Almond Model Yield Profit

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Read in data

```
climdf<- read.table("data/clim.txt", sep = "",
                    na.strings ="", stringsAsFactors= F)
```

Computed Yield Anomaly

```
climdf_summary <- climdf %>%
  filter(year != 1988) %>%
  group_by(year) %>%
  summarise(t_min = mean(tmin_c),
            t_max = mean(tmax_c),
            precip_mean = sum(precip),
            yield_anom = yield_model(climdf,
                                     yearforyield = year,
                                     crop = "almond")
  )
```

Explore Yield Data

```
climdf_summary
```

```
## # A tibble: 22 x 5
##     year t_min t_max precip_mean yield_anom
##    <int> <dbl> <dbl>       <dbl>      <dbl>
##  1  1989  11.7  22.3        146.     -0.355
##  2  1990  11.7  22.6        136.      9.29
##  3  1991  12.1  21.5        493.     68.9
##  4  1992  13.2  23.1        576.     15.4
##  5  1993  13.0  23.0        703.     20.2
##  6  1994  11.9  21.9        411.      2.48
##  7  1995  13.2  21.4       1169.   1920.
##  8  1996  12.9  21.3        498.      3.58
##  9  1997  13.2  22.5        443.    330.
## 10  1998  11.9  21.2        964.     27.9
## # ... with 12 more rows
```

Test Yield Profit

```
#Testing error messages
#yld_profdf <- yield_profit(yield_df=climdf_summary, price_per_ton=10, opcost_per_acre=500)
#yld_profdf <- yield_profit(yield_df=climdf_summary, price_per_ton=-10, opcost_per_acre=500)
#yld_profdf <- yield_profit(yield_df=climdf_summary, price_per_ton=10, opcost_per_acre=-500)
#yld_profdf <- yield_profit(yield_df=climdf, price_per_ton=10, opcost_per_acre=500)
```

Generate Parameters for Informal Sensitivity Analysis

```
deviation = 0.50
basealmondprice = 4000
price_per_ton = runif(min=basealmondprice-deviation*basealmondprice,
                max = basealmondprice+deviation*basealmondprice, n=20)
```

```
deviation = 0.50
baseopcost = 3900
opcost_per_acre = runif(min=basealmondprice-deviation*basealmondprice,
                max = basealmondprice+deviation*basealmondprice, n=20)
```

```
params_variability <- cbind.data.frame(price_per_ton,opcost_per_acre)
```

Generate results using parameters generated

```
results <- params_variability %>%
            pmap(yield_profit,yield_df=climdf_summary)
```

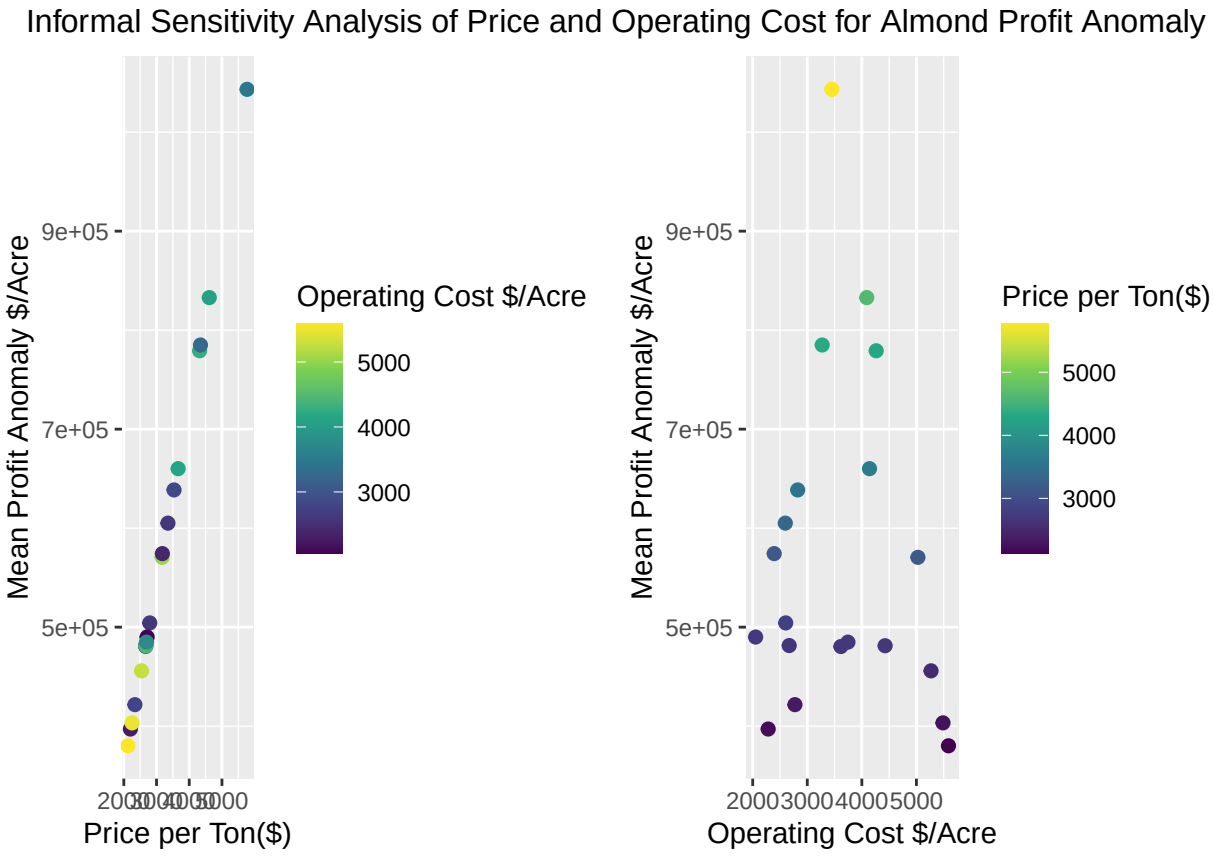
Visualize parameters from sensitivity analysis

```
# now we can extract results from the list as above
mean_profit_anom = map_df(results,`[`, c("mean"))
# and we can add the parameter values for each run
mean_profit_anom = cbind.data.frame(mean_profit_anom, params_variability)

# plot - pick on of the 2 parameter as a color

p1 = ggplot(mean_profit_anom, aes(price_per_ton, mean, col=opcost_per_acre))+
  geom_point(cex=2)+
  labs(y="Mean Profit Anomaly $/Acre", x="Price per Ton($)",
       col="Operating Cost $/Acre") +
  scale_color_viridis_c()
p2 = ggplot(mean_profit_anom, aes(opcost_per_acre, mean, col=price_per_ton))+
  geom_point(cex=2)+
  labs(y="Mean Profit Anomaly $/Acre", x="Operating Cost $/Acre",
       col="Price per Ton($)")+
  scale_color_viridis_c()
```

```
combined_plot <- ggarrange(p1,p2)
combined_plot <-
  annotate_figure(combined_plot,
                  top = text_grob("Informal Sensitivity Analysis of Price and Operating Cost for Almond
combined_plot
```




```
ggsave("figs/sensitivity_almond_profit_anom.jpg",combined_plot, width = 10, height = 7)
```