource("VanDerWerf2010")

## End(Not run)
```

<code>convertWCDE</code>	<i>convertWCDE</i>
--------------------------	--------------------

Description

It fills the missing countries of the output of `readWCDE` with the population-weighted average structure of one or more countries with similar characteristics, scaled with the population of the missing country. For years before the population data starts (the historical reconstruction of subtype "epop_v2" goes back to 1950), the earliest available population estimate is held constant; this only affects small countries and territories.

Usage

`convertWCDE(x, subtype)`

Arguments

- | | |
|----------------------|--|
| <code>x</code> | magpie object provided by the read function |
| <code>subtype</code> | "epop_v3" or "epop_v2" (only needed so that <code>readSource</code> can resolve the default subtype consistently for read and convert; the country filling is identical for both subtypes) |

See Also

[readWCDE\(\)](#), [convertLutz2014\(\)](#)

<code>convertWHO</code>	<i>convertWHO</i>
-------------------------	-------------------

Description

Converts data from the WHO

Usage

`convertWHO(x)`

Arguments

- | | |
|----------------|--|
| <code>x</code> | unconverted magpie object from read-script |
|----------------|--|

Value

magpie object with a completed dataset.

See Also

[convertWHO\(\)](#)

correctAndrijevic2019 *correctAndrijevic2019*

Description

correct Andrijevic governance data

Usage

correctAndrijevic2019(x, subtype)

Arguments

x	magpie object provided by the read function
subtype	data to be returned: "historical" for observed data until 2015 "projected" for projected SSP scenario data from 2015 to 2099

Value

corrected magpie object iso-level

Author(s)

Felicitas Beier

See Also

[readAndrijevic2019\(\)](#)

correctEDGARfood *correctEDGARfood*

Description

correct Edgar-food data

Usage

correctEDGARfood(x, subtype)

Arguments

x	magpie object provided by the read function
subtype	Type of data that should be read • foodSystemEmi: Total food system emissions of different countries • foodSystemShare: Share of food system emissions in total emissions • foodSystemSector: Food system emissions separated by country, sector and substance

Value

corrected magpie object

Author(s)

David Hoetten

See Also

[readEDGARfood](#)

correctFoodSystemsDashboard

correctFoodSystemsDashboard

Description

Correct FoodSystemsDashboard values that are questionable

Usage

correctFoodSystemsDashboard(x, subtype)

Arguments

x	magpie object provided by the read function
subtype	Switch between different levels

Value

List of magpie objects

Author(s)

David Chen

correctIPCCClimate	<i>correctIPCCClimate</i>
--------------------	---------------------------

Description

Correct IPCC climate classification

Usage

```
correctIPCCClimate(x)
```

Arguments

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

Value

Magpie object with results on cellular level for 12 IPCC climate zone types

Author(s)

Kristine Karstens

Examples

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

correctKoeppen	<i>correctKoeppen</i>
----------------	-----------------------

Description

Correct Koeppen climate zones on cellular level

Usage

```
correctKoeppen(x, subtype = "iso")
```

Arguments

x	magpie object provided by the read function
subtype	Switch between different levels

Value

List of magpie objects with results on cellular level

Author(s)

Kristine Karstens

Examples

```
## Not run:
readSource("Koeppen", subtype = "cellular", convert = "onlycorrect")

## End(Not run)
```

correctSoilGrids	<i>correctSoilGrids</i>
------------------	-------------------------

Description

Correct SoilGrids content

Usage

```
correctSoilGrids(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)

Kristine Karstens

See Also

[readSoilGrids\(\)](#)

Examples

```
## Not run:
readSource("SoilGrids", subtype = "cstock_0_30", convert = "onlycorrect")

## End(Not run)
```

correctTNC2019	<i>correctTNC2019</i>
----------------	-----------------------

Description

correct biome data

Usage

```
correctTNC2019(x)
```

Arguments

x magpie object provided by the read function

Value

magpie object on cellular level

Author(s)

Patrick v. Jeetze

See Also

[readTNC2019](#)

Examples

```
## Not run:  
readSource("TNC2019", convert = "onlycorrect")  
  
## End(Not run)
```

downloadAndrijevic2019	<i>downloadAndrijevic2019</i>
------------------------	-------------------------------

Description

This function downloads the governance indicator data available at <https://github.com/marina-andrijevic/governance2019>

Usage

```
downloadAndrijevic2019(subtype = "governance_obs_project")
```

Arguments

subtype file that should be downloaded from governance2019 repository

Author(s)

Felicitas Beier

See Also

[readAndrijevic2019\(\)](#)

Examples

```
## Not run:
downloadSource("Andrijevic2019", subtype = "governance_obs_project")

## End(Not run)
```

downloadEDGAR6	<i>downloadEDGAR</i>
----------------	----------------------

Description

download EDGAR emission data

Usage

```
downloadEDGAR6(subtype = "n2o")
```

Arguments

subtype type in gas for receiving the newest data. type in specific filename for old version 4.31 data

Value

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

Author(s)

Benjamin Leon Bodirsky

downloadEDGARfood	<i>downloadEDGARfood</i>
-------------------	--------------------------

Description

download Edgar-food v6 food system emission data

Usage

```
downloadEDGARfood()
```

Author(s)

David Hötten

downloadEurostatLivestock	<i>Download Eurostat Livestock Data</i>
---------------------------	---

Description

Downloads the latest data and meta data form the Eurostat website.

Usage

```
downloadEurostatLivestock(subtype)
```

Arguments

subtype	Type of Eurostat Livestock data that should be read.
---------	--

downloadGFED	<i>Download GFED</i>
--------------	----------------------

Description

Download the GFED (Global Fire Emissions Database) dataset for all years not labeled as beta, in addition to the emission factors.

