Evaluating Profit based Crop cultivation

in Dapoli,Maharashtra

MASTER OF SCIENCE

(COMPUTER SCIENCE)

2019-2020

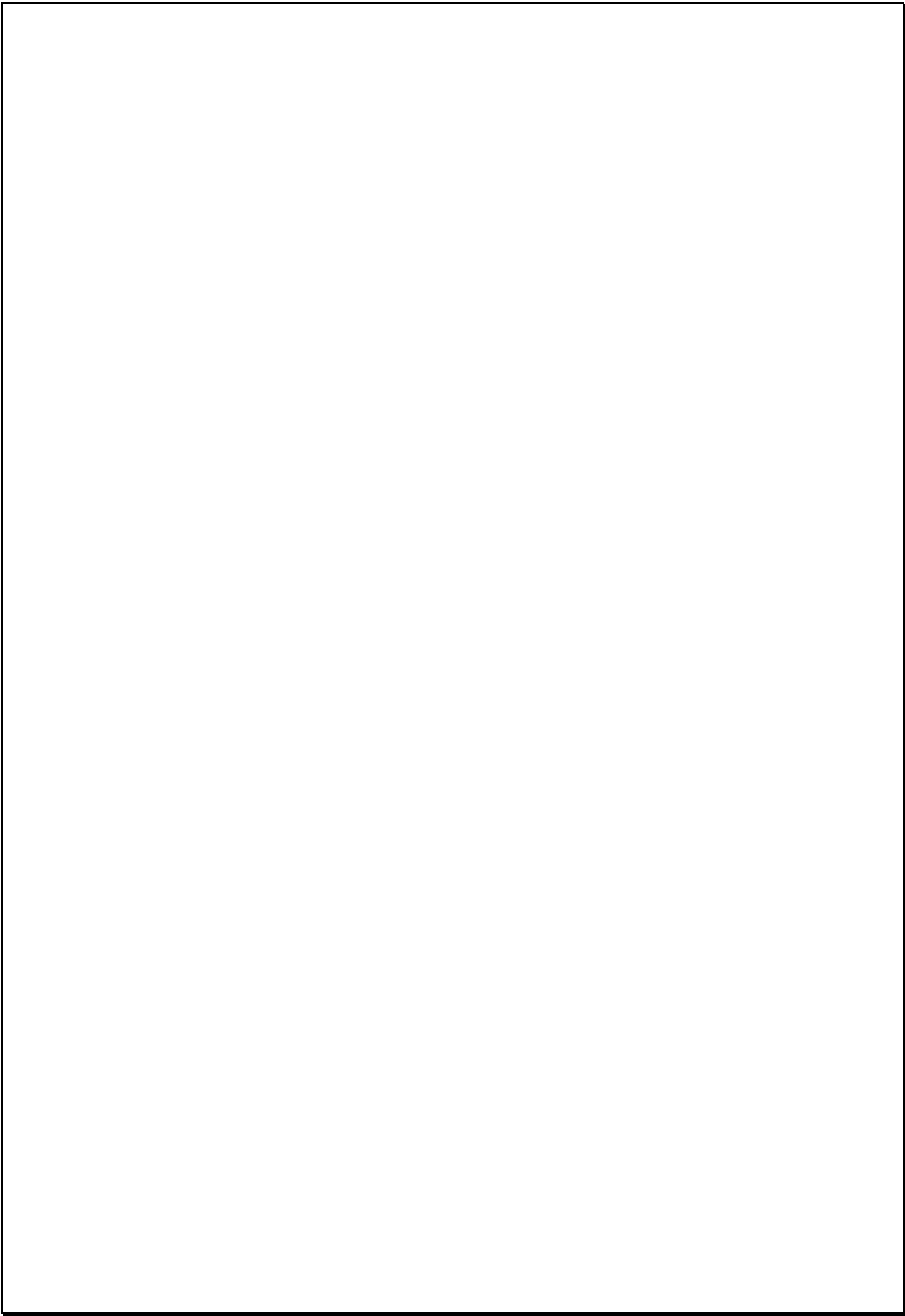SUBMITTED BY

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DEPARMENT OF COMPUTER SCIENCE & IT (2019-20)

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<u>ACKNOWLEDGEMENT</u>

Achievement is finding out what you would be doing rather than what you have to do. It is not until you undertake such a project that you realize how much effort and hard work it really takes, what are your capabilities and how well you can present yourself or other things. It tells us how much we rely on the efforts and goodwill of others. It gives me immense pleasure to present this report towards the fulfillment of my project.

It has been rightly said that we are built on the shoulder of others. For everything I have achieved, the credit goes to all those who had helped me including **Tahsildar of Dapoli** ,who help me to get the required data, to complete this project successfully.

I take this opportunity to express my profound gratitude to management of **Ramnarain Ruia Autonomous College** for giving me this opportunity to accomplish this project work.

A special vote of thanks to **Prof. Edit Juni ,**who is my professor & project guide, for his most sincere, useful and encouraging contribution throughout the project span.

Finally, I would like to thank Head of department of Computer Science **Prof. Megha Sawant** who directly or indirectly helped me in completion of this project & to my family without whose encouragement this would not have been possible.

Numair Nisar Nakhwa

ABSTRACT

It's hard to be successful at farming or any other enterprise without a plan. Many hail the romanticism of farming, but in reality, farming is a business, in most cases, a multimillion dollar business, and one that often involves multiple generations or partners.

Managing a farm business goes beyond the annual profit/loss. It's more than controlling costs or even knowing how to get the most benefit from tax laws.

Here you will find insight into some of the key issues about the business end of farming, from marketing strategies to personnel management and passing the operation to the next generation.

Farming is fraught with challenges. Weather, market fluctuations, family, and production issues all have the potential to put a kink in even the best-laid plans. That's where **having a whole farm plan that outlines the farm's mission and objectives** comes in.

Business Analysis and Effective Algorithms helps to attain a bird's eye view of the Farming operation which can help you address all components and Factors to increase the yield of the final Product. Having a comprehensive plan in place will help guide the farm when the unexpected occurs.

Launching a Farming business requires research. There are any numbers of **crops that can fit into an existing operation, it's a matter of determining which one is right for you.** Options range from Non Food Crops and varieties of traditional crops, to vegetables and Fruits like Mango that can serve as a main Source of income during the summer.

