

# Package ‘ethnoecologyR’

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**Type** Package

**Title** Quantitative Ethnoecology Analysis and Landscape Knowledge Modeling

**Version** 0.1.4

**Description** A comprehensive toolkit for quantitative ethnoecology analysis and landscape knowledge modeling. Implements core indices including Landscape Use (LU), Cultural Importance in Ecology (CIE), Frequency of Citation (FC), Fidelity Level (FL), Number of Uses (NU), and Cultural Value of Ecolandscape (CVe). Provides visualization tools for chord diagrams, alluvial plots, and radial plots, as well as Bayesian consensus modeling and bootstrap resampling to support reproducible research in Local Ecological Knowledge (LEK) and participatory land-use decision analysis. Methods are based on Tardío and Pardo-de-Santayana (2008) <[doi:10.1007/s12231-007-9004-5](https://doi.org/10.1007/s12231-007-9004-5)>, Reyes-García et al. (2006) <<https://www.jstor.org/stable/4257061>>, and Friedman et al. (1986) <[doi:10.1037/0022-3514.51.6.1173](https://doi.org/10.1037/0022-3514.51.6.1173)>.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**Imports** dplyr, magrittr, ggplot2, tidyr, circlize, ggalluvial, reshape2, rlang, boot, rstan

**Suggests** knitr, rmarkdown, testthat

**Depends** R (>= 3.5)

**VignetteBuilder** knitr

**Config/roxygen2/version** 8.1.0

**NeedsCompilation** no

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|      |                                             |
|------|---------------------------------------------|
| CIEs | <i>Cultural Importance in Ecology (CIE)</i> |
|------|---------------------------------------------|

---

Description

Calculates the Cultural Importance in Ecology (CIE) index per landscape unit.  $CIE = LU / N$ , where N is the number of informants.

Usage

CIEs(data)

Arguments

data                    an ethnoecology data set with columns 'informant' and 'landscape\_unit'.

Value

Data frame with CIE values per landscape unit.

References

Tardío, J., and Pardo-de-Santayana, M. 2008. "Cultural Importance Indices: A Comparative Analysis Based on the Useful Wild Plants of Southern Cantabria (Northern Spain)." *Economic Botany* 62(1): 24-39.

Examples

```
data(ethnoecology_data)
CIEs(ethnoecology_data)
```

---

CVe\_eco*Cultural Value of Ecolandscape (CVe)*

---

**Description**

Calculates the Cultural Value (CVe) per landscape unit.  $CVe = (LU / N) * (FC / N)$  where N = number of informants.

**Usage**

```
CVe_eco(data)
```

**Arguments**

data                      an ethnoecology data set with columns 'informant' and 'landscape\_unit'.

**Value**

Data frame with CVe values per landscape unit.

**References**

Reyes-García, V., Huanca, T., Vadez, V., Leonard, W., and Wilkie, D. 2006. "Cultural, Practical, and Economic Value of Wild Plants: A Quantitative Study in the Bolivian Amazon." *Economic Botany* 60(1): 62-74.

**Examples**

```
data(ethnoecology_data)
CVe_eco(ethnoecology_data)
```

---

ethnoecology\_data*Data Uji Coba untuk ethnoecologyR*

---

**Description**

Dataset sintetis untuk menguji fungsi-fungsi dalam paket ethnoecologyR. Berisi 15 informan, 6 unit lanskap, dan 6 kategori penggunaan (0/1).

**Usage**

```
ethnoecology_data
```

**Format**

Data frame dengan 90 baris dan 8 kolom:

**informant** ID informan (karakter)  
**landscape\_unit** Nama unit lanskap (karakter)  
**use\_forest** Penggunaan hutan (0/1)  
**use\_water** Penggunaan air (0/1)  
**use\_agriculture** Penggunaan pertanian (0/1)  
**use\_hunting** Penggunaan perburuan (0/1)  
**use\_fishing** Penggunaan perikanan (0/1)  
**use\_gathering** Penggunaan pengumpulan (0/1)

**Source**

Data sintetis buatan.

---

|                  |                                                         |
|------------------|---------------------------------------------------------|
| ethno_bayes_land | <i>Bayesian Consensus Model for Landscape Knowledge</i> |
|------------------|---------------------------------------------------------|

---

**Description**

Fits a Bayesian model to estimate consensus among informants regarding landscape use and ecological knowledge.

**Usage**

```
ethno_bayes_land(data, iter = 2000, chains = 4)
```

**Arguments**

|        |                                                                         |
|--------|-------------------------------------------------------------------------|
| data   | an ethnoecology data set with columns 'informant' and 'landscape_unit'. |
| iter   | number of MCMC iterations.                                              |
| chains | number of MCMC chains.                                                  |

**Value**

A Bayesian model object (Stan).

**Examples**

```
data(ethnoecology_data)
ethno_bayes_land(ethnoecology_data, iter = 1000, chains = 2)
```

---

ethno\_boot\_land*Bootstrap Analyses of Ethnoecology Indices*

---

**Description**

Performs bootstrap resampling to calculate confidence intervals for ethnoecology indices.

**Usage**

```
ethno_boot_land(data, index_function, R = 1000)
```

**Arguments**

`data` an ethnoecology data set.  
`index_function` a function that calculates an ethnoecology index (e.g., LUs, CIEs).  
`R` number of bootstrap replicates.

**Value**

A list containing bootstrap results.

**Examples**

```
data(ethnoecology_data)  
ethno_boot_land(ethnoecology_data, LUs, R = 100)
```

---

ethno\_landscape\_alluvial*Alluvial Plot of Landscape Uses*

---

**Description**

Creates an alluvial diagram showing flows between informants, landscape units, and ecological uses.