Usage

```
downloadGFED()
```

Author(s)

Michael S. Crawford

See Also

`madrat::downloadSource()` `readGFED()`

Examples

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

`downloadGGCMICropCalendar`

downloadGGCMICropCalendar

Description

Download ISIMIP GGCM crop calendar information and harvest area masks

Usage

```
downloadGGCMICropCalendar()
```

Author(s)

David M Chen, Edna Molina Bacca

`downloadIPCCClimate`

downloadIPCCClimate

Description

Download IPCC climate classification

Usage

```
downloadIPCCClimate()
```

Value

Meta information on downloaded data

Author(s)

Kristine Karstens

Examples

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

## End(Not run)
```

downloadISIMIP	<i>Download ISIMIP data</i>
----------------	-----------------------------

Description

Downloads the latest data from ISIMIP.

Usage

```
downloadISIMIP(subtype)
```

Arguments

subtype	Type of ISIMIP data that should be read. It consists of variable ("airrww"), model ("cwatm", "h08", "lpjml", "matsiro", "mpi-hm", "pcr-globwb"), GCM ("ipsl-cm5a-lr", "gfdl-esm2m", "miroc5", "hadgem2-es") and database version ("2a", "2b", "3a", "3b"), separated by ":" (e.g. "airrww:LPJmL:gfdl-esm2m:2b"). Similarly for ISIMIP GGCM phase3b data, with scenarios and CO2 fert setting, downloads for all crops and irrigation settings models ("LPJmL", "EPIC-IIASA", "pDSSAT", "CYGMA1p74"), gcms ("gfdl-esm4", "ipsl-cm6a-lr", "mpi-esm1-2-hr", "mri-esm2-0", "ukesm1-0-ll"), scenarios ("historical", "ssp126", "ssp370", "ssp585"), co2 ("default", "2015co2"), version c("2a", "2b", "3a", "3b")) Example of yield subtype : "yields:EPIC-IIASA:ukesm1-0-ll:ssp585:default:3b"
---------	--

Author(s)

Jan Philipp Dietrich

```
downloadNitrogenBoundariesGridded
      downloadNitrogenBoundariesGridded
```

Description

Download the grid-level regional nitrogen boundary datasets from Schulte-Uebbing et al. (2022)

Usage

```
downloadNitrogenBoundariesGridded()
```

Author(s)

Michael S. Crawford

See Also

```
madrat::downloadSource()
```

Examples

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

## End(Not run)
```

```
downloadSoilGrids      downloadSoilGrids
```

Description

This function downloads the raw SoilGrids data (available at <https://files.isric.org/soilgrids/data/recent>) or, if available, the preprocessed raster layers.

Usage

```
downloadSoilGrids(subtype = "cstock_0_30")
```

Arguments

subtype	Switch between different input. Use predefined ones or any FileName specified in 'SoilGrids/META_GEOTIFF_1B.csv'
---------	--

Value

magpie object in cellular resolution

Author(s)

Kristine Karstens

See Also

[readSoilGrids\(\)](#)

Examples

```
## Not run:  
downloadSource("SoilGrids", subtype = "carbon0_30")  
  
## End(Not run)
```

downloadUN_PopDiv

Download UN_PopDiv

Description

Download UN_PopDiv dataset (World Population Prospects)

Usage

```
downloadUN_PopDiv()
```

Author(s)

Michael Crawford, Debbora Leip

See Also

[madrat::downloadSource\(\)](#) [mrdrivers::readUN_PopDiv\(\)](#)

Examples

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

<code>downloadWCDE</code>	<i><code>downloadWCDE</code></i>
---------------------------	----------------------------------

Description

Downloads population data by age, sex and education from the Wittgenstein Centre Human Capital Data Explorer (WCDE, <https://dataexplorer.wittgensteincentre.org>). The batch files provided for the `wcde` R package are used (one file per scenario).

Subtype "epop_v3" contains the updated SSP projections (2020-2100) of the Wittgenstein Centre Data Explorer Version 3 (K.C. et al. 2024). The download is pinned to version 3.3 to keep results reproducible when newer minor versions are released. Subtype "epop_v2" contains the previous release (Version 2, Lutz et al. 2018), which includes the historical reconstruction going back to 1950. As historical estimates do not differ between scenarios, only SSP2 is downloaded for "epop_v2".

Additional scenarios (e.g. the SSP2 zero migration variant, scenario code 22) can be added to the scenario vectors below.

Usage

```
downloadWCDE(subtype = "epop_v3")
```

Arguments

subtype "epop_v3" or "epop_v2"

Author(s)

Benjamin Leon Bodirsky

See Also

```
madrat::downloadSource\(\) readWCDE\(\)
```

<code>readACCMIP</code>	<i><code>readACCMIP</code></i>
-------------------------	--------------------------------

Description

Read in data from the Atmospheric Chemistry and Climate Model Intercomparison Project

Usage

```
readACCMIP(subtype = NULL)
```

Arguments

subtype data subtype. available subtypes are:

- nhx_1850
- noy_1850
- sox_1850
- nhx_1980
- noy_1980
- sox_1980
- nhx_2000
- noy_2000
- sox_2000
- nhx_26_2030
- nhx_45_2030
- nhx_85_2030
- noy_26_2030
- noy_45_2030
- noy_85_2030
- sox_26_2030
- sox_45_2030
- sox_85_2030
- nhx_26_2100
- nhx_45_2100
- nhx_85_2100
- noy_26_2100
- noy_45_2100
- noy_85_2100
- sox_26_2100
- sox_45_2100
- sox_85_2100

Value

magpie object of the ACCMIP data. Unit is t NO₂-N per ha per year, or t NH₃-N per ha per year,...