LITERATURE REVIEW

Business in Agriculture Industry requires relevant data for appropriate, effective and reliable decisions. The concept of Business Intelligence which has been successfully established in a lot of organizations necessitates gathering relevant internal as well as external data which are often hardly acquirable. The aim of this paper is to analyze both the quality and availability of the sample of the agricultural data resources in **Dapoli, Ratnagiri** on the basis of selected criteria and to enable the evaluation of their potential. The research reveals that the resources are currently not as suitable and utilizable for the purposes of Business Intelligence as they are expected to be. Although there are exceptions, the data provided by **Dapoli Tahsildar Office, Panchayat samiti of Dapoli** and other external data available over various government websites makes it possible to analyze and implement various business models and to make effective conclusions that support the aim of the project.

In this project the current farming trend in Dapoli and in those Villages that come under Dapoli Taluka has been shown with the intention to help **decide what crop to grow** with the flexibility of Land availability taking into consideration.

This project is an Attempt to help new Farmers and Entrepreneur residing in Dapoli and its associated villages to utilize the past farming data and the Modern Business Intelligence algorithms and models to serve their best interest and to reduce the Risk factor and Maximizing the Rsult.

INTRODUCTION

Each farm business is different. The main aim of this project is to provide a basic Idea and vision on how to start and decide on a cropping Business in most efficient way possible in **given availability of land and resources**. This Agriculture Project's objectives are to increase rural incomes and stimulate the rural economy through rural entrepreneurship. Before starting any business it is very important to define your goals. This project will give an individual an overview so as to what crop Business suits its best interest.

This project also provides information on what are the possible crops that you can grow in Dapoli and what are primary and secondary sources of water and what type of land people of Dapoli posses

The research done for this project and the data collection is exclusive to Dapoli, Ratnagiri which is a Taluka in Ratnagiri district in Maharashtra and result and conclusions are based on the past agriculture data of Dapoli and of all the small and big village that comes under Dapoli .

Results and Interpretations

To evaluate our methods and model the main sources of data was the data that is available publicly over the government website and the data that was collected personally from the government office in Dapoli

The implementation of these models and data is carried on R studio and the interface used is a package under R called shiny.

The number of crops that possibly can be grown

The graph shows us as to what crops can be grows in Dapoli. So any individual can get an overview on the possibility of crops and can decide what to choose and what crop suits him/her the best
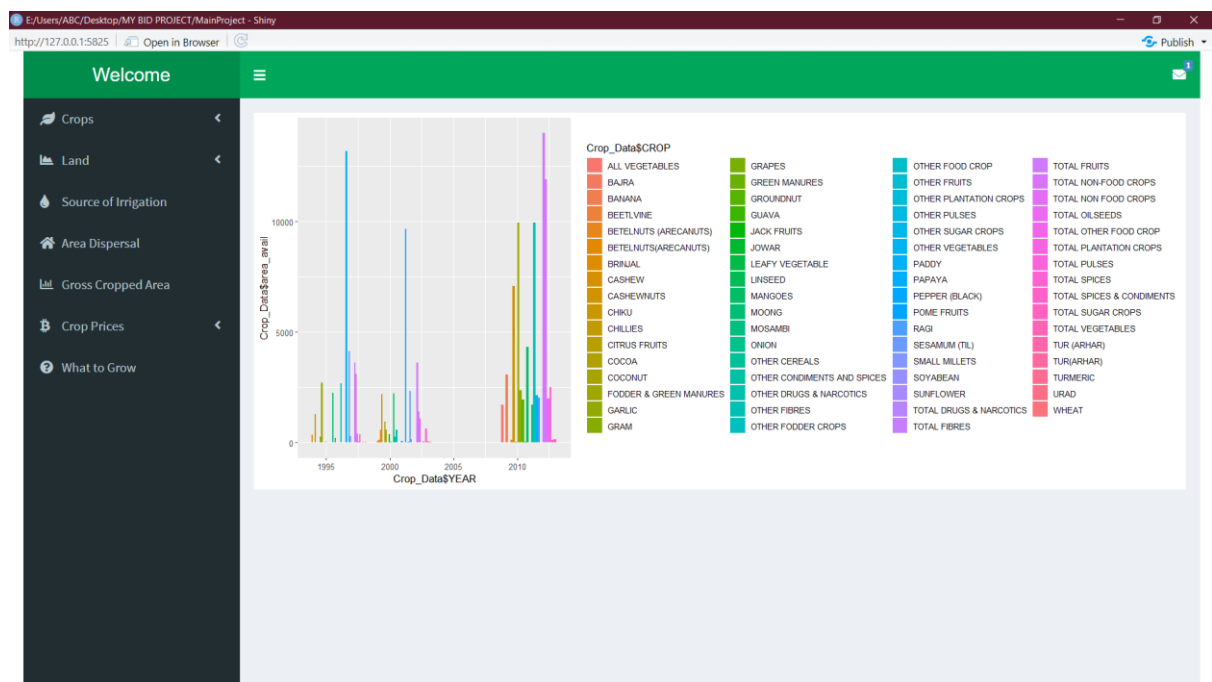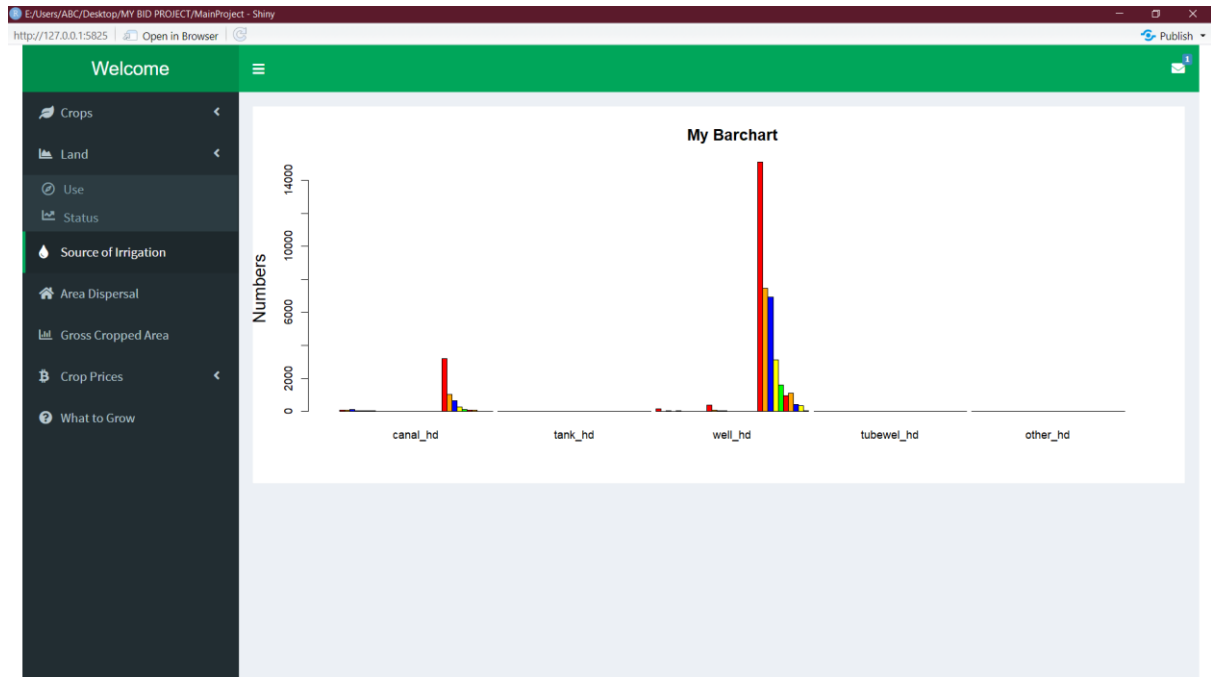
The use of Land and its status over the years

