Package: LINTULcassava (via r-universe)

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Type Package

Title LINTUL Cassava crop growth simulation model

Version 0.1-2

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Depends R (>= 3.5.0)

Suggests deSolve, litedown, tinytest

LinkingTo Rcpp

Imports Rcpp (>= 1.0-10)

VignetteBuilder litedown

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Description This package contains a fast implementation of the LINTUL crop growth model to simulate water-limited growth and development of cassava. The model was developed by Ezui et al. (2018) <doi:10.1016/j.fcr.2018.01.033> and callibrated by Adiele et al. (2021) <doi:10.1016/j.eja.2021.126242>.

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Repository https://cropmodels.r-universe.dev

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RemoteUrl https://github.com/cropmodels/LINTULcassava

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Contents

LINTULcassava-package *LINTUL Cassava crop growth simulation model*

Description

This package imlements the LINTUL-CASSAVA crop growth simulation model that was developed by

Ezui, K.S., P.A. Leffelaar, A.C. Franke, A. Mando & K.E. Giller (2018). Simulating drought impact and mitigation in cassava using the LINTUL model. Field Crops Research 219: 256-272. doi:10.1016/j.fcr.2018.01.033.

The model was calibrated with data from three locations in Nigeria by

Adiele, J.G., A.G.T. Schut, R.P.M. van den Beuken, K.S. Ezui, P. Pypers, A.O. Ano, C.N. Egesi & K.E. Giller (2021). A recalibrated and tested LINTUL-Cassava simulation model provides insight into the high yield potential of cassava under rainfed conditions. European Journal of Agronomy 124:126242. doi:10.1016/j.eja.2021.126242.

The orginal *R* implementation by Rob van den Beuken was a translation from the FST implementation of the model developed by Guillaume Ezui under supervision of Peter Leffelaar. Joy Adiele calibrated the model for Nigerian conditions using cultivar 'TME 419'. Tom Schut checked, simplified and adapted the code which is available as R scripts here (2024-10-21).

Robert Hijmans used the R scripts to create this R package. He tweaked the interface to make it easier to use, and he added an alternative R implementation of the model, as well as a C++ implementation that is more than 1000 times faster than the original R implementation.

Adiele *Example data*

Description

Get example weather data, and soil, management and model control parameters from the Adiele et al study.

Usage

```
Adiele(site, year)
```

Arguments

site	character. Site name. One of "Edo", "Cross River", or "Benue"
year	integer. Year. Either 2016 or 2017

Value

list

References

Adiele, J.G., A.G.T. Schut, K.S. Ezui, P. Pypers and K.E. Giller (2021). A recalibrated and tested LINTUL-Cassava simulation model provides insight into the high yield potential of cassava under rainfed conditions. European Journal of Agronomy 124: 126242.

Examples

```
w <- Adiele("Edo", 2016)
str(w)
```

`LC_crop` *Get crop parameters*

Description

Get crop parameters from by Ezui et al. or from by Adiele et al.

Usage

```
LC_crop(x)
```

Arguments

x	character. Either "Adiele" or "Ezui"

Value

list

References

Adiele, J.G., A.G.T. Schut, K.S. Ezui, P. Pypers and K.E. Giller (2021). A recalibrated and tested LINTUL-Cassava simulation model provides insight into the high yield potential of cassava under rainfed conditions. European Journal of Agronomy 124: 126242.

Ezui, K.S., P.A. Leffelaar, A.C. Franke, A. Mando, K.E. Giller (2018). Simulating drought impact and mitigation in cassava using the LINTUL model. Field Crops Research 219: 256-272.

Examples

```
crop <- LC_crop("Adiele")
str(crop)
```

LINTCAS *Run the LINTCAS model*

Description

Run the LINTCAS model

Usage

```
LINTCAS(weather, crop, soil, management, control, level=3)
```

Arguments

weather	data.frame with weather data
crop	list with crop parameters
soil	list with soil parameters
management	list with management parameters (PLDATE, HVDATE)
control	list with model control parameters (starttime, timestep, IRRIGF)
level	1, 2, or 3. With 1 you get the original R implementation; 2 is a modified R implementation; and 3 is the C++ implementation). The results should be exactly the same. Level 2 is about 3 times faster than level 1, and level 3 is > 1000 times faster than level 1

Value

data.frame

Examples

```
# get example parameters and environmental data
crop <- LC_crop("Adiele")
p <- Adiele("Edo", 2016)

pot <- LINTCAS(p$weather, crop, p$soil, p$management, c(p$control, IRRIGF=TRUE))
wlm <- LINTCAS(p$weather, crop, p$soil, p$management, c(p$control, IRRIGF=FALSE))
tail(wlm)
```

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