Author(s)

Roman Popov

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readACCMIP("ACCMIP", "nhx_2000")  
a <- readACCMIP("ACCMIP", "sox_26_2030")  
  
## End(Not run)
```

readAdjustGrassi2021	<i>readAdjustGrassi2021</i>
----------------------	-----------------------------

Description

Read in data from Grassi et al. 2021. Adjustment factors for emission in GtCO₂ yr⁻¹.

Usage

```
readAdjustGrassi2021(subtype)
```

Arguments

subtype	Either "data" or "weight"
---------	---------------------------

Value

Adjustment factors or weight as MAgPIE object

Author(s)

Michael Windisch, Florian Humpenoeder

Examples

```
## Not run:  
readSource("AdjustGrassi2021", subtype = "data")  
  
## End(Not run)
```

readAndrijevic2019	<i>readAndrijevic2019</i>
--------------------	---------------------------

Description

read in governance index data from Andrijevic et al. 2019

Usage

```
readAndrijevic2019(subtype)
```

Arguments

subtype data used from governance2019 repository

Value

governance index data at iso-country level

Author(s)

Felicitas Beier

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource("Andrijevic2019")  
  
## End(Not run)
```

readBodirsky2018	<i>readBodirsky2018</i>
------------------	-------------------------

Description

Reads in regression parameters estimated using mrregression, and reads in some scenario based on Bodirsky et al not yet published

Usage

```
readBodirsky2018(subtype = "bmi_shr")
```

Arguments

subtype bmi_share, demand_regression, intake_regression or bodyheight_regression for the estimated regression paramters of different regressions. scenarios for scenario projections.

Value

magpie object

See Also

[readNCDrisc\(\)](#)

readCarbonLTS

readCarbonLTS

Description

Read-in an Long term carbon storage data for historical period.

Usage

```
readCarbonLTS(subtype)
```

Arguments

subtype data subtype.

Value

magpie object of the FRA 2015 data

Author(s)

Abhijeet Mishra

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("CarbonLTS", "Lauk_et_al")

## End(Not run)
```

`readCEDS2021`*readCEDS2021*

Description

reads in emission data from the CEDS database

Usage

```
readCEDS2021()
```

Value

MAGPIE object

Author(s)

Benjamin Leon Bodirsky, David Klein

`readCEDS2025`*readCEDS2025*

Description

reads in emission data from the CEDS database publication: <https://zenodo.org/records/15059443>

Usage

```
readCEDS2025()
```

Value

MAGPIE object

Author(s)

Pascal Weigmann

<code>readCMIP7_CEDS</code>	<i><code>readCMIP7_CEDS</code></i>
-----------------------------	------------------------------------

Description

reads in harmonized emission data used for CMIP7 from three files. countryFile for energy related emissions on country level and global bunker emissions, globalFile for F-Gases and AFOLU on global level, cmip7-historical-ghg-eq for GHG totals. Source: <https://zenodo.org/records/15059443>

Usage

`readCMIP7_CEDS()`

Value

MAGPIE object

Author(s)

Pascal Weigmann

<code>readDomingues</code>	<i><code>readDomingues</code></i>
----------------------------	-----------------------------------

Description

Reads biomass yields (GJ/ha/year) and factor costs (US\$ 2018/GJ) for bioenergy crops from Domingues et al., 2022 (DOI: 10.5281/zenodo.6913709)

Usage

`readDomingues()`

Value

Data as MAGPIE object with average yields and costs of betr and begr

Author(s)

Eva Bleidorn

readEDGAR_LU	<i>Read EDGAR_LU</i>
--------------	----------------------

Description

Read-in EDGAR_LU csv file as magclass object

Usage

```
readEDGAR_LU(subtype = "CO2")
```

Arguments

subtype	emission type
---------	---------------

Value

magpie object EDGAR_LU data

Author(s)

Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource(type = "EDGAR_LU")  
  
## End(Not run)
```

readEDGAR6	<i>readEDGAR6</i>
------------	-------------------

Description

download EDGAR 5 and 6 emission data

Usage

```
readEDGAR6(subtype)
```

Arguments

subtype type in gas

Value

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

Author(s)

Benjamin Leon Bodirsky, Michael S. Crawford

readEDGARfood	<i>readEDGARfood</i>
---------------	----------------------

Description

read Edgar-food v6 food system emission data

Usage

readEDGARfood(subtype)

Arguments

subtype	Type of data that should be read • foodSystemEmi: Total food system emissions of different countries • foodSystemShare: Share of food system emissions in total emissions • foodSystemSector: Food system emissions separated by country, sector and substance
---------	--

Value

A magpie object with foodsystem total emissions, emission shares or sector and substance specific emission, depending on subtype

Author(s)

David Hötten

readEDGARghg	<i>readEDGAR_GHG</i>
--------------	----------------------

Description

read EDGAR GHG emission data

Usage

```
readEDGARghg(subtype = "ghg_by_sector")
```

Arguments

subtype	ghg_by_sector to read in the sheet GHG_by_sector_and_country, lulucf to read in the sheet LULUCF_countries
---------	--

Value

magpie objects of EDGAR historical emissions (MtCO₂eq)

Author(s)

Pascal Weigmann

readEurostatLivestock	<i>Read EUROSTAT_livestock</i>
-----------------------	--------------------------------

Description

Read in EUROSTAT livestock data

Usage

```
readEurostatLivestock(subtype)
```

Arguments

subtype	Type of FAO data that should be read. Available types are: • EggPopProd : Production of eggs for consumption and number of laying hens • LayingHensPop : Laying hens population - annual data • PoultryPop : Poultry - annual data • PigPop : Pig population - annual data • BovinePop : Bovine population - annual data • Nuts2Pop : Animal populations by NUTS 2 regions
---------	---

- MeatProd : Meat production and foreign trade - head - monthly data
- MilkNuts2Prod : Production of cow's milk on farms by NUTS 2 regions
- MilkProd : Production and utilization of milk on the farm - annual data

Value

EUROSTAT livestock data as MAgPIE object

Author(s)

David Hötten

See Also

`madrat::readSource()`

Examples

```
## Not run:
a <- readSource("EurostatLivestock", "MeatProd")

## End(Not run)
```

```
readExpertGuessSSPLivestockProduction
      readExpertGuessSSPLivestockProduction
```

Description

Read the Expert Guesses for future Livestock Production for the SSP Scenarios

Usage

```
readExpertGuessSSPLivestockProduction(subtype)
```

Arguments

subtype : Available subtypes are: ssp1 to 5 Data for the SSP Scenario

Value

magpie object containing the expert guesses

Author(s)