The graph shows us the use of land in the past 10 to 15 year of span. Basically the land is divided on the based on size class which ranges from 0.5 acre to 30 acre. On the second graph we can look at the growth of the land pattern.
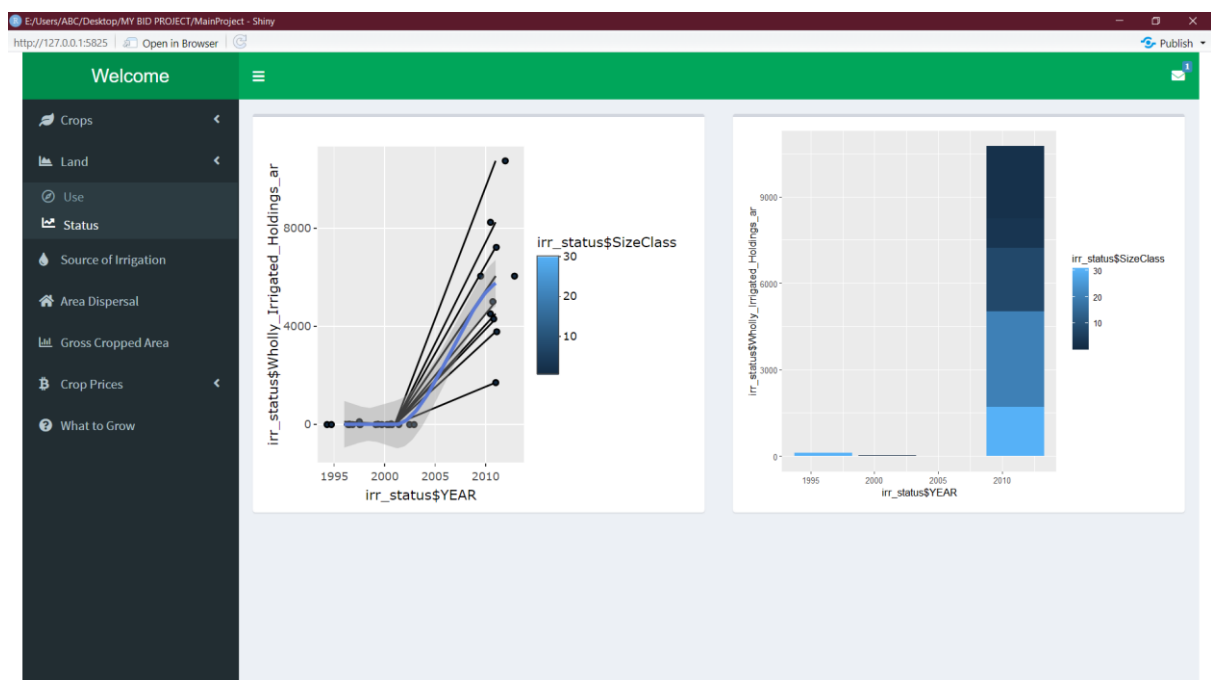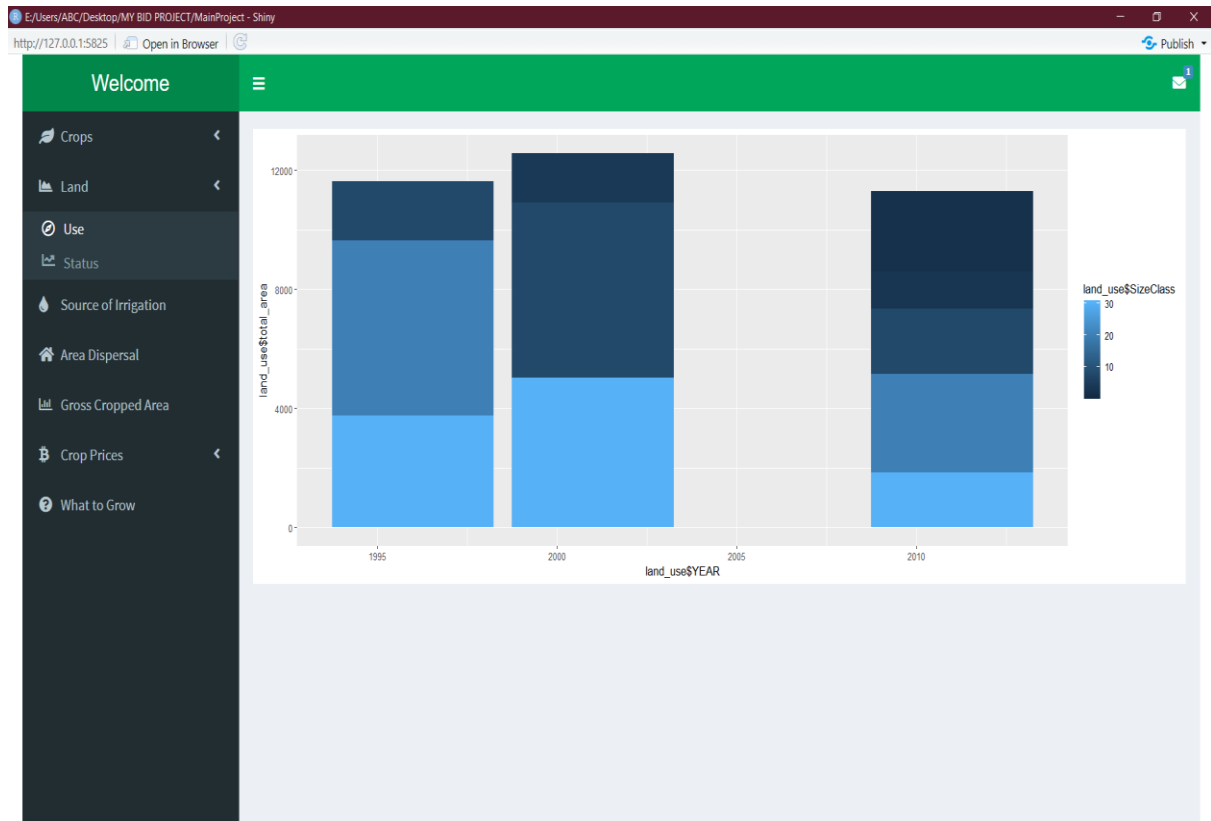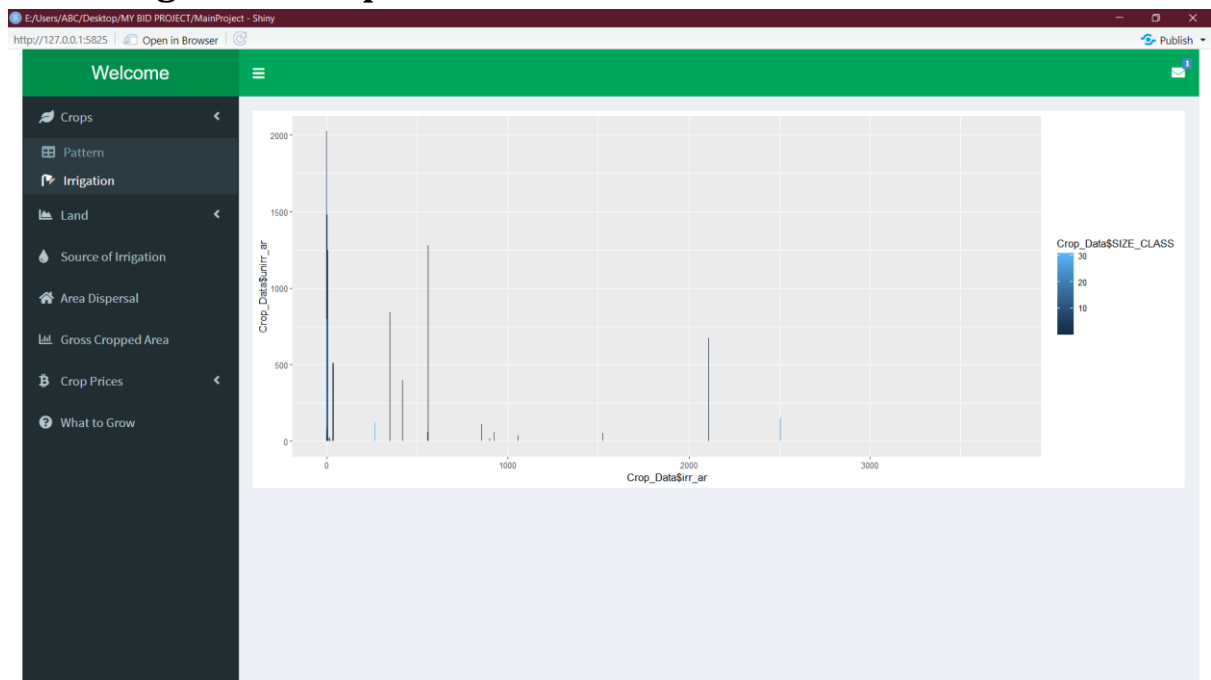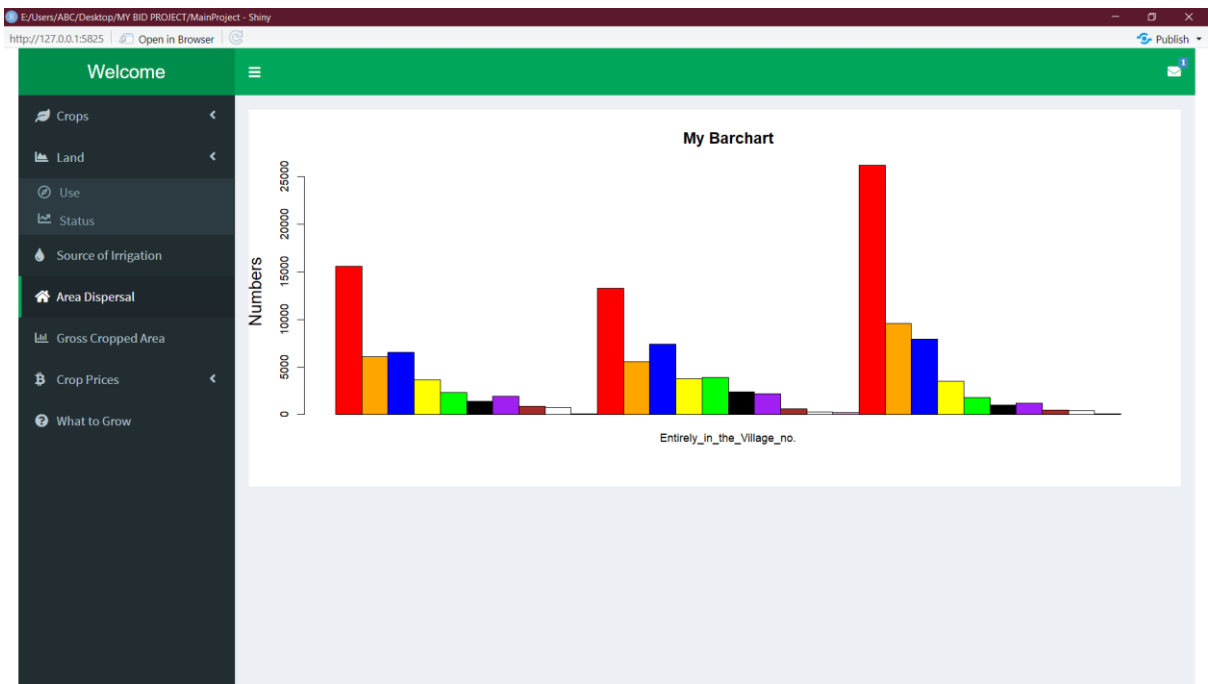
Source of Irrigation

