Package 'SSplots'

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Type Package

Title Stock Status Plots (SSPs)

Version 0.1.1

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Imports ggplot2, reshape2, zoo

Description Pauly et al. (2008) <http://legacy.seaaroundus.s3.amazonaws.com/doc/Researcher+Publications/dpauly/PDF/2008/Books%26Chapters/FisheriesInLargeMarineEcosystems.pdf> created (and coined the name) 'Stock Status Plots' for a UNEP compendium on Large Marine Ecosystems (LMEs, Sherman and Hempel 2008 <https://agris.fao.org/agris-search/search.do?recordID=XF2015036057>). Stock status plots are bivariate graphs summarizing the status (e.g., developing, fully exploited, overexploited, etc.), through time, of the multispecies fisheries of a fished area or ecosystem. This package contains two functions to generate stock status plots viz., SSplots_pauly() (as per the criteria proposed by Pauly et al.,2008) and SSplots_kleisner() (as per the criteria proposed by Kleisner and Pauly (2011) <http://www.ecomarres.com/downloads/regional.pdf> and Kleisner et al. (2013) <doi:10.1111/j.1467-2979.2012.00469.x>).

License GPL (>= 2)

Encoding UTF-8

LazyData true

Repository CRAN

Depends R (>= 3.5.0)

RoxygenNote 7.2.3

NeedsCompilation no

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R topics documented:

`SampleData` *Sample time series of commercial fish landings of selected marine resources (2007-2021)*

Description

A dataframe named "SampleData" was taken for illustration. It contains time series of landings of 25 resources.

Usage

```
SampleData
```

Format

This data frame contains 15 rows and 26 variables

Source

National Marine Fishery Resources Data Centre (NMFDC) of CMFRI, Kochi

References

http://www.cmfri.org.in/fish-catch-estimates

`SSplots_kleisner` *Stock-Catch-Status Plot or Catch by Stock Status Graph (Kleisner and Pauly (2011) and Kleisner et al. (2013))*

Description

This function provides stock status plots to see the typical transition from rebuilding through over-exploited to collapsed for each resources as per the criteria used by (Kleisner and Pauly (2011) and Kleisner et al. (2013) to interpret the status of fishery resource.

Usage

```
SSplots_kleisner(data,lower.lt,upper.lt, tsplots, MA)
```

Arguments

`data`	dataset
`lower.lt`	lower limit
`upper.lt`	upper limit
`tsplots`	time series plot
`MA`	moving average

Details

Status of fishery **Criterion Applied**

Rebuilding(Recovering): Year of landings > year of post-max-min landings AND post-max-min landings < 10 percent of max landings AND landings is between 10-50 percent of max landings

Developing: Year of landings < year of max landings AND landings <= 50 percent of max landings OR year of max landings= final year of landings

Exploited: Landings > 50 percent of max landings

Overexploited: Year of landings > year of max landings AND landings is between 10-50 percent of max landings

Collapsed: Year of landings > year of max landings AND landings< 10 percent of max landings

Value

This function returns two plots one with "number of stocks by status" and the other one is "catch by stock status" apart from the time seriers plots.

Note

Note1: Here, post-maximum-minimum (post-max-min) indicates the minimum landings occuring after the maximum catch.

Note2: tsplots=TRUE for generating the time series plots for each resources. In that case it is advisable to set a working directory and number of graphs generated will be equal to the number of resources.

Note3: MA=TRUE for using the running average of order 3 (a three year running average was used to smooth the curve).

References

1) Grainger RJR and Garcia S (1996) Chronicles of marine fisheries landings (1950-1994): trend analysis and fisheries potential. FAO Fisheries Technical Paper 359, 51 p.

2) Kristin Kleisner and Daniel Pauly (2015) Stock-Status Plots (SSPs), https://www.seaaroundus.org/stock-status-plots-method/ (accessed on 28.02.2023)

3) Pauly D, Alder J, Booth S, Cheung WWL, Christensen V, Close C, Sumaila UR, Swartz W, Tavakolie A, Watson R and Zeller D (2008) Fisheries in Large Marine Ecosystems: Descriptions and Diagnoses. pp. 23-40 In: Sherman K and Hempel G (eds.), The UNEP Large Marine Ecosystem Report: a Perspective on Changing Conditions in LMEs of the World's Regional Seas. UNEP Regional Seas Reports and Studies No. 182, Nairobi.

4) Sherman K and Hempel G, editors (2008) The UNEP Large Marine Ecosystem report: a Perspective on Changing Conditions in LMEs of the World's Regional Seas. UNEP Regional Seas Reports and Studies No. 182, United Nations Environment Programme, Nairobi. 852 p.

Examples

```
library (SSplots)
data(SampleData)
SSplots_kleisner(data=SampleData,lower.lt=10,upper.lt=50, tsplots=FALSE, MA=FALSE)
```

`SSplots_pauly` *Stock-Catch-Status Plot or Catch by Stock Status Graph (Pauly et al., 2008)*

Description

This function provides plots to see the typical transition from undeveloped through fully exploited, to collapsed for each resources as per the criteria used by Pauly et al (2008) to interpret the status of fishery resource

Usage

```
SSplots_pauly(data,lower.lt,upper.lt, tsplots)
```

Arguments

`data`	dataset
`lower.lt`	lower limit
`upper.lt`	upper limit
`tsplots`	time series plot

Details

Status of fishery **Criterion Applied**

Undeveloped: Year< max landings AND landings < 10 percent of max value

Developing: Year < max landings AND landings is between 10-50 percent of max value

Fully exploited: Landings > 50 percent of max value

Overexploited: Year > max landings AND landings is between 10-50 percent of max value

Collapsed: Year > max landings AND landings< 10 percent of max value

Value

This function returns two plots one with "number of stocks by status" and the other one is "catch by stock status" apart from the time seriers plots.

Note

Note: tsplots=TRUE for generating the time series plots for each resources. In that case it is advisable to set a working directory and the number of time series plots generated will be equal to the number of resources.

References

1) Grainger RJR and Garcia S (1996) Chronicles of marine fisheries landings (1950-1994): trend analysis and fisheries potential. FAO Fisheries Technical Paper 359, 51 p.

2) Kristin Kleisner and Daniel Pauly (2015) Stock-Status Plots (SSPs), https://www.seaaroundus.org/stock-status-plots-method/ (accessed on 28.02.2023)

3) Pauly D, Alder J, Booth S, Cheung WWL, Christensen V, Close C, Sumaila UR, Swartz W, Tavakolie A, Watson R and Zeller D (2008) Fisheries in Large Marine Ecosystems: Descriptions and Diagnoses. pp. 23-40 In: Sherman K and Hempel G (eds.), The UNEP Large Marine Ecosystem Report: a Perspective on Changing Conditions in LMEs of the World's Regional Seas. UNEP Regional Seas Reports and Studies No. 182, Nairobi.

4) Sherman K and Hempel G, editors (2008) The UNEP Large Marine Ecosystem report: a Perspective on Changing Conditions in LMEs of the World's Regional Seas. UNEP Regional Seas Reports and Studies No. 182, United Nations Environment Programme, Nairobi. 852 p.

Examples

```
library (SSplots)
data(SampleData)
SSplots_pauly(data=SampleData,lower.lt=10,upper.lt=50, tsplots=FALSE)
```

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