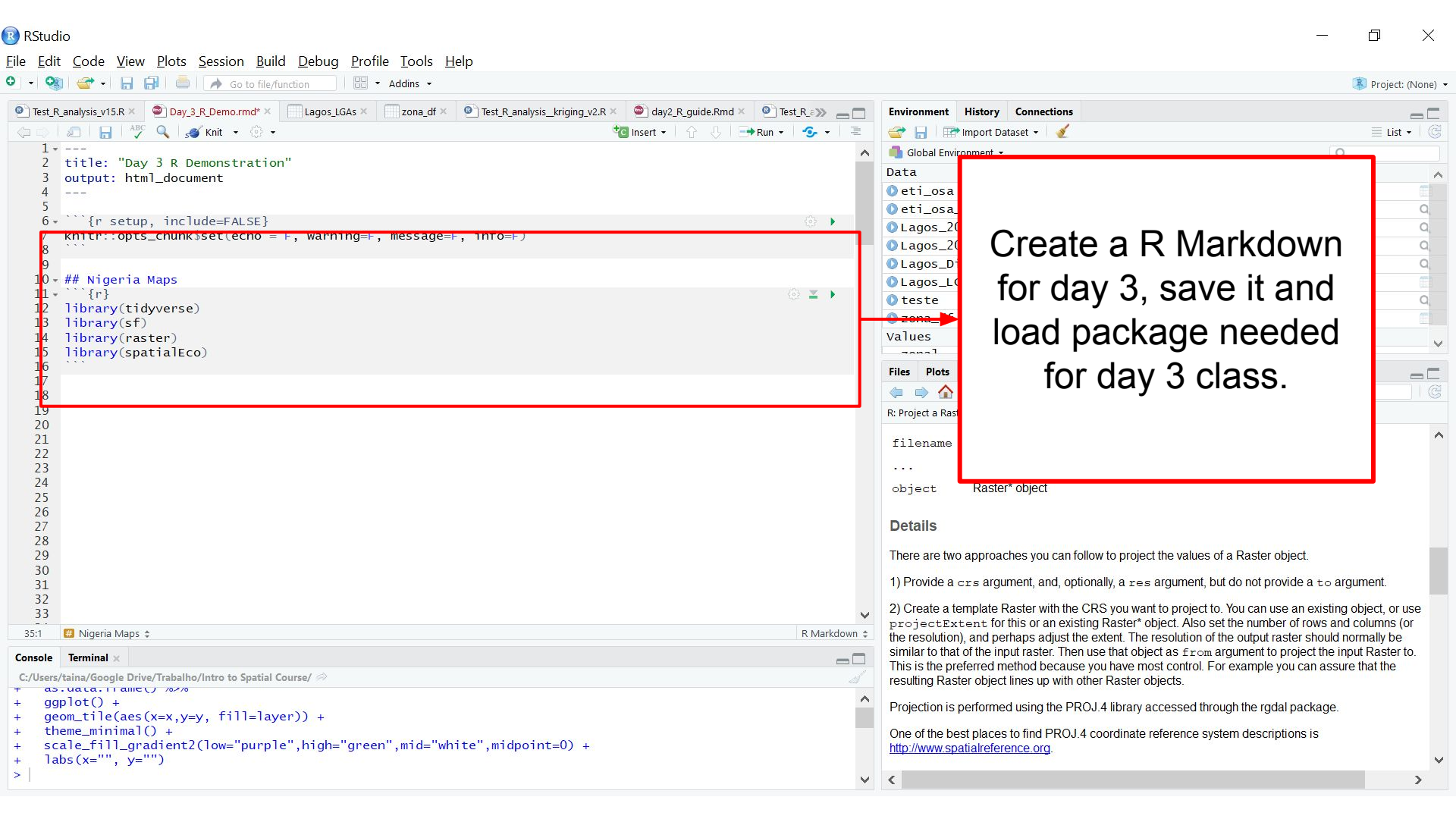
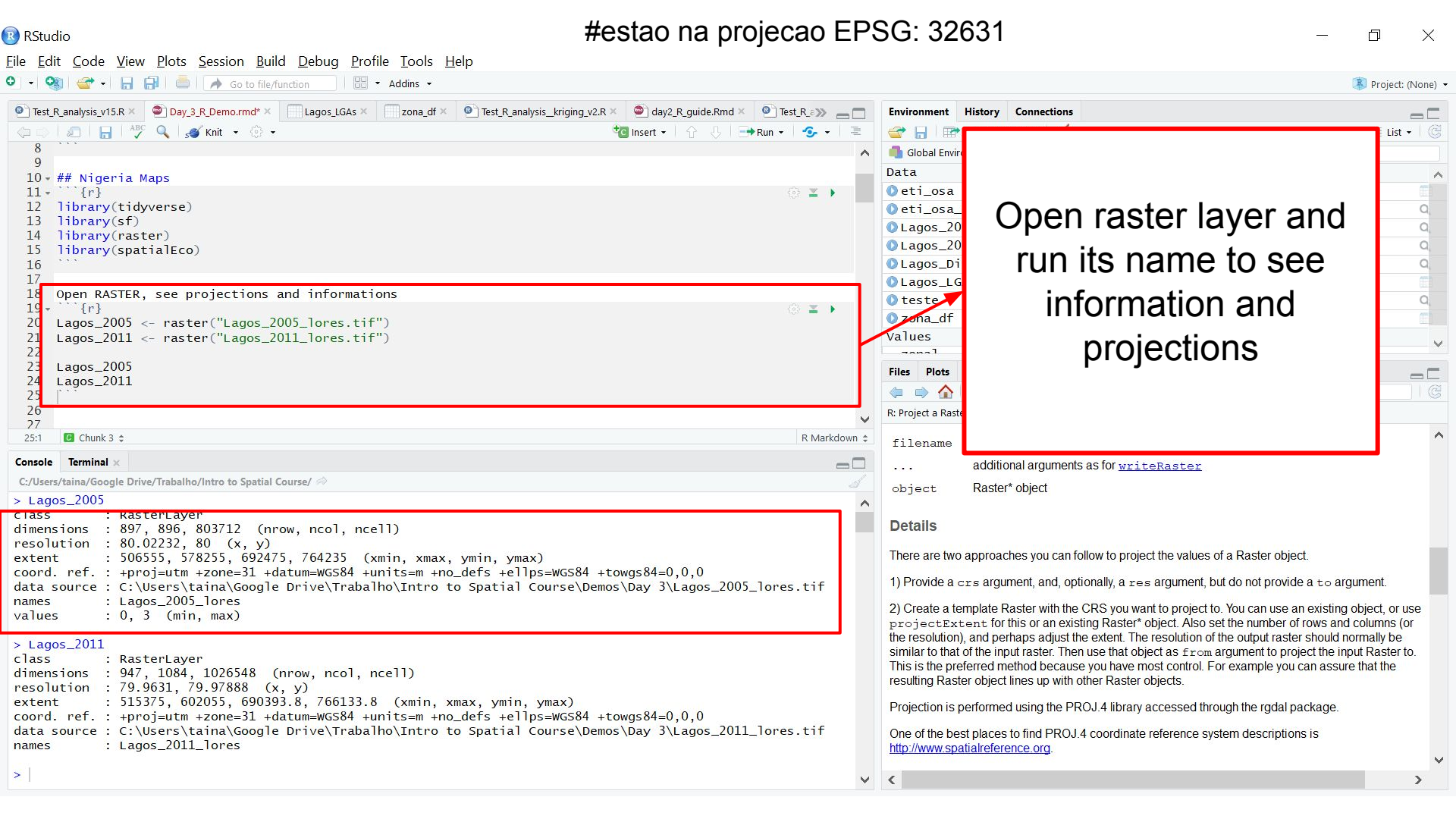
DAY 3 R GUIDE