The main source of water for the crops for many years was rain but now as the time passes the people starting to irrigate their land and well has become the main source of irrigation.
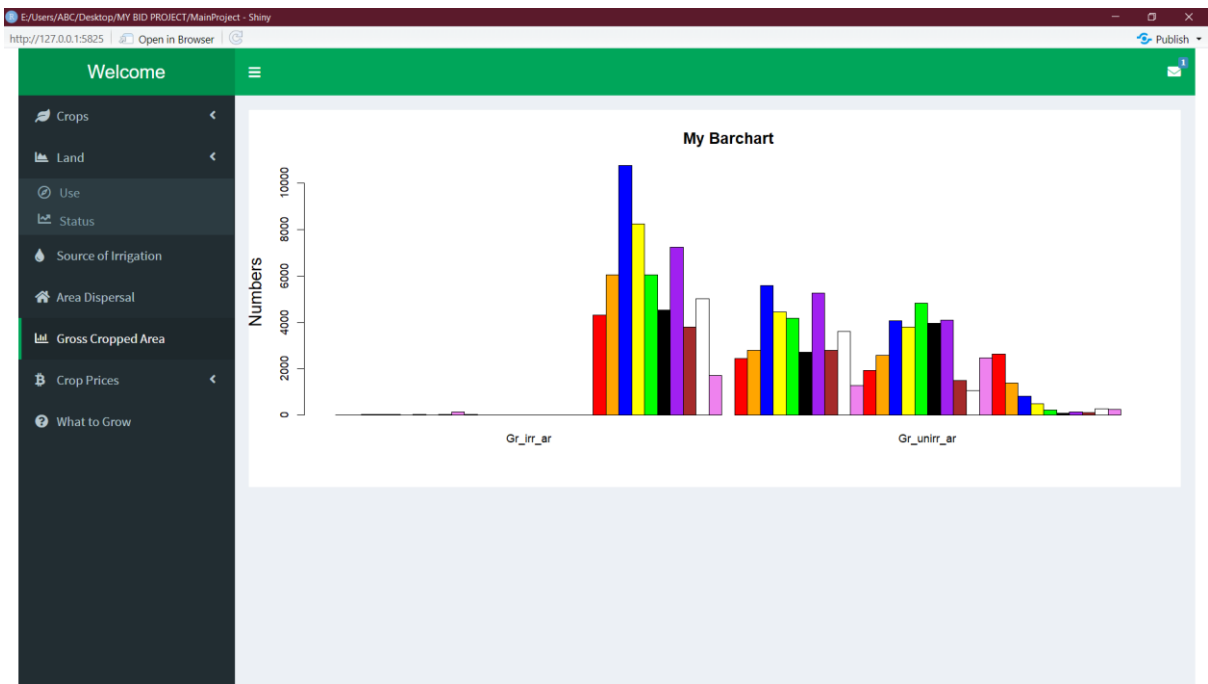
Land Irrigation in Dapoli

