

Impact of Natural-Calamities on the Economy

Synopsis

Storms, Tornadoes and several other Natural-Calamities cause public-health-safety and economic problems, for communities and municipalities.

Many of these calamities result in fatalities, injuries, and property damage.

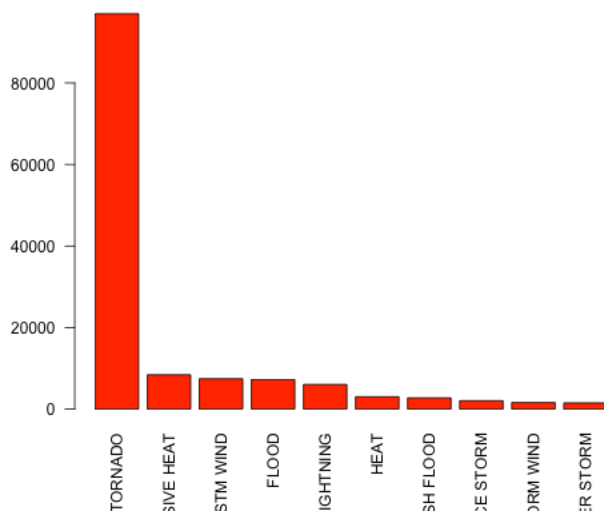
Preventing these calamities to the extent possible is a key concern.

This report downloads data from NOAA Storm Database and performs a statistical analysis on the impact of physical events to population health and economy.

Examining the event-types, it is observed that most of the physical phenomena cause injuries to people, which sometimes are fatal.

Analysing the event-types and their impact on the economy, we observe that these events caused \$15 billions damage to property, in the last 60 years.

By far, Tornadoes are the most dangerous of these events, caused ~100.000 injuries on the last 60 years.



Data Processing

Load / Storing: stormdata

- Data is downloaded from: <https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2FStormData.csv.bz2>
- It exists in zipped-format.
- It is downloaded and un-zipped it is stored in a data-frame stormdata

```
fileurl <- "https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2FStormData.csv.bz2"
download.file(fileurl, destfile = "tempdata.csv.bz2", method = "curl")
stormdata <- read.csv("./tempdata.csv.bz2")
```

Process

The Data is then processed and analyzed to:

- Calculate injuries to humans: "damages" dataframe is used to aggregate both fatal and non-fatal injuries.
- Assess the economic impact by calculating the exponential value of the property and corp damage in data frame "economic".
- Two smaller data frames, "dam" and "eco", are created to calculate the top 10 events in human and economic impact.

Loading required packages and creating required subsets

```

library(Hmisc)
library(reshape)
library(ggplot2)
library(car)

stormdata$EVTYPE <- capitalize(tolower(stormdata$EVTYPE))

damages <- aggregate(cbind(FATALITIES, INJURIES) ~ EVTYPE, stormdata, sum)
dam <- melt(head(damages[order(-damages$FATALITIES, -damages$INJURIES), ], 10))

stormdata$PROPDMG <- stormdata$PROPDMG * as.numeric(Recode(stormdata$PROPDMGEXP,
"'0'=1;'1'=10;'2'=100;'3'=1000;'4'=10000;'5'=100000;'6'=1000000;'7'=10000000;'8'=100000000;'B'=1000000000
'=0;'?'=0;'+'=0",
as.factor.result = FALSE))
stormdata$CROPDMG <- stormdata$CROPDMG * as.numeric(Recode(stormdata$CROPDMGEXP,
"'0'=1;'2'=100;'B'=1000000000;'k'=1000;'K'=1000;'m'=1000000;'M'=1000000;'=0;'?'=0",
as.factor.result = FALSE))

economic <- aggregate(cbind(PROPDMG, CROPDMG) ~ EVTYPE, stormdata, sum)
eco <- melt(head(economic[order(-economic$PROPDMG, -economic$CROPDMG), ], 10))

```

Results

Human casualties

Question:

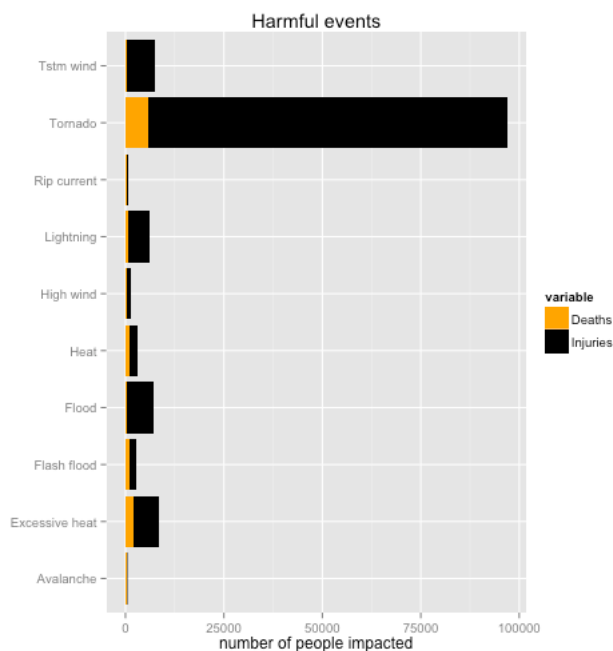
Across the United States, which types of events (as indicated in the EVTYPE variable) are most harmful with respect to population health?

Using the ggplot2 library, a combined flipped barplot graph of the fatal (Deaths) and non-fatal Injuries, by event type - is created.

```

ggplot(dam, aes(x = EVTYPE, y = value, fill = variable)) + geom_bar(stat = "identity") +
  coord_flip() + ggtitle("Harmful events") + labs(x = "", y = "number of people impacted") +
  scale_fill_manual(values = c("orange", "black"), labels = c("Deaths", "Injuries"))

```



Economic impact

Question:

Across the United States, which types of events have the greatest economic consequences?

Using the ggplot2 library a flipped barplot graph of the property and crop damages, by event type - is created.

```
ggplot(eco, aes(x = EVTYPE, y = value, fill = variable)) + geom_bar(stat = "identity") +
  coord_flip() + ggtitle("Economic consequences") + labs(x = "", y = "cost of damages in
dollars") +
  scale_fill_manual(values = c("orange", "black"), labels = c("Property Damage",
"Crop Damage"))
```