For Nigeria Data

R-3.5.0


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Test_R_analysis_v15.R
Day_3_R_Demo.rmd*
Lagos_LGAs
zona_df
Test_R_analysis_kriging_v2.R
day2_R_guide.Rmd
Knit
Insert
Run
1 ---
2 title: "Day 3 R Demonstration"
3 output: html_document
4 ---
5
6 ```{r setup, include=FALSE}
7 knitr::opts_chunk$set(echo = F, warning=F, message=F, info=F)
8 ```
9
10 ## Nigeria Maps
11 ```{r}
12 library(tidyverse)
13 library(sf)
14 library(raster)
15 library(spatialEco)
16 ```
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
35:1
Nigeria Maps
R Markdown
Console
Terminal
C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/
+ ggplot() +
+ geom_tile(aes(x=x,y=y, fill=layer)) +
+ theme_minimal() +
+ scale_fill_gradient2(low="purple",high="green",mid="white",midpoint=0) +
+ labs(x="", y="")
>
Environment
History
Connections
Import Dataset
List
Global Environment
Data
eti_osa
eti_osa_
Lagos_2(
Lagos_2(
Lagos_D
Lagos_LG
teste
zona_25
Values
zonal
Files
Plots
R: Project a Rast
filename
...
object
Raster* object
Details
There are two approaches you can follow to project the values of a Raster object.
1) Provide a crs argument, and, optionally, a res argument, but do not provide a to argument.
2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use projectExtent for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as from argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.
Projection is performed using the PROJ.4 library accessed through the rgdal package.
One of the best places to find PROJ.4 coordinate reference system descriptions is
http://www.spatialreference.org.
Create a R Markdown for day 3, save it and load package needed for day 3 class.

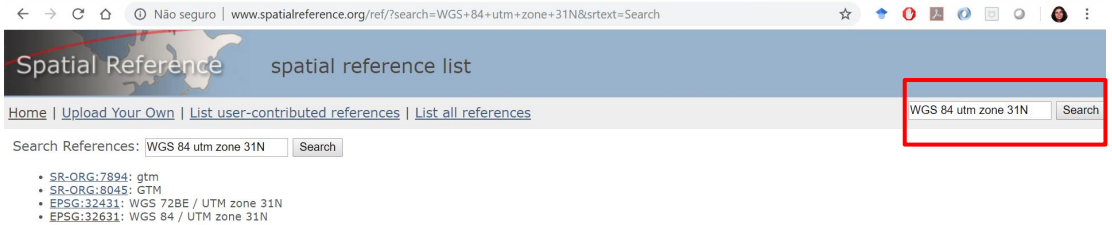

#estao na projecao EPSG: 32631
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Test_R_analysis_v15.R
Day_3_R_Demo.rmd*
Lagos_LGAs
zona_df
Test_R_analysis_kriging_v2.R
day2_R_guide.Rmd
Knit
Insert
Run
Nigeria Maps
```{r}
library(tidyverse)
library(sf)
library(raster)
library(spatialEco)
```
Open RASTER, see projections and informations
```{r}
Lagos_2005 <- raster("Lagos_2005_lores.tif")
Lagos_2011 <- raster("Lagos_2011_lores.tif")
Lagos_2005
Lagos_2011
```
Chunk 3
R Markdown
Console
Terminal
C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/
> Lagos_2005
class : RasterLayer
dimensions : 897, 896, 803712 (nrow, ncol, ncell)
resolution : 80.02232, 80 (x, y)
extent : 506555, 578255, 692475, 764235 (xmin, xmax, ymin, ymax)
coord. ref. : +proj=utm +zone=31 +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0
data source : C:\Users\taina\Google Drive\Trabalho\Intro to Spatial Course\Demos\Day 3\Lagos_2005_lores.tif
names : Lagos_2005_lores
values : 0, 3 (min, max)
> Lagos_2011
class : RasterLayer
dimensions : 947, 1084, 1026548 (nrow, ncol, ncell)
resolution : 79.9631, 79.97888 (x, y)
extent : 515375, 602055, 690393.8, 766133.8 (xmin, xmax, ymin, ymax)
coord. ref. : +proj=utm +zone=31 +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0
data source : C:\Users\taina\Google Drive\Trabalho\Intro to Spatial Course\Demos\Day 3\Lagos_2011_lores.tif
names : Lagos_2011_lores
Environment
History
Connections
Data
eti_osa
eti_osa_
Lagos_20
Lagos_20
Lagos_Di
Lagos_LG
teste
zona_df
Values
Files
Plots
R: Project a Raste
filename
... additional arguments as for writeRaster
object Raster* object
Details
There are two approaches you can follow to project the values of a Raster object.
1) Provide a crs argument, and, optionally, a res argument, but do not provide a to argument.
2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use projectExtent for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as from argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.
Projection is performed using the PROJ.4 library accessed through the rgdal package.
One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.
Open raster layer and run its name to see information and projections

