Do Women Promote Different Policies than Men? Part III: Estimating an Average Causal Effect

Let's continue working with the data from the experiment in India. As a reminder, Table 1 shows the names and descriptions of the variables in this dataset, where the unit of observation is villages.

variable	description
village	village identifier ("Gram Panchayat number _ village number")
female	whether village was assigned a female politician: 1=yes, 0=no
water	number of new (or repaired) drinking water facilities in the village since random assignment
irrigation	number of new (or repaired) irrigation facilities in the village since random assignment

Table 1: Variables in "india.csv"

In this problem set, we practice (1) how to estimate an average treatment effect using data from a randomized experiment and (2) how to write a conclusion statement.

As always, we start by loading and looking at the data:

```
## load and look at the data
india <- read.csv("india.csv") # reads and stores data
head(india) # shows first observations
##          village female water irrigation
## 1 GP1_village2      1    10          0
## 2 GP1_village1      1     0          5
## 3 GP2_village2      1     2          2
## 4 GP2_village1      1    31          4
## 5 GP3_village2      0     0          0
## 6 GP3_village1      0     0          0
```

1. Considering that the dataset we are analyzing comes from a randomized experiment, what can we compute to estimate the average causal effect of having a female politician on the number of new (or repaired) drinking water facilities? Please provide the name of the estimator. (5 points)
2. In this dataset, what is the average number of new (or repaired) drinking water facilities in villages with a female politician? Please answer with a full sentence. (10 points)
3. What is the average number of new (or repaired) drinking water facilities in villages with a male politician? Please answer with a full sentence. (10 points)
4. What is the estimated average causal effect of having a female politician on the number of new (or repaired) drinking water facilities? Please provide a full substantive answer (make sure to include the assumption, why the assumption is reasonable, the treatment, the outcome, as well as the direction, size, and unit of measurement of the average treatment effect) (25 points)