Stephen Wirth, Isabelle Weindl

See Also[madrat::readSource\(\)](#)**Examples**

```
## Not run:  
a <- readSource("ExpertGuessSSPLivestockProduction", "ssp1")  
  
## End(Not run)
```

readFeedEfficiencyReg *Read in regression coefficients for feed efficiency*

Description

Read in csv file containing coefficients of non-linear regression analysis for the calculation of future feed efficiencies of feed baskets dependent on livestock productivity trends

Usage

```
readFeedEfficiencyReg()
```

Value

MAGPIE object containing regression coefficients

Author(s)

Isabelle Weindl

See Also[madrat::readSource\(\)](#)**Examples**

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

readFeedModel	<i>Read in data of FeedModel</i>
---------------	----------------------------------

Description

Read in csv files containing data on production system distribution and system-specific feed baskets from the FeedModel "MAgPIE_FEED"

Usage

```
readFeedModel(subtype = "FeedBaskets")
```

Arguments

subtype Available subtypes: "ProdSysRatio", "FeedBaskets" and "FeedBasketsDetailed"

Value

magpie object of feed basket data

Author(s)

Isabelle Weindl

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource(type = "FeedModel", subtype = "FeedBaskets")

## End(Not run)
```

readFeedShareReg	<i>Read in regression coefficients for central feed shares</i>
------------------	--

Description

Read in csv file containing coefficients of non-linear regression analysis for the calculation of future central feed shares in feed baskets dependent on livestock productivity trends

Usage

```
readFeedShareReg()
```

Value

MAGPIE object containing regression coefficients

Author(s)

Isabelle Weindl

See Also

[madrat::readSource\(\)](#)

Examples

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

readFoodSystemsDashboard	
	<i>readFoodSystemsDashboard</i>

Description

read in Food Systems Dashboard indicators

Usage

```
readFoodSystemsDashboard(subtype)
```

Arguments

subtype	Currently either "Processed" for Processed food expenditures per capita or "Industrial Processing Share"
---------	--

Value

governance index data at iso-country level

Author(s)

David Chen

See Also

[madrat::readSource\(\)](#)

Examples

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

readFroehle

Read parameters of Froehle equations

Description

Publication Froehle, Andrew W. 2008 "Climate Variables as Predictors of Basal Metabolic Rate: New Equations" American Journal of Human Biology: The Official Journal of the Human Biology Council 20 (5): 510-29. doi: 10.1002/ajhb.20769.

Usage

```
readFroehle()
```

Value

MAGPIE object

Author(s)

Benjamin Bodirsky

See Also

[madrat::readSource\(\)](#)

Examples

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

readGFED

Read GFED

Description

Read the Global Fire Emissions Database over the available years and store them in a MAgPIE object with two sub-dimensions: Species (e.g. DM, CO₂, CH₄, or N₂O), and Partition (e.g. SAVA, BORF, TEMF, DEFO, PEAT, AGRI). Emissions are reported in Mt X. For more information, see: <https://globalfiredata.org/pages/data/>. Due to runtime considerations, this function only calculates a small sample of the total emissions (CH₄, N₂O, NO_x, NH₃) and burning partitions (AGRI), which are currently being used for validation.

Usage

```
readGFED()
```

Value

A MAgPIE object with the GFED emissions data and sub-dimensions Partition and Species.

Author(s)

Michael S. Crawford

See Also

`madrat::readSource()`

Examples

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

## End(Not run)
```

readGGCMICropCalendar *readGGCMICropCalendar*

Description

Reads in GGCM fraction of Harvested Area masks for rice 1 and rice 2 (other crops available too, see path in download function), or other variables available in the GGCM crop calendar.

Usage

```
readGGCMICropCalendar(subtype = "fraction_of_harvested_area")
```

Arguments

subtype variable or vector of variables to read from the crop calendar set. Options: ("planting_day","maturity_day","fraction_of_harvested_area","cal" (which is a combination of planting_day, maturity_day and harvest_day)), wheat areas and rice_areas

Value

MAGPIE object with the requested data

Author(s)

David M Chen, Edna Molina Bacca

readGTAPv8v9	<i>readGTAPv8v9</i>
--------------	---------------------

Description

Read in data from GTAP 8.1 baseyears 2007 and 2004. All values in mio. current US\$MER.

Usage

readGTAPv8v9(subtype)

Arguments

subtype GTAP version and header that should be read. Available versions are "81" and "9" Available headers are listed in the contents_XXX.csv in the GTAPv8v9 source folder for each GTAP file (BaseData.har, BaseRate.har, BaseView.har, CO2.har, gsdvole.har, GTAPSam.har, Sets.har, TStrade.har, and Default.prm - file is determined based on the header via a mapping and does not need to be specified).

Value

GTAP data as MAGPIE object

Author(s)

Debbora Leip, David M. Chen

Examples

```
## Not run:
readSource("GTAPv8v9", subtype = "81:SF01")

## End(Not run)
```

readHerridge	<i>readHerridge</i>
--------------	---------------------

Description

Reads a dataset containing values for biological nitrogen fixation in agricultural systems. Source: Herridge D. F., Peoples M. B., Boddey R. M.: Global inputs of biological nitrogen fixation in agricultural systems

Usage

```
readHerridge(subtype = NULL)
```

Arguments

subtype a subtype for the calculation

Details

Availables Subtypes:

- ndfa: National values for Plant associated fixation
- freelifving: Global values for free living agents

Value

A MAgPIE object containing the share of Nr derived from

- ndfa: fixation for each country and each commodity.
- freelifving: fixation by free living agents

Author(s)

Stephen Wirth, Jan Philipp Dietrich

Examples

```
## Not run:  
x <- readSource("Herridge", "ndfa")  
x <- readSource("Herridge", "freelifving", convert = F)  
  
## End(Not run)
```

readHHS_USDA	<i>readHHS_USDA</i>
--------------	---------------------

Description

reads calory requirement for a standardized population from HHS & USDA. 2015. "2015-2020 Dietary Guidelines for Americans." 8. Dietary Guidelines for Americans. https://health.gov/dietaryguidelines/2015/resources/2020_Dietary_Guidelines.pdf. Appendix 2

Usage

readHHS_USDA()

Value

Magpie object with results on global level.