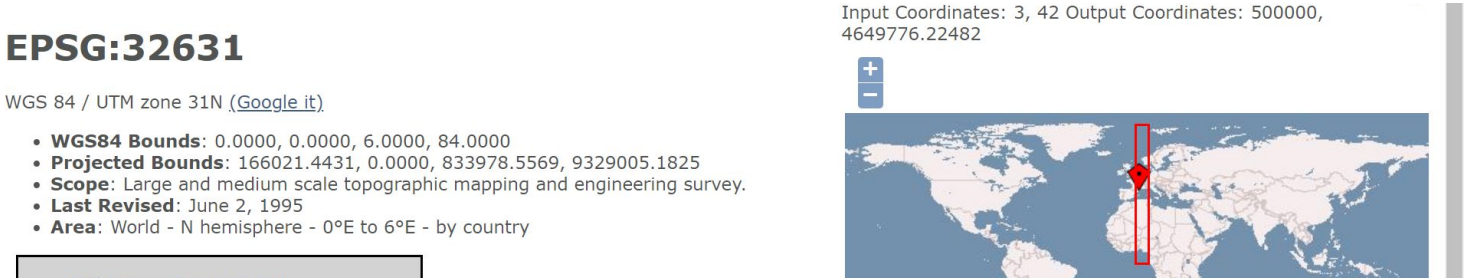
HOW DO I KNOW THE RASTER REFERENCE SYSTEM IN THIS CASE?

```
> Lagos_2005
class       : RasterLayer
dimensions  : 897, 896, 803712  (nrow, ncol, ncell)
resolution  : 80.02232, 80  (x, y)
extent      : 506555, 578255, 692475, 764235  (xmin, xmax, ymin, ymax)
coord. ref. : +proj=utm +zone=31 +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0
data source : C:\Users\taina\Google Drive\Trabalho\Intro to Spatial Course\Demos\Day 3\Lagos_2005_lores.tif
names       : Lagos_2005_lores
values      : 0, 3  (min, max)
```

Open

http://www.spatialreference.org/



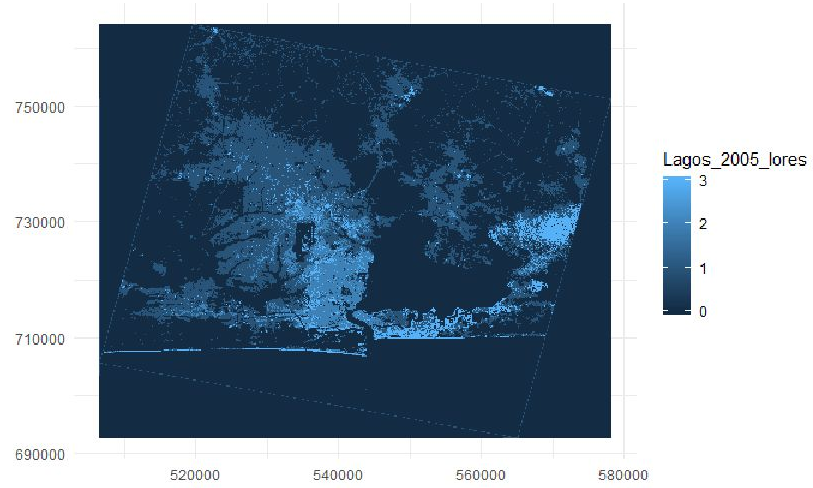
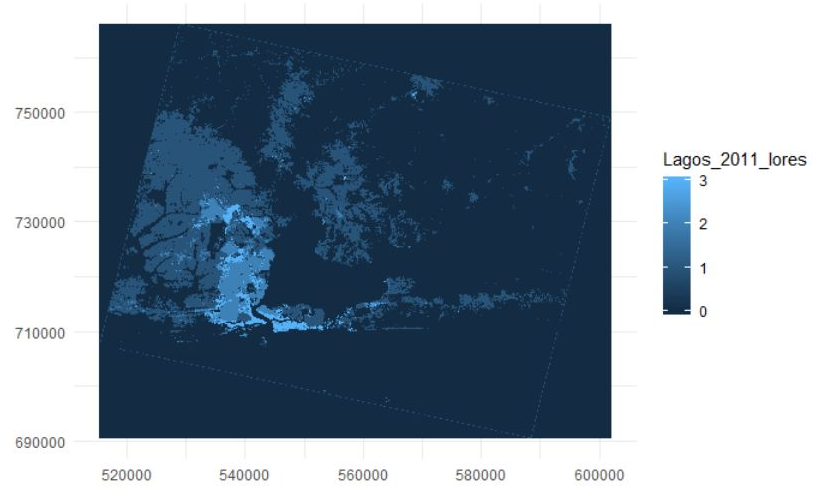


RStudio

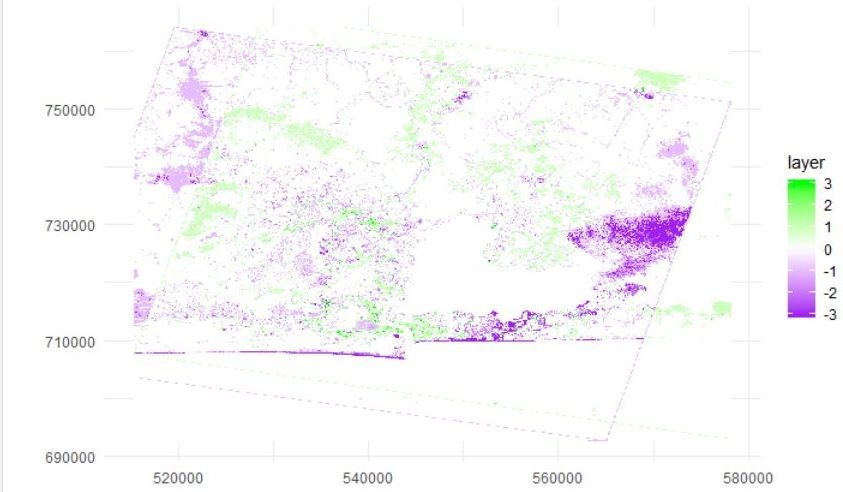
File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | zona_df | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_a

Knit | Insert | Run

```
Plot 2005
```{r}
Lagos_2005 %>% as("SpatialPixelsDataFrame") %>%
  as.data.frame() %>%
  ggplot() +
  geom_tile(aes(x=x,y=y, fill=Lagos_2005_lores)) +
  theme_minimal() +
  labs(x="", y = "")
```
```



35:1 | Chunk 4 | R Markdown

Console | Terminal

C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/

Environment | History | Connections

Import Dataset | List

Global Environment

Data

eti_osa	1 obs. of 19 variables
eti_osa	
Lagos_2	
Lagos_2	
Lagos_D	
Lagos_L	
teste	
zona_df	

Values

Files | Plots

R: Project a Ra

filename

...

object

Plot 2005

Details

There are two approaches you can follow to project the values of a Raster object.