**Usage**

```
ethno_landscape_alluvial(data)
```

**Arguments**

`data` an ethnoecology data set with columns 'informant', 'landscape\_unit', and use categories.

**Value**

A ggplot2 alluvial plot.

**Examples**

```
data(ethnoecology_data)
ethno_landscape_alluvial(ethnoecology_data)
```

---

ethno\_landscape\_chord *Chord Diagram of Landscape Uses*

---

**Description**

Creates a chord diagram showing relationships between informants, landscape units, and ecological uses.

**Usage**

```
ethno_landscape_chord(data, by = "landscape_unit")
```

**Arguments**

|      |                                                                         |
|------|-------------------------------------------------------------------------|
| data | an ethnoecology data set with columns 'informant' and 'landscape_unit'. |
| by   | grouping variable: "landscape_unit" or "informant".                     |

**Value**

A chord diagram plot.

**Examples**

```
data(ethnoecology_data)
ethno_landscape_chord(ethnoecology_data, by = "landscape_unit")
```

---

FCs\_eco*Frequency of Citation (FC) for Ethnoecology*

---

**Description**

Calculates the Frequency of Citation (FC) per landscape unit. FC = number of informants who mention the landscape unit for any use.

**Usage**

```
FCs_eco(data)
```

**Arguments**

data                    an ethnoecology data set with columns 'informant' and 'landscape\_unit'.

**Value**

Data frame with FC values per landscape unit.

**References**

Friedman, J., Yaniv, Z., Dafni, A., and Palevitch, D. 1986. "A Preliminary Classification of the Healing Potential of Medicinal Plants, Based on a Rational Analysis of an Ethnopharmacological Field Survey among Bedouins in the Negev Desert, Israel." *Journal of Ethnopharmacology* 16(2-3): 275-287.

**Examples**

```
data(ethnoecology_data)
FCs_eco(ethnoecology_data)
```

---

FLs\_eco*Fidelity Level (FL) for Ethnoecology*

---

**Description**

Calculates the Fidelity Level (FL) per landscape unit for a specific use category. FL = (number of informants who mention the landscape unit for a specific use / total number of informants who mention the landscape unit for any use) \* 100.

**Usage**

```
FLs_eco(data, use_category)
```

**Arguments**

`data` an ethnoecology data set with columns 'informant' and 'landscape\_unit'.  
`use_category` a character string specifying the use category column name.

**Value**

Data frame with FL values per landscape unit.

**References**

Friedman, J., Yaniv, Z., Dafni, A., and Palevitch, D. 1986. "A Preliminary Classification of the Healing Potential of Medicinal Plants, Based on a Rational Analysis of an Ethnopharmacological Field Survey among Bedouins in the Negev Desert, Israel." *Journal of Ethnopharmacology* 16(2-3): 275-287.

**Examples**

```
data(ethnoecology_data)
FLs_eco(ethnoecology_data, "use_forest")
```

---

landscape\_radial\_plot *Radial Bar Plot of Ethnoecology Indices*

---

**Description**

Creates a radial bar plot to visualize multiple ethnoecology indices per landscape unit.

**Usage**

```
landscape_radial_plot(data, indices_list)
```

**Arguments**

`data` an ethnoecology data set.  
`indices_list` a list of index functions to apply (e.g., list(LUs, CIEs)).

**Value**

A ggplot2 radial plot.

**Examples**

```
data(ethnoecology_data)
landscape_radial_plot(ethnoecology_data, list(LUs, CIEs))
```

LUs

*Landscape Use (LU)***Description**

Calculates the Landscape Use (LU) per landscape unit, a common metric for ethnoecology studies. This is the sum of all use reports for each landscape unit.

**Usage**

```
LUs(data)
```

**Arguments**

|      |                                                                                                                                                                                                                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data | an ethnoecology data set with column 1 'informant' and column 2 'landscape_unit' as row identifiers of informants and of landscape units respectively. The rest of the columns are the identified ethnoecology use categories. The data should be populated with counts of uses per person (0 or 1 values). |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Value**

Data frame of landscape units and Landscape Use (LU) values.

**Warning**

Identification for informants and landscape units must be listed by the names 'informant' and 'landscape\_unit' respectively in the data set. The rest of the columns should all represent separate identified ethnoecology use categories.

**References**

- Tardío, J., and Pardo-de-Santayana, M. 2008. "Cultural Importance Indices: A Comparative Analysis Based on the Useful Wild Plants of Southern Cantabria (Northern Spain)." *Economic Botany* 62(1): 24-39.
- Whitney, C. W., Bahati, J., and Gebauer, J. 2018. "Ethnobotany and Agrobiodiversity: Valuation of Plants in the Homegardens of Southwestern Uganda." *Ethnobiology Letters* 9(2): 1-12.

**Examples**

```
data(ethnoecology_data)
LUs(ethnoecology_data)
```

---

|                      |                                             |
|----------------------|---------------------------------------------|
| <code>NUs_eco</code> | <i>Number of Uses (NU) for Ethnoecology</i> |
|----------------------|---------------------------------------------|

---

**Description**

Calculates the Number of Uses (NU) per landscape unit. NU = total number of use categories reported for each landscape unit.

**Usage**

```
NUs_eco(data)
```

**Arguments**

`data`                    an ethnoecology data set with columns 'informant' and 'landscape\_unit'.

**Value**

Data frame with NU values per landscape unit.

**Examples**

```
data(ethnoecology_data)
NUs_eco(ethnoecology_data)
```

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