Author(s)

Benjamin Leon Bodirsky

See Also

[convertLassaletta2014\(\)](#), [madrat::readSource\(\)](#)

readHI	<i>Read allometric coeffizients for residue to harvest translation</i>
--------	--

Description

Read-in a file containing the allometric coeffizients of MAgPIE crop types. Values are assembled from various literature sources, and the weighting and allocation is done in the spreadsheet `crop_specifications_*.ods` for different versions of the file

Usage

readHI()

Value

magpie object with the dimension crops and coeffizients

Author(s)

Benjamin Leon Bodrisky, Kristine Karstens

See Also

`madrat::readSource()`

Examples

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

readHoulton2018	<i>readHoulton2018</i>
-----------------	------------------------

Description

Read Houlton 2018 model on weathering of N from rocks

Usage

```
readHoulton2018()
```

Value

magpie object global resolution by landuse types in Mt of N weathered from rocks each year

Author(s)

David M Chen

Examples

```
## Not run:  
readSource("Houlton2018", convert = FALSE)  
  
## End(Not run)
```

`readICP2017``readICP2017`

Description

Reads data of World Bank ICP round, downloaded from here: <https://databank.worldbank.org/source/icp-2017>

Usage

```
readICP2017(subtype = "per_cap_expMER")
```

Arguments

subtype data subtype to be read in. Available subtypes are:

- priceLevel Price level index (World = 100)
- expRatio Expenditure component share of GDP (GDP = 100%)
- exp_LCU Expenditure (local currency units, billions)
- exp_MER Expenditure, market exchange rate-based (US\$, billions)
- exp_PPP Expenditure, PPP-based (US\$, billions)
- per_cap_expPPP Expenditure per capita, PPP-based (US\$)
- per_cap_expMER Expenditure per capita, market exchange rate-based (US\$)

Value

magpie object of relative price levels (world = 100) or per capita expenditure (USD17 MER)

Author(s)

David M Chen

Examples

```
## Not run:  
a <- readSource("ICP2017", "per_cap_exp")  
  
## End(Not run)
```

readIEA_EEI	<i>Read-in data from IEA End Uses and Efficiency Indicators Database</i>
-------------	--

Description

Read-in data from IEA End Uses and Efficiency Indicators Database

Usage

```
readIEA_EEI()
```

Author(s)

Falk Benke

readIFA	<i>Read IFA</i>
---------	-----------------

Description

Read-in IFA (International Fertilizer Association) data .xlsx file as magclass object

Usage

```
readIFA(subtype)
```

Arguments

subtype	Type of IFA data that should be read. Available types are: • consumption: read in fertilizer_consumption.xlsx data • production: read in fertilizer_production.xlsx data
---------	--

Value

magpie object of the IFA data

Author(s)

Lavinia Baumstark

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource(type = "IFA", subtype = "consumption")

## End(Not run)
```

readIfBB

readIfBB

Description

reads data on historic bioplastic production from csv source: "Biopolymers facts and statistics 2021" page 58, Institute for Bioplastics and Biocomposites (IfBB)

Usage

```
readIfBB()
```

Value

data as MAgPIE object

Author(s)

Debbora Leip

Examples

```
## Not run:
readSource("HistBioplasticProd")

## End(Not run)
```

readImageMacc

Read in ImageMacc Costcurves for different subtypes

Description

Read in ImageMacc Costcurves for different subtypes, which are based on a Paper fro Lucas et al 2007 (<http://linkinghub.elsevier.com/retrieve/pii/S1462901106001316>) Rows are removed, the dataframe is reshaped and numbers are replaced by descriptions.

Usage

```
readImageMacc(subtype)
```

Arguments

subtype data subtype. Options are: "CH4_Energy_Industry", "CH4_Landuse", "N2O_Energy_Industry", "N2O_Landuse", "HFC_tot", "SF6_tot", "PFC_tot" or "baseline_sources"

Value

magpie object of the ImageMacc data

Author(s)

Nele Steinmetz

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("ImageMacc", "CH4_Energy_Industry")
a <- readSource("ImageMacc", "CH4_Landuse")
a <- readSource("ImageMacc", "N2O_Energy_Industry")
a <- readSource("ImageMacc", "N2O_Landuse")
a <- readSource("ImageMacc", "HFC_tot")
a <- readSource("ImageMacc", "SF6_tot")
a <- readSource("ImageMacc", "PFC_tot")
a <- readSource("ImageMacc", "baseline_sources")

## End(Not run)
```

readIMPACT3.2.2World_Price

Read IMPACT3.2.2World_Price

Description

Read-in world prices data csv file as magclass object

Usage

```
readIMPACT3.2.2World_Price()
```

Value

magpie object of the world prices from the IMPACT model for different SSP scenarios

Author(s)

Mishko Stevanovic

See Also

`madrat::readSource()`

Examples

```
## Not run:
a <- readSource(type = "IMPACT3.2.2World_Price")

## End(Not run)
```

readIPCC

Read in IPCC emissions

Description

Read in IPCC data:

- Read in IPCC emissions from livestock and manure management. Source: IPCC Guidelines for National Greenhouse Gas Inventories (2006); Chapter 10: Emissions from Livestock and Manure Management.
- Read in IPCC emissions from Lime and urea application. Source: IPCC Guidelines for National Greenhouse Gas Inventories (2006); Chapter 11: N₂O Emissions from managed Soils and CO₂ Emissions from Lime and Urea Application.
- Read in IPCC efficiency factors for burning of residue. Source: IPCC Guidelines for National Greenhouse Gas Inventories (2006); Chapter 02: Generic Methodologies applicable to multiple Land-use Categories.
- Read in soil related stock change factors for carbon and manure parameterization. Source: IPCC Guidelines for National Greenhouse Gas Inventories (2006); Chapter 5: Cropland.