1) Provide a `crs` argument, and, optionally, a `res` argument, but do not provide a `to` argument.

2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use `projectExtent` for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as `from` argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.

Projection is performed using the PROJ.4 library accessed through the rgdal package.

One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | zona_df | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_a

Knit | Insert | Run

```
Plot 2011
```{r}
Lagos_2011 %>% as("SpatialPixelsDataFrame") %>%
  as.data.frame() %>%
  ggplot() +
  geom_tile(aes(x=x,y=y, fill=Lagos_2011_lores)) +
  theme_minimal()+
  labs(x="", y = "")
```
```



48:1 Chunk 5 R Markdown

Console Terminal

C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/

Environment History Connections

Import Dataset | List

Global Environment

Data

eti_osa 1 obs. of 19 variables

Lagos_2

Lagos_2

Lagos_D

Lagos_L

teste

zona_df

Values

Files Plots

R: Project a Ra

filename

...

object

Plot 2011.

Could you see they are different?

Details

There are two approaches you can follow to project the values of a Raster object.

1) Provide a `crs` argument, and, optionally, a `res` argument, but do not provide a `to` argument.

2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use `projectExtent` for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as `from` argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.

Projection is performed using the PROJ.4 library accessed through the rgdal package.

One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | zona_df | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_a

Knit | Insert | Run

```
Calculate and plot land Use Change in Lagos, Nigeria, 2005-11
```{r}
Lagos_Diff <- Lagos_2011 - Lagos_2005

Lagos_Diff %>% as("SpatialPixelsDataFrame") %>%
  as.data.frame() %>%
  ggplot() +
  geom_tile(aes(x=x,y=y, fill=layer)) +
  theme_minimal() +
  scale_fill_gradient2(low="purple",high="green",mid="white",midpoint=0)+
  labs(x="", y="")
```
```



62:1 Chunk 6 R Markdown

Console

Environment | History | Connections

Import Dataset | List

Global Environment

Data

eti_osa	1 obs. of 19 variables
eti_osa	
Lagos_2	
Lagos_2	
Lagos_D	
Lagos_L	
teste	
zona_df	

Values

Files | Plots

R: Project a Ra

```
filename
...
object
```

Details

There are two approaches you can follow to project the values of a Raster object.

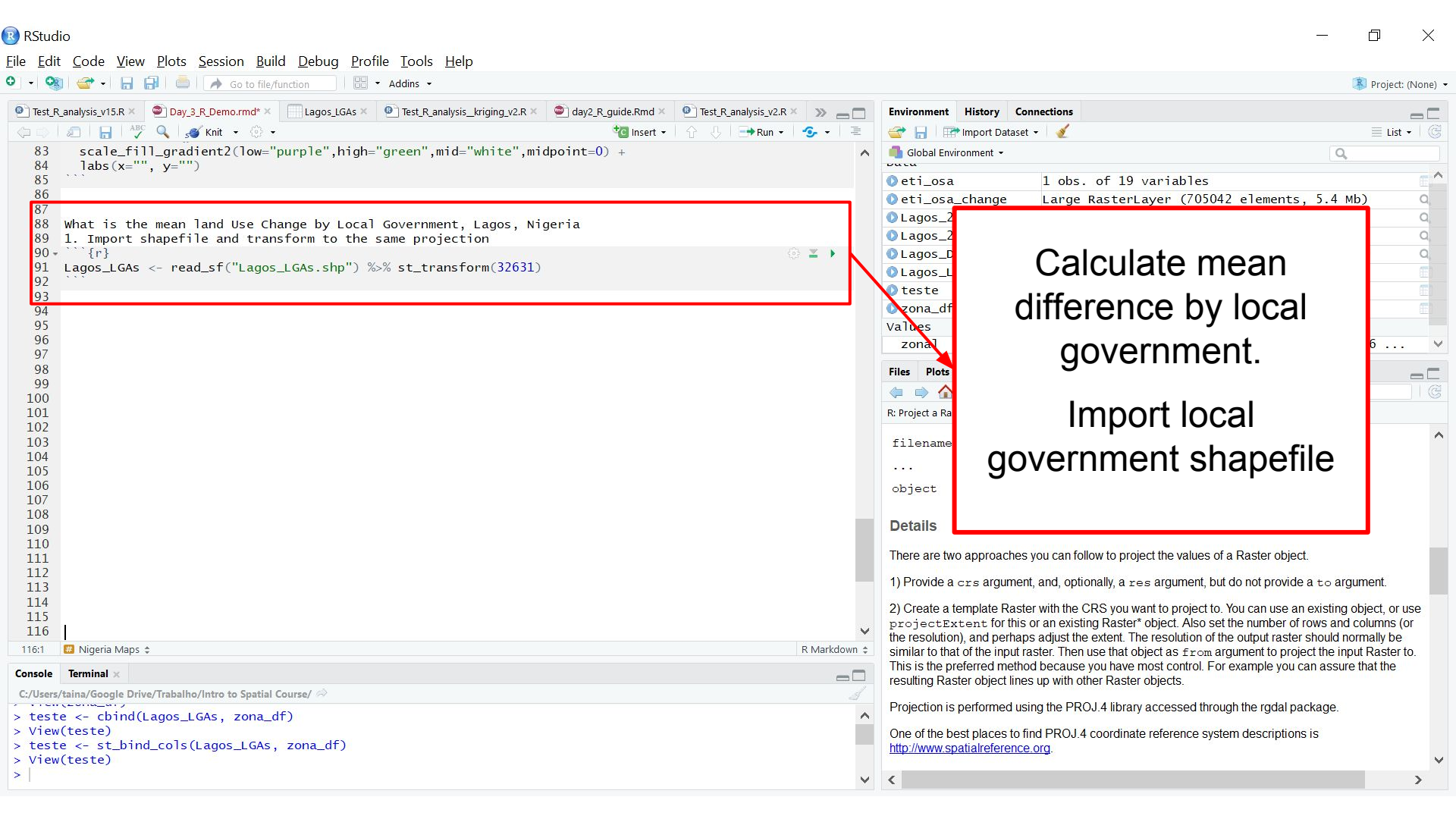
1) Provide a `crs` argument, and, optionally, a `res` argument, but do not provide a `to` argument.