Number of villages in Dapoli
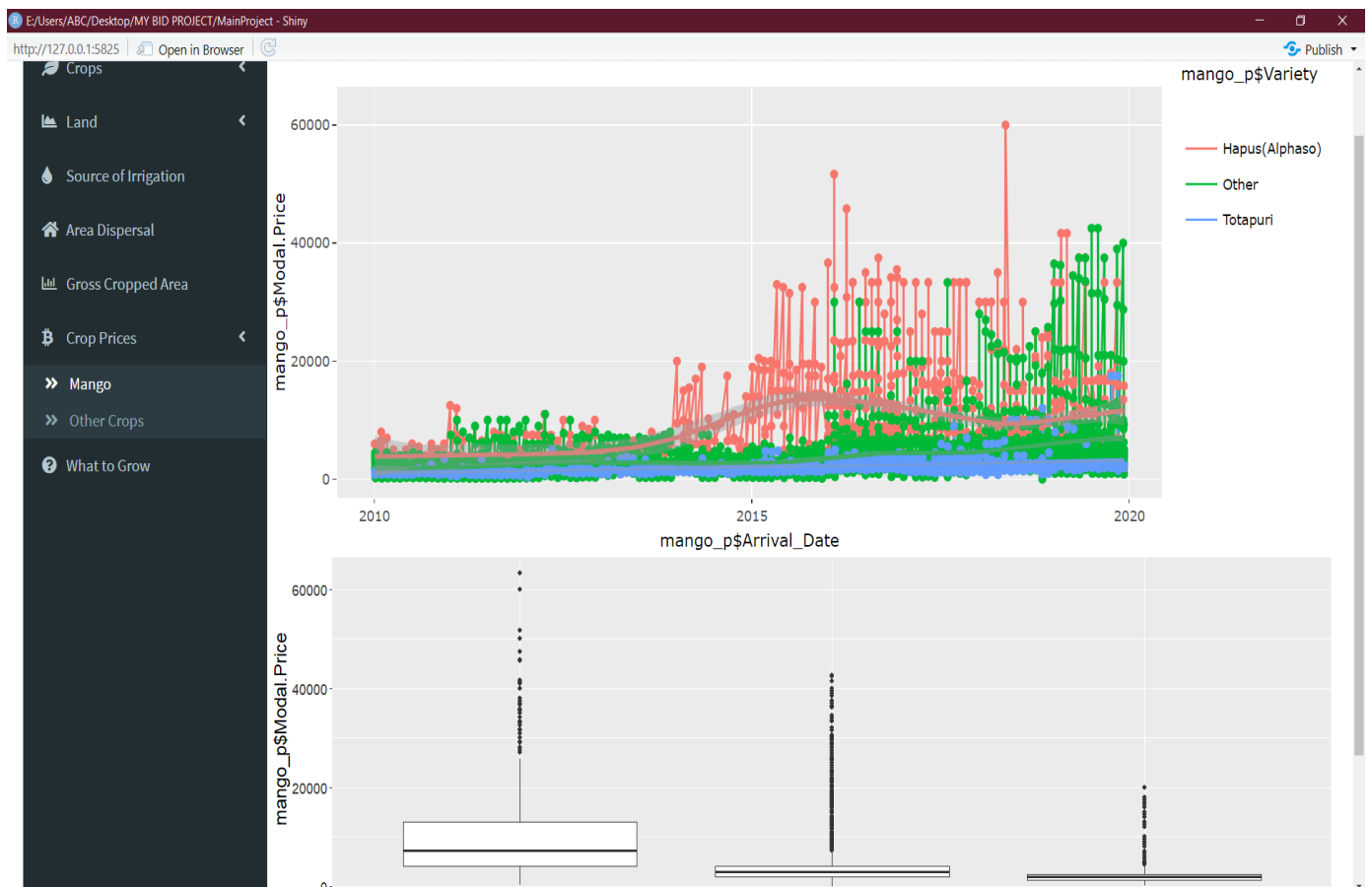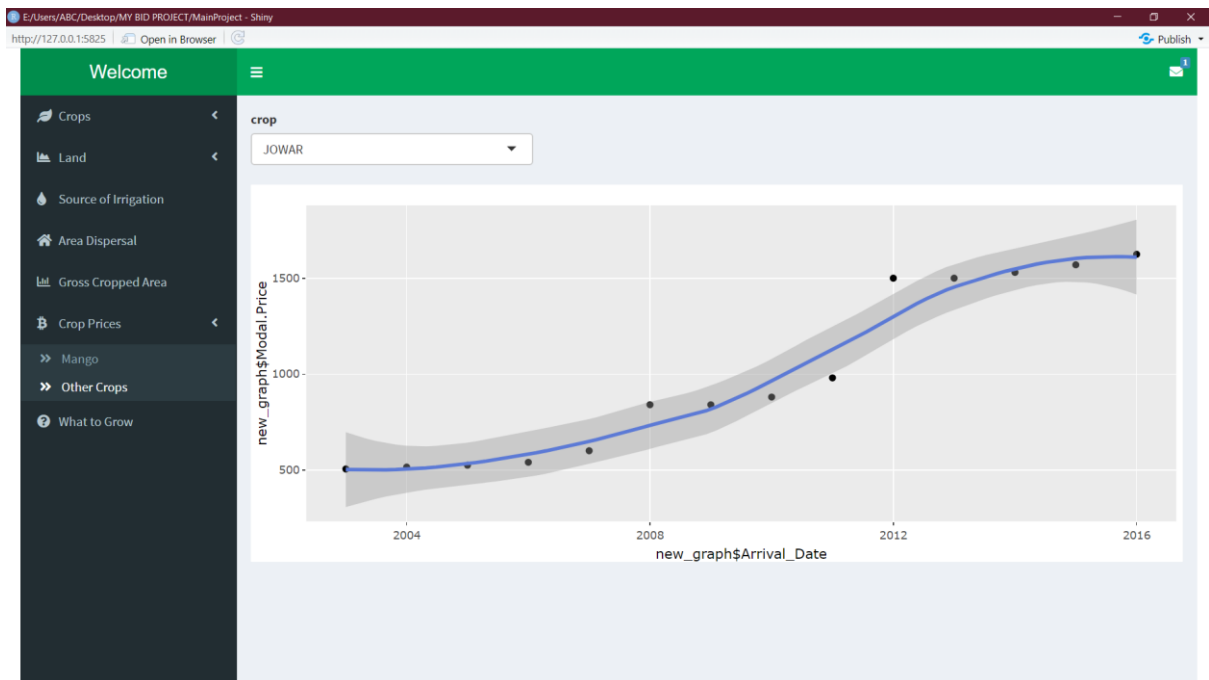