Usage

```
readIPCC(subtype)
```

Arguments

subtype data subtype

Value

magpie object of the IPCC data

Author(s)

Nele Steinmetz, Stephen Wirth, Jan Philipp Dietrich, Kristine Karstens

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("IPCC", "awmsShr")
a <- readSource("IPCC", "awmsEfCh4")
a <- readSource("IPCC", "awmsParCh4")
a <- readSource("IPCC", "nExcrRate")
a <- readSource("IPCC", "awmsconfef3", convert = FALSE)
a <- readSource("IPCC", "fracgasms", convert = FALSE)
a <- readSource("IPCC", "fraclossms", convert = FALSE)
a <- readSource("IPCC", "emissionfactors", convert = FALSE)
a <- readSource("IPCC", "rescombusteff", convert = FALSE)
a <- readSource("IPCC", "efnsoil", convert = FALSE)

## End(Not run)
```

readIPCCClimate

readIPCCClimate

Description

Read IPCC climate classification

Usage

```
readIPCCClimate()
```

Value

Magpie object with results on cellular level for 12 IPCC climate zone types

Author(s)

Kristine Karstens

Examples

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

## End(Not run)
```

<code>readISIMIP</code>	<i>readISIMIP</i>
-------------------------	-------------------

Description

Reads in ISIMIP data

Usage

```
readISIMIP(subtype = "airww:LPJmL:gfdl-esm2m:2b")
```

Arguments

subtype	Type of ISIMIP data that should be read. It consists of variable ("airrww"), model ("cwatm", "h08", "lpjml", "matsiro", "mpi-hm", "pcr-globwb"), GCM ("ipsl-cm5a-lr", "gfdl-esm2m", "miroc5", "hadgem2-es") and database version ("2a", "2b", "3a", "3b"), separated by ":" (e.g. "airrww:LPJmL:gfdl-esm2m:2b") Similarlyly for ISIMIP GGCMi phase3b data, with scenarios and CO2 fert setting, downloads for all crops and irrigation settings models ("LPJmL", "EPIC-IIASA", "pDSSAT", "CYGMA1p74"), gcms ("gfdl-esm4", "ipsl-cm6a-lr", "mpi-esm1-2-hr", "mri-esm2-0", "ukesm1-0-ll"), scenarios ("historical", "ssp126", "ssp370", "ssp585"), co2 ("default", "2015co2"), version c("2a", "2b", "3a", "3b")) Example of yield subtype : "yields:EPIC-IIASA:ukesm1-0-ll:ssp585:default:3b"
---------	--

Value

MAGPIE object with the requested data

Note

Values for years before 1961 will be ignored to reduce overall object size

Author(s)

Jan Philipp Dietrich, Felicitas Beier, David Chen

Examples

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

## End(Not run)
```

readKoeppen	<i>readKoeppen</i>
-------------	--------------------

Description

Read Koeppen climate zones on iso-country and cellular level

Usage

```
readKoeppen(subtype = "iso")
```

Arguments

subtype	Switch between different levels
---------	---------------------------------

Value

List of magpie objects with results on country or cellular level

Author(s)

Kristine Karstens

Examples

```
## Not run:  
readSource("Koeppen", subtype = "iso")  
  
## End(Not run)
```

readLassaletta2014	<i>readLassaletta2014</i>
--------------------	---------------------------

Description

reads nitrogen budgets for a country dataset from Lassaletta, L., G. Billen, B. Grizzetti, J. Angalde, and J. Garnier. 2014. 50 Year Trends in Nitrogen Use Efficiency of World Cropping Systems: The Relationship between Yield and Nitrogen Input to Cropland. Environmental Research Letters.

Usage

```
readLassaletta2014(subtype = "budget")
```

Arguments

subtype	budget provides the nr cropland budgets, fert_to_cropland the share of inorganic fertilizers being applied to croplands
---------	---

Value

Magpie object with results on country level.

Author(s)

Benjamin Leon Bodirsky, Felicitas Beier

See Also

[convertLassaletta2014\(\)](#), [madrat::readSource\(\)](#)

Examples

```
## Not run:
readSource("Lassaletta2014", subtype = "budget", convert = FALSE)

## End(Not run)
```

readLotzeCampenBiofuel

Read LotzeCampenBiofuel

Description

Read-in Future trends in first generation bioenergy demand from the publication Lotze Campen et al. 2014. "Impacts of increased bioenergy demand on global food markets: an AgMIP economic model intercomparison" Agricultural Economics 45 (103-116). doi:10.1111/agec.12092. from a .csv file to a magclass object

Usage

```
readLotzeCampenBiofuel()
```

Value

Future trends in first generation bioenergy demand in ExaJoule as magpie object

Author(s)

Ewerton Araujo

See Also

[madrat::readSource\(\)](#)

Examples

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

`readLutz2014`*readLutz2014*

Description

It reads and clears the dataset of the global population projections by age, sex and education, available on the Wittgenstein Centre Data Explorer and published by Lutz, Butz and K. C. , 2014. "Population and human capital in the twenty-first century" Oxford University Press. From .csv file to a magclass object

Usage

```
readLutz2014()
```

Value

magpie object with the dataset downloaded. It contains missing values and it is possible to replace them with the function `convertLutz2014`.

See Also

[convertLutz2014\(\)](#)

`readMAGPIE`*Read MAGPIE data*

Description

Read-in MAGPIE data

Usage

```
readMAGPIE(subtype)
```

Arguments

subtype Either "EmiAirPoll", "macBase" or "co2tax"

Value

magpie object

Author(s)

Julian Oeser

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource(type = "MAGPIE", subtype = "EmiAPExo")  
  
## End(Not run)
```

readNCDrisc

readNCDrisc

Description

Reads in data from the NCD risc consortium body height: Collaboration (NCD-RisC), NCD Risk Factor. 2016. "A Century of Trends in Adult Human Height." ELife 5 (July):e13410. <https://doi.org/10.7554/eLife.13410>.

