Package: mrwaste (via r-universe)

January 31, 2025

Type Package

Title Analysis and Projection of Municipal Solid Waste

Version 0.4.4

Date 2024-06-05

Description Reads in waste data from What a Waste 2.0 and uses brms package to create future regressions based on GDP.

License LGPL-3

Depends madrat(>= 1.30), magclass(>= 3.17), mrcommons, R(>= 2.10.0)

Imports alabama, brms, dplyr, magpiesets, magrittr, mstools, readxl, rlang, rstan, SPEI, tidyr, tidyselect, utils

Suggests covr

Encoding UTF-8

LazyData true

RoxygenNote 7.3.1

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

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

RemoteUrl https://github.com/pik-piam/mrwaste

RemoteRef HEAD

RemoteSha 6891b1860c92fcf01ad4355cec3a577ff53bf56e

Contents

`calcIPCCClimateRegions` *calcClimateRegionsIPCC*

Description

calculates IPCC Climate Regions (IPCC2006 ch.4.3) based on t, ppt, pet from LPJml. elevation dimension not included for tropical montane class

Usage

```
calcIPCCClimateRegions(
  landusetypes = "all",
  cellular = FALSE,
  yearly = FALSE,
  convert = TRUE
)
```

Arguments

`landusetypes`	all or only one (to save computation memory)
`cellular`	FALSE for country level, TRUE for cells
`yearly`	FALSE for normal magpie 5 year time spans, TRUE for yearly
`convert`	fills missing countries for country level aggregation with warm temperate moist (mostly small island nations)

Value

Country or cellular magpie object with matrix of fraction of each climate region by country or cell

Author(s)

David Chen

Examples

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

## End(Not run)
```

`calcNlWasteDistrib` *calcNlWasteDistrib*

Description

non-linear optimization distributes waste by composition type to disposal type. returns magpie object, share of total disposal

Usage

```
calcNlWasteDistrib()
```

Value

Magpie object of waste types to waste distribution, share

Author(s)

David Chen

Examples

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

`calcOceanPlastic` *calcOceanPlastic*

Description

Calculates amount of ocean plastic based on calibrated waste projections, for unmanaged waste: all dumps, landfills and dumps from develolping countries, and 2 Coastal pop from Janbeck et al. 2016 buffer, as constant percentage future pop

Usage

```
calcOceanPlastic(filtration = 0.4)
```

Arguments

filtration	amount of plastic NOT captured by filtration, janbeck uses 0.15, 0.25, 0.4, but cites a source at .6

Value

million kg of plastic waste

Author(s)

David Chen

---

calcWasteDistrib *calcWasteDistrib*

Description

rule-based distribution of waste by composition type to disposal type. returns list of magpie object, share of total disposal

Usage

```
calcWasteDistrib()
```

Value

Magpie object of waste types to waste distribution, percentage

Author(s)

David Chen

Examples

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

calcWasteEmissions *calcWasteEmissions*

Description

Calculates GHG emissions from solid waste disposal treatments, input from calcWasteProjections, based on IPCC 2006 SWDS waste model and reporting calculations, in million t CO2eq

Usage

```
calcWasteEmissions(treatment = "swds")
```

Arguments

treatment	type of waste treatment

Value

Magpie object of emissions from waste treatments

Author(s)

David Chen

Examples

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

calcWasteGen *calcWasteGen*

Description

Calculates waste generation based on WhataWaste2.0 data, based on gdp regressions and calibrated to real data multiplicatively

Usage

```
calcWasteGen(pc = TRUE, form = "LogLog")
```

Arguments

pc	per capita (kg/capita) or total (Mt)
form	Functional form of predicted waste generation

Value

magpie object of total waste generation

Author(s)

David Chen

`calcWasteProj` *calcWasteProj*

Description

Calculates all waste projections, multiplies shares properly by pc or total generation quantities

Usage

```
calcWasteProj(pc = TRUE, SSP = "SSP2")
```

Arguments

`pc`	per capita (kg/capita) or total (Mt) wet weight
`SSP`	SSP scenario

Value

magpie object of waste projections by treatment and type

Author(s)

David Chen

`calcWasteTrt` *calcWasteDirTrt*

Description

Calculates shares of waste treatments by type based on Dirichlet regression on gdp using WhataWaste2.0 data note that each type is independent - treatments for each type all sum to 1

Usage

```
calcWasteTrt(weight = "pop", SSP = "SSP2")
```

Arguments

weight	population weights or "none"
SSP	SSP scenario

Value

magpie object of waste treatment by type share

Author(s)

David Chen

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calcWasteType *calcWasteType*

Description

Calculates shares of waste types based on Dirichlet regression on gdp using WhataWaste2.0 data

Usage

```
calcWasteType(weight = "pop", SSP = "SSP2")
```

Arguments

weight	population weights or other weights or NULL
SSP	SSP scenario

Value

magpie object of waste shares

Author(s)

David Chen

convertCoastalPop *convertCoastalPop*

Description

Fills and completes Janbeck 2011 coastal population data for all years based on constant percentage of coastal pop for future years

Usage

```
convertCoastalPop()
```

Value

pop in millions

Author(s)

David Chen

See Also

readSource

convertLandfillCH4Capture
Convert landfill CH4 capture data

Description

Convert landfill CH4 capture data

Usage

```
convertLandfillCH4Capture(x)
```

Arguments

x	MAgPIE object containing original values

Value

DemandModel data as MAgPIE object aggregated to country level

Author(s)

David Chen

convertWaste *convertWaste*

Description

Converts readWaste output to complete MAgPIE object containing Waste data on country level (kg/cap)

Usage

```
convertWaste(subtype)
```

Arguments

subtype	type of waste data, generation composition treatment or special

Value

Waste data as complete MAgPIE object on country level

Author(s)

David Chen

See Also

readSource

readCoastalPop *Read Janbeck 2011 Coastal Population data, for Ocean Plastic input*

Description

Read-in a xlsx file as magclass object kg/cap

Usage

```
readCoastalPop()
```

Value

magpie object of coastal population by country, 50km buffer around coastline, keeping percentage same in future

Author(s)

David Chen

See Also

readSource

Examples

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

---

readLandfillCH4Capture *readLandfillCH4Capture*

Description

reads percentage of ch4 from landfills that is captured, from World Bank CURB Toolv2.1

Usage

```
readLandfillCH4Capture()
```

Value

Magpie object with results on global level.

Author(s)

David Chen

See Also

readSource

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readWaste *Read WhataWaste2.0 World Bank data*

Description

Read-in a xlsx file as magclass object kg/cap

Usage

```
readWaste(subtype)
```

Arguments

subtype	data subtype. "Generation" "Composition" and "Treatment" in kg/capita

Value

magpie object of the WhataWaste data with Generation, Disposal, or Composition

Author(s)

David Chen

See Also

readSource

Examples

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

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