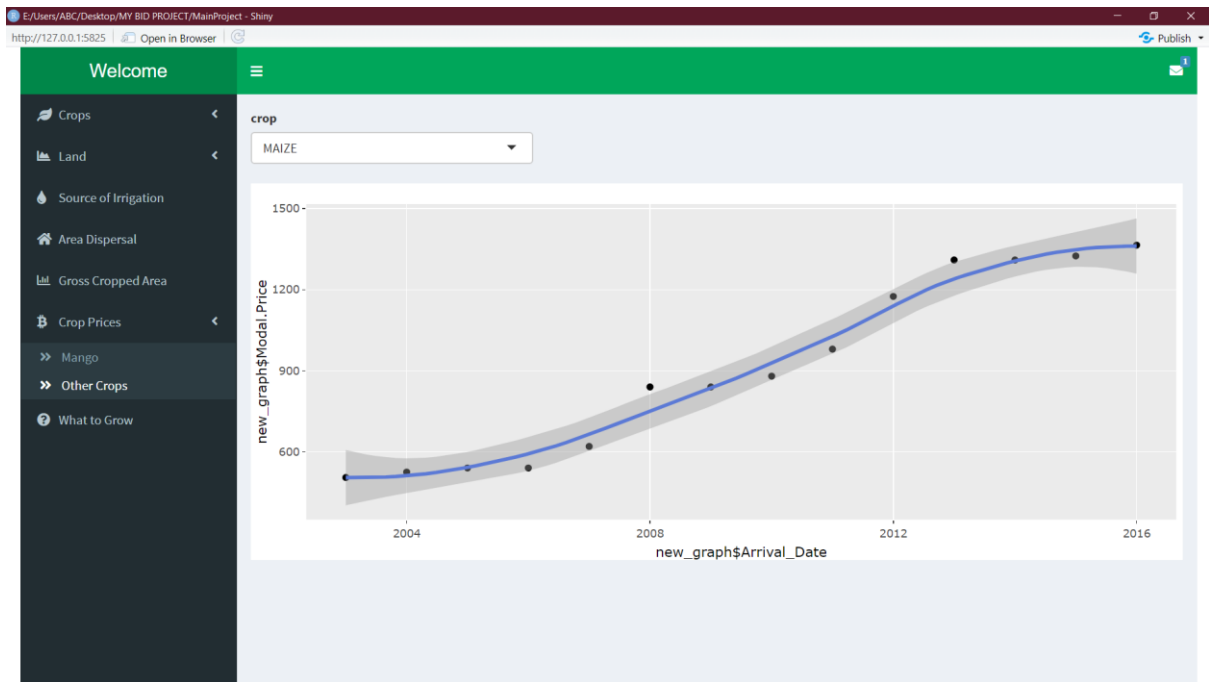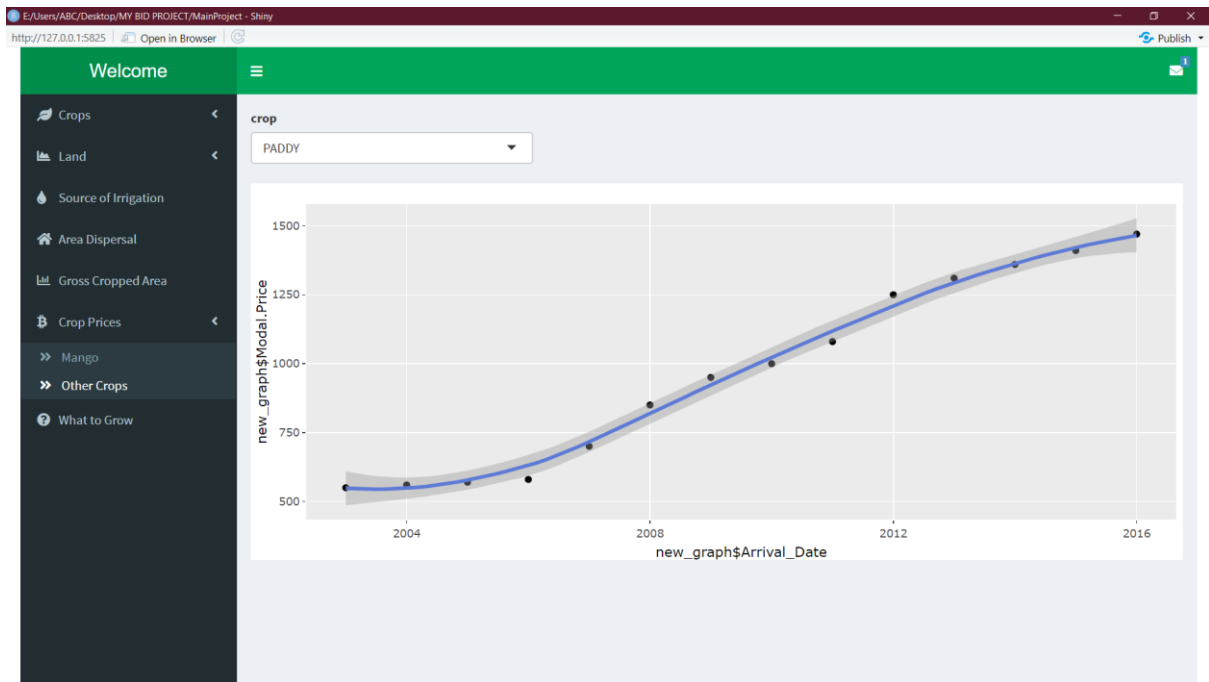