Usage

```
readNCDrisc(subtype)
```

Arguments

subtype "height" for body height data

Value

magpie object with the dataset downloaded. It contains missing values and it is possible to replace them with the function `convertNCDrisc`

Author(s)

Benjamin Leon Bodirsky

See Also

[convertNCDrisc\(\)](#)

```
readNitrogenBoundariesGridded  
  readNitrogenBoundariesGridded
```

Description

Read the grid-level regional nitrogen boundary datasets from Schulte-Uebbing et al. (2022). For the moment, this only uses the critical N surplus in all agricultural land (arable + intensively managed grassland) in view of all thresholds simultaneously, measured in kg N per ha per yr.

Usage

```
readNitrogenBoundariesGridded()
```

Value

A MAgPIE object with the critical nitrogen surplus in kg N per ha per yr in 2010

Author(s)

Michael S. Crawford

See Also

[madrat::readSource\(\)](#)

Examples

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

```
readPBL_MACC_2019      Read in PBL MAC curves from Harmsen_et_al_2019 for different sub-  
                        types
```

Description

Read in PBL MAC curves from Harmsen_et_al_2019 for different subtypes

Usage

```
readPBL_MACC_2019(subtype)
```

Arguments

subtype data subtype. "ch4coal", "ch4oil", "ch4gas", "ch4wstl", "ch4wsts", "ch4rice", "ch4animals", "ch4anmlwst", "n2otrans", "n2oadac", "n2onitac", "n2ofert", "n2oanwst", "n2owaste", "HFC_tot", "SF6_tot", "PFC_tot" or "baseline_sources"

Value

magpie object of the PBL_MACC_2019 data

Author(s)

Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

readPBL_MACC_2022	<i>Read in PBL MAC curves from Harmsen_et_al_2022 for different subtypes and subsets</i>
-------------------	--

Description

Read in PBL MAC curves from Harmsen_et_al_2022 for different subtypes and subsets

Usage

```
readPBL_MACC_2022(subtype, subset)
```

Arguments

subtype data subtype. "ch4coal", "ch4oil", "ch4gas", "ch4wstl", "ch4wsts", "ch4rice", "ch4animals", "ch4anmlwst", "n2otrans", "n2oadac", "n2onitac", "n2ofert", "n2oanwst", "n2owaste"

subset data subset. "Default", "Optimistic", "Pessimistic"

Value

magpie object of the PBL_MACC_2022 data

Author(s)

Michael Windisch, Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

readPBL_MACC_SSP2_2022

Read in PBL MAC curves from Harmsen_et_al_2022 for different subtypes and subsets, using the baseline-dependent IMAGE SSP2 version

Description

Read in PBL MAC curves from Harmsen_et_al_2022 for different subtypes and subsets, using the baseline-dependent IMAGE SSP2 version

Usage

```
readPBL_MACC_SSP2_2022(subtype, subset)
```

Arguments

subtype	data subtype. "ch4coal", "ch4oil", "ch4gas", "ch4wstl", "ch4wsts", "ch4rice", "ch4animals", "ch4anmlwst", "n2otrans", "n2oadac", "n2onitac", "n2ofert", "n2oanwst", "n2owaste"
subset	data subset. "Default", "Optimistic", "Pessimistic"

Value

magpie object of the PBL_MACC_SSP2_2022 data

Author(s)

Michael Windisch, Florian Humpenoeder, Gabriel Abrahao

See Also

[madrat::readSource\(\)](#)

readPRIMAPHist

readPRIMAPHist

Description

Read in an PRIMAP-hist data csv file as magclass object.

Usage

```
readPRIMAPHist(subtype)
```

Arguments

subtype data subtype. available subtypes are:

- hist
- hist_no_ex

Value

magpie object of the PRIMAP-hist data.

Author(s)

Roman Popov

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readPRIMAPHist("PRIMAPHist", "hist")  
  
## End(Not run)
```

readPyrolysisConditions
readPyrolysisConditions

Description

Reads in parameter specifications for different pyrolysis process conditions from several literature sources, which are available as separate source data files.

Usage

```
readPyrolysisConditions(subtype = "Schmidt_2019")
```

Arguments

subtype Available subtypes: "Schmidt_2019", "Woolf_2014", "Buffi_2024" and "Cornelissen_2016"

Value

Magpie object with the dimensions "properties" and "process_cond"

Author(s)

Isabelle Weindl

See Also

[madrat::readSource\(\)](#)

Examples

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

## End(Not run)
```

readResFor2ndBE

readResFor2ndBE

Description

Read in old ReMIND use of residues for 2nd generation bioenergy and newly estimations

Usage

```
readResFor2ndBE(subtype)
```

Arguments

subtype oldReMIND, newAgriSupply

Value

List of magpie objects with results on old ReMIND regions level

Author(s)

Kristine Karstens

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
a <- readSource("ResFor2ndBE", subtype = "oldReMIND")

## End(Not run)
```

readSchofield	<i>Read parameters of Schofield equations</i>
---------------	---

Description

University, United Nations. 2004. Human Energy Requirements: Report of a Joint FAO/WHO/UNU Expert Consultation: Rome, 17-24 October 2001. Vol. 1. Food & Agriculture Org. http://books.google.com/books?hl=en&lr=Hr6&sig=ocPdelHKyX2_npUTh41zZRRHf68. #nolint

Usage

```
readSchofield()
```

Value

MAgPIE object

Author(s)

Benjamin Bodirsky

See Also

[madrat::readSource\(\)](#)

Examples

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

## End(Not run)
```

readSoilGrids	<i>readSoilGrids</i>
---------------	----------------------

Description

This function reads the raw SoilGrids data (available at https://files.isric.org/soilgrids/data/recent/OCSTHA_M_30cm_250m) or if available the preprocessed raster layers.