2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use `projectExtent` for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as `from` argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.

Projection is performed using the PROJ.4 library accessed through the rgdal package.

One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.

Calculate the difference between years


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Test_R_analysis_v15.R
Day_3_R_Demo.rmd*
Lagos_LGAs
Test_R_analysis_kriging_v2.R
day2_R_guide.Rmd
Test_R_analysis_v2.R
Knit
Insert
Run
scale_fill_gradient2(low="purple",high="green",mid="white",midpoint=0) +
labs(x="", y="")
What is the mean land Use Change by Local Government, Lagos, Nigeria
1. Import shapefile and transform to the same projection
```{r}
Lagos_LGAs <- read_sf("Lagos_LGAs.shp") %>% st_transform(32631)
Nigeria Maps
R Markdown
Console
Terminal
C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/
> teste <- cbind(Lagos_LGAs, zona_df)
> View(teste)
> teste <- st_bind_cols(Lagos_LGAs, zona_df)
> View(teste)
Environment
History
Connections
Import Dataset
List
Global Environment
eti_osa
1 obs. of 19 variables
eti_osa_change
Large RasterLayer (705042 elements, 5.4 Mb)
teste
zona_df
Values
zonal
Files
Plots
filename
...
object
Details
There are two approaches you can follow to project the values of a Raster object.
1) Provide a crs argument, and, optionally, a res argument, but do not provide a to argument.
2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use projectExtent for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as from argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.
Projection is performed using the PROJ.4 library accessed through the rgdal package.
One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.
Calculate mean difference by local government.
Import local government shapefile
```

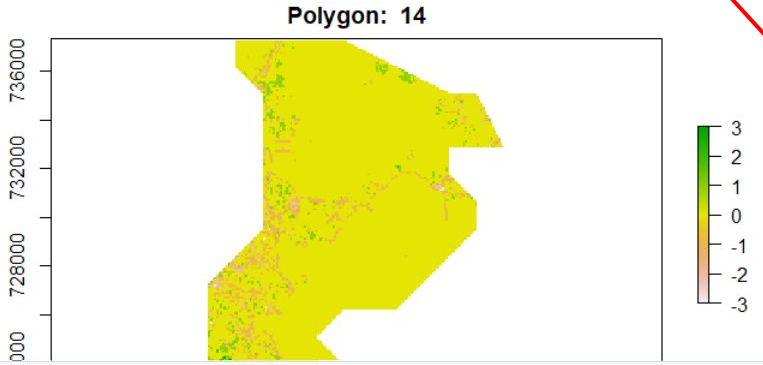
RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_analysis_v2.R

Knit | Insert | Run

```
93
94  2. Perform the calculation
95  ```{r}
96  zonal <- Lagos_LGAs %>% as("Spatial") %>%
97    zonal.stats(Lagos_Diff,stat=function(x) {mean(x, na.rm = T)})
98  ```
```



Environment | History | Connections

Import Dataset | List

Global Environment

eti_osa	1 obs. of 19 variables
eti_osa_change	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_2005	Formal class RasterLayer
Lagos_2011	Formal class RasterLayer
Lagos_Diff	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_LGAs	14 obs. of 19 variables
teste	14 obs. of 20 variables
zona_df	14 obs. of 1 variable
Values	
zonal	num [1:14] -0.0755 NA -0.0256 -0.2725 0.1226 ...

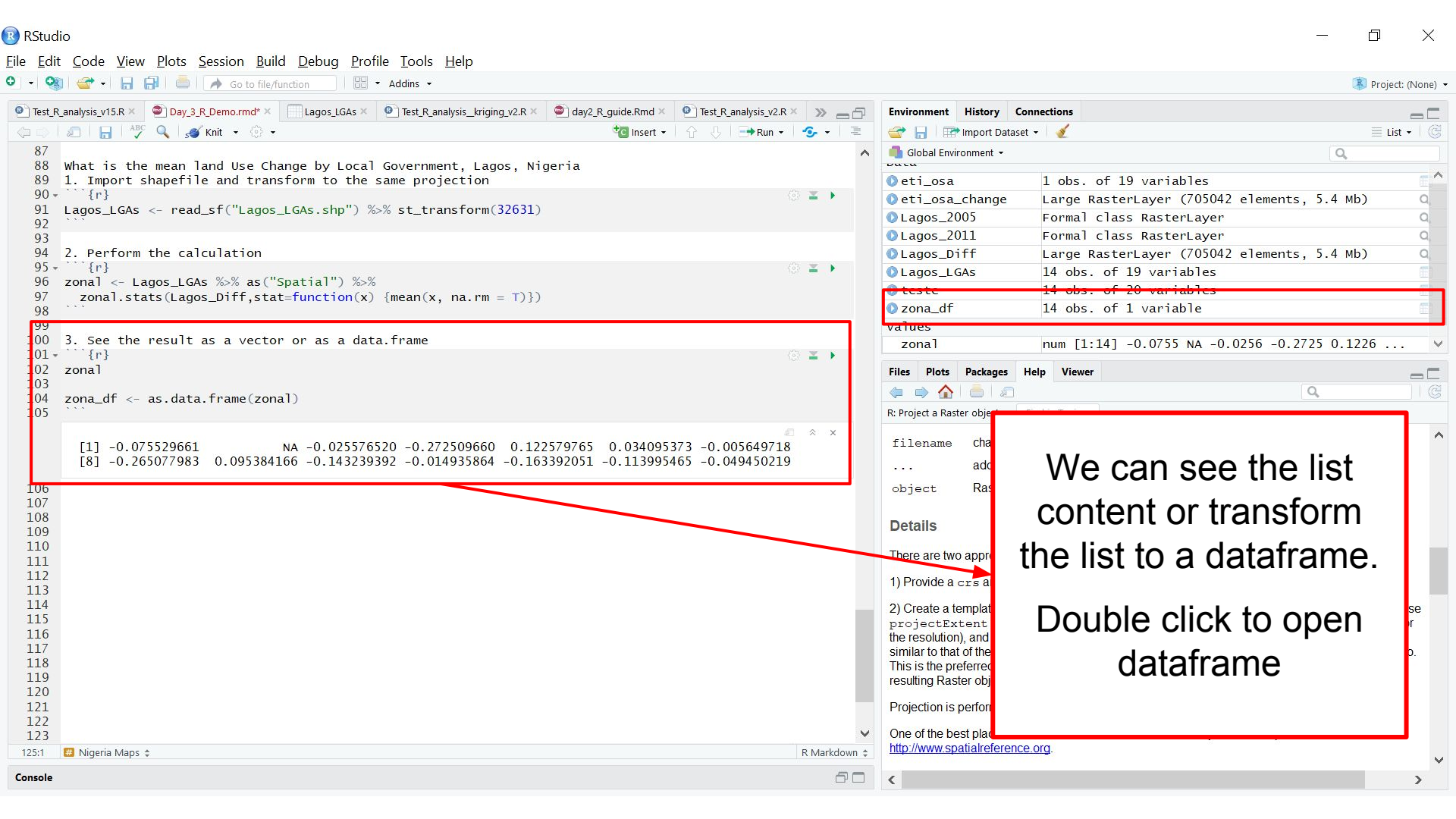
Files | Plots | Packages | Help | Viewer

