

Лабораторна робота 7

Юрій Харченко

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Продовження роботи, розпочатої в Самостійна робота 1

Підключимо потрібні пакети

```
library(WDI)
library(dplyr)

##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:stats':
##
##   filter, lag
##
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(psych)
library(pander)
```

Назви змінних із Світового банку - сільське господарство

```
year <- 2014L

vars <- c(
  "AG.LND.TOTL.K2",
  "AG.LND.AGRI.ZS",
  "AG.LND.IRIG.AG.ZS",
  "AG.LND.ARBL.ZS",
  "AG.LND.ARBL.HA.PC",
  "AG.YLD.CREL.KG",
  "SP.RUR.TOTL",
  "SP.RUR.TOTL.ZS"
)

varNames <- c(
  "Land area (sq km)",
  "Agricultural land (% of land area)",
  "Agricultural irrigated land (% of total agricultural land)",
  "Arable land (% of land area)",
  "Arable land (hectares per person)",
  "Cereal yield (kg per hectare)",
  "Rural population",
```

```
"Rural population (% of total population)"
)
```

Завантажемо дані вибраних змінних

```
df <- WDI(country="all", indicator=vars, start=year, end=year, extra = TRUE) %>%
  filter(region != "Aggregates") %>%
  select(iso2c, country, region, vars)
```

```
## Note: Using an external vector in selections is ambiguous.
## i Use `all_of(vars)` instead of `vars` to silence this message.
## i See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This message is displayed once per session.
```

```
names(df) <- c("iso2c", "country", "region", varNames)
pander(summary(df))
```

Table 1: Table continues below

iso2c	country	region	Land area (sq km)
Length:217	Length:217	Length:217	Min. : 2
Class :character	Class :character	Class :character	1st Qu.: 10065
Mode :character	Mode :character	Mode :character	Median : 90530
NA	NA	NA	Mean : 592137
NA	NA	NA	3rd Qu.: 429764
NA	NA	NA	Max. :16376870
NA	NA	NA	NA's :2

Table 2: Table continues below

Agricultural land (% of land area)	Agricultural irrigated land (% of total agricultural land)
Min. : 0.5654	Min. : 0.00962
1st Qu.:19.5378	1st Qu.: 1.10718
Median :38.8532	Median : 7.74789
Mean :37.7298	Mean :12.74784
3rd Qu.:54.7349	3rd Qu.:19.28253
Max. :82.5597	Max. :59.36916
NA's :9	NA's :179

Table 3: Table continues below

Arable land (% of land area)	Arable land (hectares per person)
Min. : 0.00219	Min. :0.000102
1st Qu.: 2.97955	1st Qu.:0.045930
Median :10.38344	Median :0.121898
Mean :14.10293	Mean :0.196644
3rd Qu.:20.40389	3rd Qu.:0.245621
Max. :58.91526	Max. :2.000240
NA's :11	NA's :12

Cereal yield (kg per hectare)	Rural population	Rural population (% of total population)
Min. : 34.3	Min. : 0	Min. : 0.00
1st Qu.: 1589.1	1st Qu.: 196267	1st Qu.:20.72
Median : 2992.5	Median : 1885795	Median :39.56
Mean : 3478.1	Mean : 15737568	Mean :40.26
3rd Qu.: 4513.2	3rd Qu.: 9513920	3rd Qu.:58.82
Max. :24485.7	Max. :876035725	Max. :88.22
NA's :37	NA's :3	NA's :3

Описові статистики отриманих даних

```
df %>%
  select(all_of(varNames)) %>%
  describe(na.rm = TRUE) %>%
  as.data.frame() %>%
  pander(style = "grid", use.hyphenating = TRUE, split.cells = 3)
```

Table 5: Table continues below

	vars	n	mean	sd	median	trimmed
Land area (sq km)	1	215	592137	1755697	90530	221398
Agricultural land (% of land area)	2	208	37.73	22.31	38.85	37.31
Agricultural irrigated land (% of total agricultural land)	3	38	12.75	14.69	7.748	10.53
Arable land (% of land area)	4	206	14.1	13.48	10.38	12.05
Arable land (hectares per person)	5	205	0.1966	0.2533	0.1219	0.1483
Cereal yield (kg per hectare)	6	180	3478	3014	2992	3066
Rural population	7	214	15737568	74839945	1885795	4582340
Rural population (% of total population)	8	214	40.26	24.15	39.56	39.92

Table 6: Table continues below

	mad	min	max	range	skew
Land area (sq km)	133642	2	16376870	16376868	5.769

	mad	min	max	range	skew
Agricultural land (% of land area)	27.15	0.5654	82.56	81.99	0.1145
Agricultural irrigated land (% of total agricultural land)	10.53	0.009615	59.37	59.36	1.424
Arable land (% of land area)	11.48	0.002193	58.92	58.91	1.281
Arable land (hectares per person)	0.1376	0.0001024	2	2	3.626
Cereal yield (kg per hectare)	2184	34.3	24486	24451	3.414
Rural population	2764323	0	8.76e+08	8.76e+08	9.649
Rural population (% of total population)	28.12	0	88.22	88.22	0.111

	kurtosis	se
Land area (sq km)	38.58	119738
Agricultural land (% of land area)	-1.044	1.547
Agricultural irrigated land (% of total agricultural land)	1.539	2.382
Arable land (% of land area)	1.134	0.9392
Arable land (hectares per person)	18.42	0.01769
Cereal yield (kg per hectare)	18.83	224.7
Rural population	99.05	5115953
Rural population (% of total population)	-1.054	1.651