Usage

```
readSoilGrids(subtype)
```

Arguments

subtype Switch between different input. Use predefined ones or any FileName specified in 'SoilGrids/META_GEOTIFF_1B.csv'

Value

magpie object in cellular resolution

Author(s)

Kristine Karstens

See Also

[downloadSoilGrids\(\)](#)

Examples

```
## Not run:
readSource("SoilGrids", subtype = "cstock_0_30")

## End(Not run)
```

readSSPResults	<i>readSSPResults</i>
----------------	-----------------------

Description

Reads in a reporting mif file from the SSP scenario results

Usage

```
readSSPResults()
```

Value

MAGPIE object with regional aggregation of SSP regions, including all indicators

Author(s)

Abhijeet Mishra, Florian Humpenoeder

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
readSource("SSPresults", aggregate = FALSE)

## End(Not run)
```

readTNC2019

readTNC2019

Description

Reads geospatial data from 'the nature conservancy' on ecoregions, major habitat types (MHT, or biome types) and biogeographic realms.

Usage

```
readTNC2019()
```

Value

Returns magpie object with a share of each spatial unit belonging to a biogeographic realm and major habitat type.

Author(s)

Patrick v. Jeetze

Examples

```
## Not run:
readSource("TNC2019", convert = "onlycorrect")

## End(Not run)
```

readTransportCostsGTAP

Read Transport Costs

Description

Read in Transport Costs from GTAP

Usage

```
readTransportCostsGTAP()
```

Value

Transport Costs in USD

Author(s)

David Chen

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource(type = "TransportCostsGTAP")  
  
## End(Not run)
```

readVanDrecht2009

readvanDrecht2009

Description

Reads a dataset containing values for sewage

Usage

```
readVanDrecht2009()
```

Value

A MAgPIE object containing sewage quantities and losses

Author(s)

Benjamin Leon Bodirksy

Examples

```
## Not run:  
x <- readSource("VanDerWerf2010")  
  
## End(Not run)
```

readWBGEM	<i>readWBGEM</i>
-----------	------------------

Description

read raw data of world commodity prices from the dataset of World Bank global economic monitor

Usage

readWBGEM()

Value

magpie object of global price of commodities

Author(s)

Xiaoxi Wang

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:
readSource(type = "WBGEM")

## End(Not run)
```

readWCDE	<i>readWCDE</i>
----------	-----------------

Description

It reads the population projections by age, sex and education of the Wittgenstein Centre Human Capital Data Explorer as downloaded by [downloadWCDE\(\)](#). The output format follows [readLutz2014\(\)](#): a magpie object with the dimensions country, year, scenario, sex, age and education in million people. In addition to the education categories of Lutz2014, the datasets contain a finer split of the highest levels ("Short Post Secondary", "Bachelor" and "Master and higher"). These belong to a separate classification level and do not sum to "Post Secondary". Age-education combinations that do not occur (e.g. a young child with a university degree) are set to 0, as in Lutz2014. Country-year slices that are entirely absent from the source (the pre-2015 reconstruction is missing for some countries in "epop_v2") are kept as NA. World and continental aggregates (UN M49 codes >= 900) are removed.

Usage

readWCDE(subtype = "epop_v3")

Arguments

subtype "epop_v3" (projections 2020-2100, K.C. et al. 2024) or "epop_v2" (SSP2 only, including the historical reconstruction 1950-2015, Lutz et al. 2018)

Value

magpie object with missing countries, which can be filled with the function convertWCDE.

See Also

[downloadWCDE\(\)](#), [convertWCDE\(\)](#), [readLutz2014\(\)](#)

readWHO	<i>Read WHO</i>
---------	-----------------

Description

Read-in WHO (World health organization) data files as magpie object. The files contain information on physical inactivity

Usage

readWHO(subtype)

Arguments

subtype Type of WHO data that should be read. Includes physical_inactivity_adults and physical_inactivity_underaged

Value

magpie object of the WHO data

Author(s)

Benjamin Bodirsky

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource(type = "WHO", subtype = "physical_activity_adults")  
  
## End(Not run)
```

readZhang2015*Read Nitrogen Use Efficiency Parameters from Zhang et al 2015*

Description

Publication: Zhang, Xin, Eric A. Davidson, Denise L. Mauzerall, Timothy D. Searchinger, Patrice Dumas, and Ye Shen. 2015. "Managing Nitrogen for Sustainable Development". Nature 528 (7580): 51–59. <https://doi.org/10.1038/nature15743>.

Usage

```
readZhang2015()
```

Value

MAGPIE object

Author(s)

Benjamin Leon Bodirsky

See Also

[magrat::readSource\(\)](#)

Examples

```
## Not run:  
a <- readSource("Zhang2015", convert = FALSE)  
  
## End(Not run)
```

```
toolAWMSScenarioCreation
    toolAWMSScenarioCreation
```

Description

tool function to calculate the share of manure managed in different animal waste management systems in confinements.

Usage

```
toolAWMSScenarioCreation(name, startYear, categories, values, out)
```

Arguments

name	Name of the scenario
startYear	Year were prediction starts
categories	share of manure managed in different animal waste management systems
values	target values
out	contains historical data

Value

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

Author(s)

Edna J. Molina Bacca

See Also

[calcAWMSconfShr\(\)](#)

```
toolCalcIEAfromStructureMappingPEFE
    toolCalcIEAfromStructureMappingPEFE
```

Description

mapping IEA reported data to ReMIND-MAGPIE items

Usage

```
toolCalcIEAfromStructureMappingPEFE(data, structureMapping)
```

Arguments

data data to map
structureMapping
 mapping to use

Value

MAgPIE object with completed time dimensionality.

Author(s)

Anastasis Giannousakis, Lavinia Baumstark, Isabelle Weindl

toolPregnant	<i>toolPregnant</i>
--------------	---------------------

Description

extra intake kcal/day for pregnant women. The number of pregnant women is computed through the number of 0 year old children each year (Lutz dataset). According to Human energy requirments , Fao (Rome, 2004) , a woman requires an additional food of 845 kcal/day and 675 kcal/day of food on average during her pregnancy and lactation period respectively. According to Naegele's rule, the mean gestation period is 280 days (40 weeks) and the lactation period 6 month (25 weeks).

Usage

toolPregnant(demo, reproductive)

Arguments

demo demo is the population divided by sex male (M) , female (F) and both (B) and divided by 8 age classes: 0-4, 5-9, 10-14, 15-19, AG1 (20-29), AG2 (30-59), AG3(60-79), AG4(80+)

reproductive reproductive age classes (on which the energy requiremetns for newborns are distributed)

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