R: Project a Raster object | Find in Topic

Perform the calculation. The information we want will be stored as a list

98:1 | Chunk 10 | R Markdown

Console


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Test_R_analysis_v15.R
Day_3_R_Demo.rmd*
Lagos_LGAs
Test_R_analysis_kriging_v2.R
day2_R_guide.Rmd
Test_R_analysis_v2.R
Knit
Insert
Run
What is the mean land Use Change by Local Government, Lagos, Nigeria
1. Import shapefile and transform to the same projection
```{r}
Lagos_LGAs <- read_sf("Lagos_LGAs.shp") %>% st_transform(32631)
```
2. Perform the calculation
```{r}
zonal <- Lagos_LGAs %>% as("Spatial") %>%
zonal.stats(Lagos_Diff,stat=function(x) {mean(x, na.rm = T)})
```
3. See the result as a vector or as a data.frame
```{r}
zonal
zona_df <- as.data.frame(zonal)
```
[1] -0.075529661 NA -0.025576520 -0.272509660 0.122579765 0.034095373 -0.005649718
[8] -0.265077983 0.095384166 -0.143239392 -0.014935864 -0.163392051 -0.113995465 -0.049450219
125:1
Nigeria Maps
R Markdown
Console
Environment
History
Connections
Import Dataset
List
Global Environment
eti_osa 1 obs. of 19 variables
eti_osa_change Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_2005 Formal class RasterLayer
Lagos_2011 Formal class RasterLayer
Lagos_Diff Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_LGAs 14 obs. of 19 variables
teste 14 obs. of 20 variables
zona_df 14 obs. of 1 variable
Values
zonal num [1:14] -0.0755 NA -0.0256 -0.2725 0.1226 ...
Files
Plots
Packages
Help
Viewer
R: Project a Raster obje
filename
...
object
Details
There are two appr
1) Provide a crs a
2) Create a templat
projectExtent
the resolution), and
similar to that of the
This is the preferre
resulting Raster obj
Projection is perfor
One of the best pla
http://www.spatialreference.org.
We can see the list content or transform the list to a dataframe.
Double click to open dataframe

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins | Project: (None)

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | zona_df | Lagos_LGAs | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R...

Filter

	zonal
1	-0.075529661
2	NA
3	-0.025576520
4	-0.272509660
5	0.122579765
6	0.034095373
7	-0.005649718
8	-0.265077983
9	0.095384166
10	-0.143239392
11	-0.014935864
12	-0.163392051
13	-0.113995465
14	-0.049450219

Showing 1 to 14 of 14 entries

Console | Terminal

C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/

```
> zonal
 [1] -0.075529661          NA -0.025576520 -0.272509660  0.122579765  0.034095373 -0.005649718
 [8] -0.265077983  0.095384166 -0.143239392 -0.014935864 -0.163392051 -0.113995465 -0.049450219
> View(zona_df)
>
```

Environment | History | Connections

Import Dataset | List

Global Environment

eti_osa	1 obs. of 19 variables
eti_osa_change	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_2005	Formal class RasterLayer
Lagos_2011	Formal class RasterLayer
Lagos_Diff	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_LGAs	14 obs. of 19 variables
teste	14 obs. of 20 variables
zona_df	14 obs. of 1 variable
Values	
zonal	num [1:14] -0.0755 NA -0.0256 -0.2725 0.1226 ...

Files | Plots | Packages | Help | Viewer

R: Project a Raster obje...

filename cha...
... ado...
object Ras...

Details

There are two appr...

1) Provide a crs a...

2) Create a templat... projectExtent... the resolution), and... similar to that of the... This is the preferred... resulting Raster obj...

Projection is perfor...

One of the best pla... http://www.spatialreference.org.