Grossed Cropped Area

Crop Prices

In the following graphs the prices of various crops and how they have grown over the years has been shown. The most significant crop or fruit in Dapoli or in whole of Ratnagiri is mango and there are variety of mangoes in these region.

Linear Regression

Crop to grow for a limited spread of land which is most profitable in coming years

CONCLSION

The agricultural sector is of vital importance for this region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply set-ups, as is the case with all other sectors of the economy. Over all there is a increase in specific crops like paddy and fruits like mango and cashew but a total decline in other crops production can be observed.

To make this farming or cropping activity into a profitable Business a continuous and reliable source of water is a vital necessity .The change in climate conditions has also affected this region resulting in the decrease of rain and also the reliability of crops on it.

Future scope and Development

The project can be extended with respect to the area it covers. In the project we are dealing with one Taluka of Ratnagiri district, with the right data we can implement the business models on other villages that come under this district

The increase in factors to weather and market condition will increase the accuracy of our predictions

No measures and effort were taken in the past to ensure the quality of data that is being recorded; the Proper data collection methods can increase the scope of this project and result in better and more precise predictions

References

-Data from Tahsildar office Dapoli

-National Bank for Agriculture and Rural Development (**NABARD**)

- http://agricoop.nic.in/

-http://agcensus.dacnet.nic.in/DatabaseHome.aspx

- http://www.censusindia.gov.in

CODE

```r
cropping_pattern<- read.csv("cropping_pattern.csv")

dooa<- read.csv("DISPERSAL OF OPERATED AREA.csv")

gca<- read.csv("gross cropped area.csv")

irr_status<- read.csv("IRRIGATION STATUS.csv")

land_use<- read.csv("LAND USE.csv")

src_irr<- read.csv("sources of irrigation.csv")

WELL_tube<- read.csv("WELLS & TUBEWELLS.csv")

library(shiny)

library(shinydashboard)

library(ggplot2)

library(reshape2)

library(ggpubr)

library(devtools)

library(dplyr)

library(plotly)


# Define UI for application that draws a histogram
ui <- fluidPage(

  dashboardPage(skin = "green",

    dashboardHeader(

      title = "Welcome ",

      dropdownMenu(type = "message",
```

```
                messageItem(from="You from Future",message = "Farming is
the Future")
                )
    ),
    dashboardSidebar(
      sidebarMenu(
      menuItem("Crops",icon = icon("crop",class = "fa-leaf"),
      menuSubItem("Pattern",tabName = "pattern",icon = icon("patt",class
= "fa-table")),
      menuSubItem("Irrigation",tabName = "irrigation",icon =
icon("patt",class = "fa-shower"))
      ),
      menuItem("Land",icon = icon("land",class = "fa-area-chart"),
            menuSubItem("Use",tabName = "use",icon = icon("use",class =
"fa-compass")),
            menuSubItem("Status",tabName = "status",icon =icon("line
chart",class = "fa-line-chart"))),
      menuItem("Source of Irrigation",tabName = "sourceofirrigation",icon
= icon("patt",class = "fa-tint")),
      menuItem("Area Dispersal",tabName = "dooa",icon =
icon("patt",class = "fa-home")),
      menuItem("Gross Cropped Area",tabName = "gca",icon =
icon("patt",class = "fa-bar-chart")),
      menuItem("Crop Prices",icon = icon("patt",class = "fa-btc"),
            menuSubItem("Mango",tabName = "mangoprice"),
            menuSubItem("Other Crops",tabName = "other")),
```

```
        menuItem("What to Grow",tabName = "what_to",icon =
icon("patt",class = " fa-question-circle"))




    )),
    dashboardBody(
      tabItems(
        tabPanel("Map",tags$img(src="Dapoli_map.jpg")),

        tabItem(plotOutput("pattern"),tabName = "pattern"),

        tabItem(plotOutput("irrigation"), tabName = "irrigation"),

        tabItem(plotOutput("use"),tabName = "use"),

        tabItem(fluidRow(

          box(plotlyOutput("statusline")),

          box(plotOutput("statusbar"))

        ) ,tabName = "status"),

        tabItem(plotOutput("sourceofirrigation"),tabName =
"sourceofirrigation"),

        tabItem(plotOutput("dooa"),tabName = "dooa"),

        tabItem(plotOutput("gca"),tabName = "gca"),

        tabItem(fluidRow(

          plotlyOutput("mangoprices1"),

          plotOutput("mangoprices2")

        ),tabName = "mangoprice"),
```

```r
tabItem(selectInput("choose_crop","crop",c("PADDY","JOWAR","BAJRA","MAIZE","RAGI","ARHAR(Tur)","MOONG","GROUNDNUT","SUNFLOWER","SOYABEEN","SESAMUM","NIGERSEED")),plotlyOutput("other_prices"),tabName = "other"),

        tabItem(

selectInput("what","what",c(0.5,1.0,2.0,3.0,4.0,5.0,7.5,10.0,20.0,30.0)),

          selectInput ("Year","future",c(2020:2035)),

          textOutput("what"),

          tabName = "what_to")


      )

    )
))



# Define server logic required to draw a histogram

server <- function(input, output) {


  output$pattern <- renderPlot({

    ggplot(data, aes( fill=Crop_Data$CROP,x=Crop_Data$YEAR, y=Crop_Data$area_avail )) +

      geom_bar(position="dodge", stat="identity")

  })
```

```
output$irrigation <- renderPlot({

  ggplot(data, aes( fill=Crop_Data$SIZE_CLASS,x=Crop_Data$irr_ar,
y=Crop_Data$unirr_ar )) +

    geom_bar(position="dodge", stat="identity")

  #ggplotly(irr+geom_line()+stat_smooth())


})


output$use <- renderPlot({

  ggplot(land_use, aes(fill=land_use$SizeClass, x=land_use$YEAR,
y=land_use$total_area )) +

    geom_bar(position="dodge", stat="identity")


})


output$statusline <- renderPlotly({

  status <- ggplot(land_use, aes(fill=irr_status$SizeClass,
x=irr_status$YEAR, y=irr_status$Wholly_Irrigated_Holdings_ar )) +

    geom_line(position="dodge", stat="identity")


  ggplotly(status+geom_jitter()+stat_smooth())


})


output$statusbar <- renderPlot({
```

```r
    ggplot(land_use, aes(fill=irr_status$SizeClass, x=irr_status$YEAR,
y=irr_status$Wholly_Irrigated_Holdings_ar )) +

        geom_bar(position="dodge", stat="identity")

  })


  output$sourceofirrigation <- renderPlot({

    library(dplyr)

    colours <- c("red", "orange", "blue", "yellow", "green")

barplot(as.matrix(select(src_irr,canal_hd,tank_hd,well_hd,tubewel_hd,other
_hd)), main="My Barchart", ylab = "Numbers", cex.lab = 1.5, cex.main = 1.4,
beside=TRUE, col=colours)


  })


  output$dooa <- renderPlot({

    colours <- c("red", "orange", "blue", "yellow",
"green","black","purple","brown","white","violet")

    barplot(as.matrix(select(dooa,Entirely_in_the_Village_no.)), main="My
Barchart", ylab = "Numbers", cex.lab = 1.5, cex.main = 1.4, beside=TRUE,
col=colours)


  })


  output$gca <- renderPlot({

    colours <- c("red", "orange", "blue", "yellow",
"green","black","purple","brown","white","violet")
```

```r
    barplot(as.matrix(select(gca,Gr_irr_ar,Gr_unirr_ar)), main="My
Barchart", ylab = "Numbers", cex.lab = 1.5, cex.main = 1.4,col=colours,
beside=TRUE)


  })


  output$mangoprices1 <- renderPlotly({

    mango <- ggplot(data = mango_p, mapping = aes(x =
mango_p$Arrival_Date, y = mango_p$Modal.Price,color=mango_p$Variety))
+

      geom_line()

    ggplotly(mango+geom_jitter()+stat_smooth())


  })




  output$mangoprices2 <- renderPlot({

    ggplot(mango_p, aes(x = mango_p$Variety, y = mango_p$Modal.Price))
+

      geom_boxplot() +

      grey_theme

  })
```

```r
  output$hapus <- renderPlotly({

    p <- ggplot(hapus, aes(x = hapus$Arrival_Date, y = hapus$Modal.Price))
+

      geom_point()

    p <- p + geom_point() + stat_smooth()

    ggplotly(p)


  })


  output$what <- renderText({

    size <- Crop_Data[Crop_Data[,6]==input$what,]

    crops <- c("CASHEW","PADDY","JOWAR","MANGOES")

    result <- 0

    fruit <- NULL

    a <- data.frame(x=input$future)

    if(input$what<4.0){

    for (i in crops) {

      which_crp <- size[size[,2]==i,]

      x <- which_crp$YEAR

      y <- which_crp$total_ar

      relation <- lm(y~x)

      if(result<predict(relation,a)){

        result <- predict(relation,a)

        fruit <- i
```

```r
        }
    }}
    else{
      for (i in crops) {
        #i=c("JOWAR")
        which_crp <- size[size[,2]==i,]
        if(i=="MANGOES"){
          what_crp <- mango_p[mango_p[,5]=="Hapus(Alphaso)",]
          what_crp$Arrival_Date <-
format(as.Date(what_crp$Arrival_Date,format="%d-%m-%Y"),"%Y")
          what_crp$Arrival_Date <- as.numeric(what_crp$Arrival_Date)
        }
        else if(i=="CASHEW"){
          what_crp <- cashew_p
          what_crp$Arrival_Date <-
format(as.Date(what_crp$Arrival_Date,format="%d-%m-%Y"),"%Y")
          what_crp$Arrival_Date <- as.numeric(what_crp$Arrival_Date)
        }
        else{
          what_crp <- other_prices[other_prices[,1]==i,]
          #what_crp$Arrival_Date <-
format(as.Date(what_crp$Arrival_Date,format="%d-%m-%Y"),"%Y")


        }
```

```r
      x_p <- what_crp$Arrival_Date

      y_p <- what_crp$Modal.Price


      relation_p <- lm(y_p~x_p)

      x_c <- which_crp$YEAR

      y_c<- which_crp$total_ar

      relation_c <- lm(y_c~x_c)

      a <- data.frame(x_c=2022)

      b <- data.frame(x_p=2022)

      print(a)

      if(result<predict(relation_c,a)*predict(relation_p,b)){

         result <- predict(relation,a)*predict(relation_p,b)

         fruit <- i

      }

    }

  }

  paste("you should grow",fruit)

})


output$other_prices <- renderPlotly({

  new_graph <- other_prices[other_prices[,1]==input$choose_crop,]

  #print(input$choose_crop)
```

```r
    x <- ggplot(data = new_graph, mapping = aes(x =
new_graph$Arrival_Date, y = new_graph$Modal.Price)) +

      geom_point()

    x <- x+geom_point()+stat_smooth()

    ggplotly(x)

  })

}


# Run the application
shinyApp(ui = ui, server = server)
```