Here is your dataframe

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

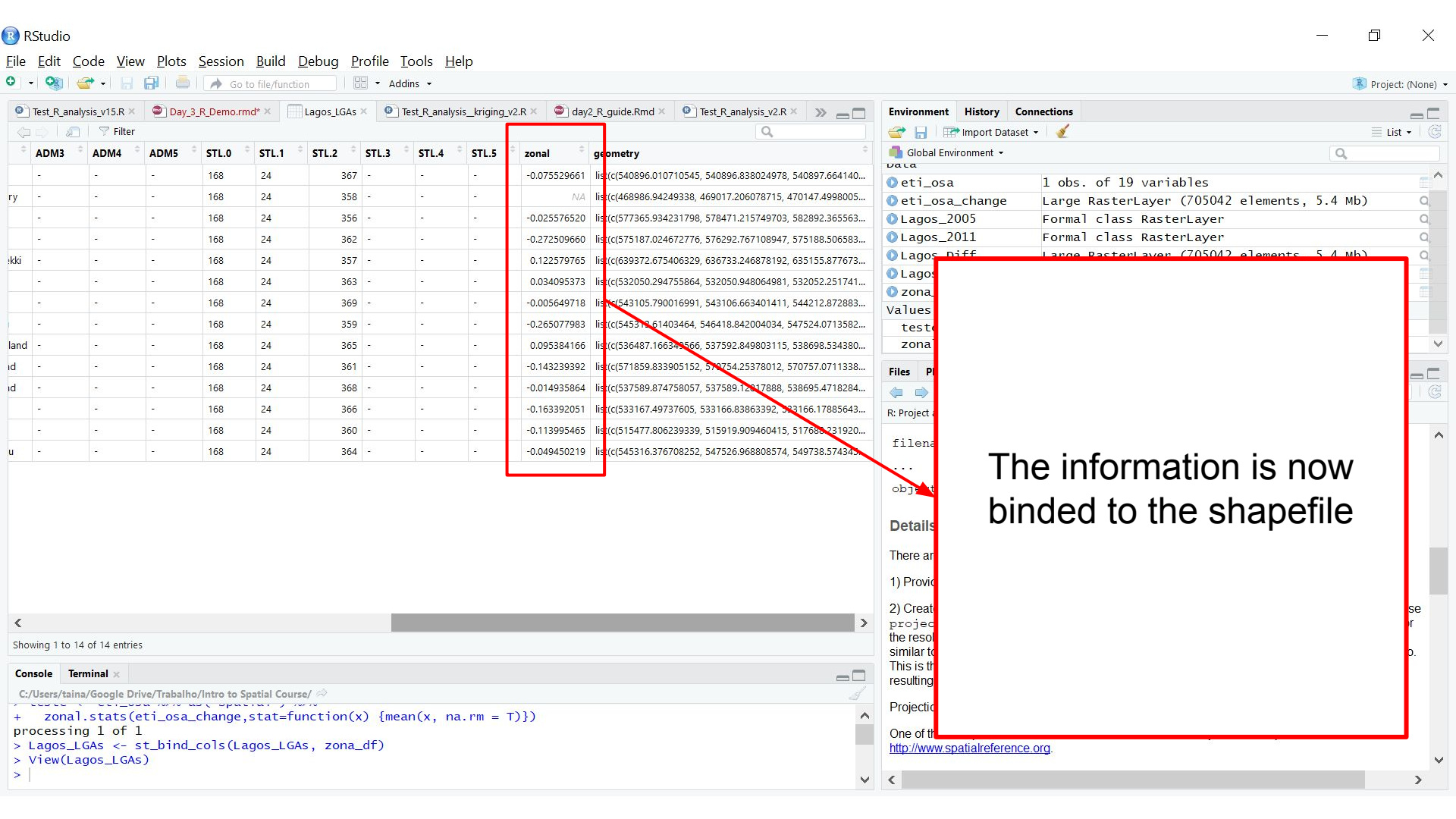
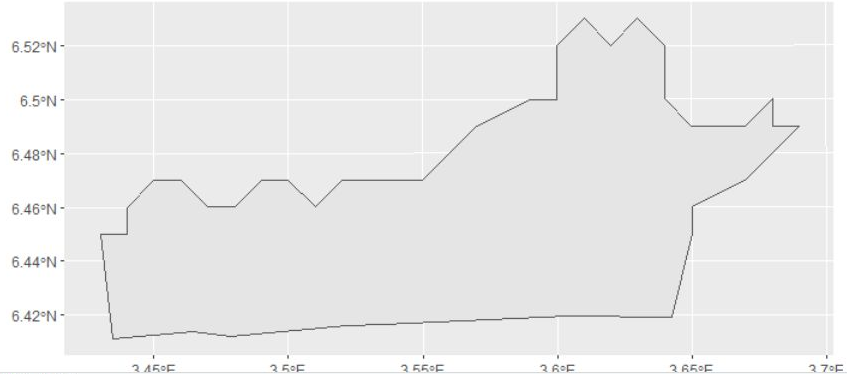
Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_analysis_v2.R | mun_Housing_unit

Knit | Insert | Run

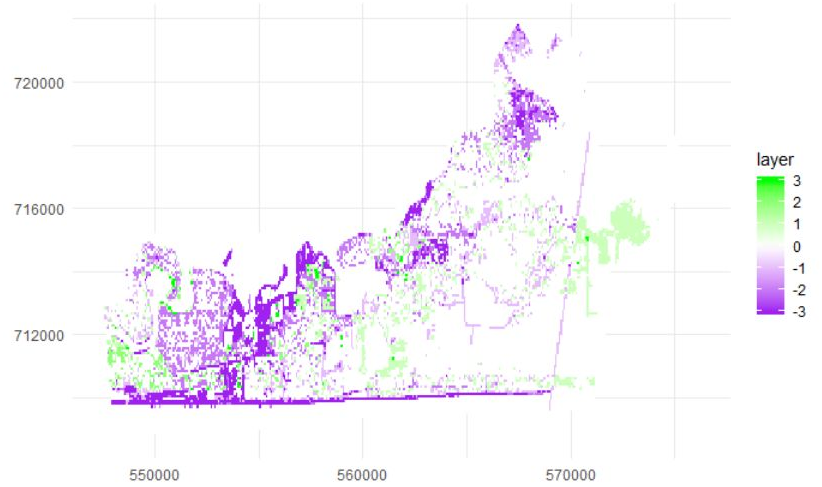
```
What is the mean land Use Change by Local Government, Lagos, Nigeria
1. Import shapefile and transform to the same projection
```{r}
Lagos_LGAs <- read_sf("Lagos_LGAs.shp") %>% st_transform(32631)
```

2. Perform the calculation
```{r}
zonal <- Lagos_LGAs %>% as("Spatial") %>%
  zonal.stats(Lagos_Diff,stat=function(x) {mean(x, na.rm = T)})
```

3. See the result as a vector or as a data.frame
```{r}
zonal

zona_df <- as.data.frame(zonal)
```

4. As the data.frame preserves the shapefile order, we can bind column
```{r}
Lagos_LGAs <- st_bind_cols(Lagos_LGAs, zona_df)
```
```

109:48 Chunk 12 R Markdown

Console Terminal

C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/

```
> teste <- eti_osa %>% as("Spatial") %>%
+   zonal.stats(eti_osa_change,stat=function(x) {mean(x, na.rm = T)})
processing 1 of 1
> Lagos_LGAs <- st_bind_cols(Lagos_LGAs, zona_df)
>
```

Environment | History | Connections

Import Dataset | List

Global Environment

eti_osa	1 obs. of 19 variables
eti_osa_change	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_2005	Formal class RasterLayer
Lagos_2011	Formal class RasterLayer
Lagos_Diff	Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_LGAs	14 obs. of 20 variables
zona_df	14 obs. of 1 variable
Values	
teste	-0.272509660431556
zonal	num [1:14] -0.0755 NA -0.0256 -0.2725 0.1226 ...

Files | Plots | Packages | Help | Viewer

R: Project a Raster obje

filename cha

... ado

object Ras

Details

There are two appr

1) Provide a crs a

2) Create a templat
projectExtent
the resolution), and
similar to that of the
This is the preferre
resulting Raster obj

Projection is perfor

One of the best pla
http://www.spatialreference.org.

We can bind the new dataframe to the shapefile


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Test_R_analysis_v15.R
Day_3_R_Demo.rmd*
Lagos_LGAs
Test_R_analysis_kriging_v2.R
day2_R_guide.Rmd
Test_R_analysis_v2.R
Filter
ADM3 ADM4 ADM5 STL.0 STL.1 STL.2 STL.3 STL.4 STL.5 zonal geometry
-0.075529661 list(c(540896.010710545, 540896.838024978, 540897.664140...
NA list(c(468986.94249338, 469017.206078715, 470147.4998005...
-0.025576520 list(c(577365.934231798, 578471.215749703, 582892.365563...
-0.272509660 list(c(575187.024672776, 576292.767108947, 575188.506583...
0.122579765 list(c(639372.675406329, 636733.246878192, 635155.877673...
0.034095373 list(c(532050.294755864, 532050.948064981, 532052.251741...
-0.005649718 list(c(543105.790016991, 543106.663401411, 544212.872883...
-0.265077983 list(c(545313.61403464, 546418.842004034, 547524.0713582...
0.095384166 list(c(536487.166349566, 537592.849803115, 538698.534380...
-0.143239392 list(c(571859.833905152, 570754.25378012, 570757.0711338...
-0.014935864 list(c(537589.874758057, 537589.12917888, 538695.4718284...
-0.163392051 list(c(533167.49737605, 533166.83863392, 533166.17885643...
-0.113995465 list(c(515477.806239339, 515919.909460415, 517688.231920...
-0.049450219 list(c(545316.376708252, 547526.968808574, 549738.574345...
Showing 1 to 14 of 14 entries
Console Terminal
C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/
+ zonal.stats(eti_osa_change,stat=function(x) {mean(x, na.rm = T)})
processing 1 of 1
> Lagos_LGAs <- st_bind_cols(Lagos_LGAs, zona_df)
> View(Lagos_LGAs)
Environment History Connections
Import Dataset
List
Global Environment
Data
eti_osa 1 obs. of 19 variables
eti_osa_change Large RasterLayer (705042 elements, 5.4 Mb)
Lagos_2005 Formal class RasterLayer
Lagos_2011 Formal class RasterLayer
Values
Files
The information is now binded to the shapefile
http://www.spatialreference.org.

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | zona_df | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_a

Knit | Insert | Run

```
63
64  Whats the difference in a specific region?
65  1. filter for the region, plot it and check its projection
66  ```{r}
67  eti_osa <- Lagos_LGAs %>% filter(ADM2 == "Eti-Osa")
68
69  eti_osa %>% ggplot() + geom_sf()
70
71  eti_osa
72  ```
```



71:1 Chunk 7 R Markdown

Console Terminal

C:/Users/taina/Google Drive/Trabalho/Intro to Spatial Course/

```
bbox:           xmin: 547547.8 ymin: 708666.5 xmax: 576292.8 ymax: 721836.1
epsg (SRID):    32631
proj4string:    +proj=utm +zone=31 +datum=WGS84 +units=m +no_defs
> eti_osa %>% ggplot() + geom_sf()
>
```

Environment History Connections

Import Dataset | List

Global Environment

Data

eti_osa	1 obs. of 19 variables
eti_osa	
Lagos_2	
Lagos_2	
Lagos_D	
Lagos_L	
teste	
zona_df	

Values

Files Plots

R: Project a Ra

filename

...

object

Details

There are two approaches you can follow to project the values of a Raster object.

1) Provide a `crs` argument, and, optionally, a `res` argument, but do not provide a `to` argument.

2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use `projectExtent` for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as `from` argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.

Projection is performed using the PROJ.4 library accessed through the rgdal package.

One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.

What if we want the difference for just one region?

Create a polygon for the region

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Test_R_analysis_v15.R | Day_3_R_Demo.rmd* | Lagos_LGAs | zona_df | Test_R_analysis_kriging_v2.R | day2_R_guide.Rmd | Test_R_a

Knit | Insert | Run

```
2. Clip difference raster and plot it
```{r}
eti_osa_change <- Lagos_Diff %>% mask(as(eti_osa, "Spatial"))

eti_osa_change %>% as("SpatialPixelsDataFrame") %>%
  as.data.frame() %>%
  ggplot() +
  geom_tile(aes(x=x,y=y, fill=layer)) +
  theme_minimal() +
  scale_fill_gradient2(low="purple",high="green",mid="white",midpoint=0) +
  labs(x="", y="")
```
```



74:38 Nigeria Maps R Markdown

Console

Environment History Connections

Import Dataset List

Global Environment

Data

eti_osa	1 obs. of 19 variables
eti_osa	
Lagos_2	
Lagos_2	
Lagos_D	
Lagos_L	
teste	
zona_df	

Values

Files Plots

R: Project a Ra

filename

...

object

Details

There are two approaches you can follow to project the values of a Raster object.

1) Provide a `crs` argument, and, optionally, a `res` argument, but do not provide a `to` argument.

2) Create a template Raster with the CRS you want to project to. You can use an existing object, or use `projectExtent` for this or an existing Raster* object. Also set the number of rows and columns (or the resolution), and perhaps adjust the extent. The resolution of the output raster should normally be similar to that of the input raster. Then use that object as `from` argument to project the input Raster to. This is the preferred method because you have most control. For example you can assure that the resulting Raster object lines up with other Raster objects.

Projection is performed using the PROJ.4 library accessed through the rgdal package.

One of the best places to find PROJ.4 coordinate reference system descriptions is http://www.spatialreference.org.

For rasters clip is called “mask”.

Plot the result