

HAR KHET KO PANI

TEAM KILLERCODE
MAEER'S MITCOE, PUNE

PROBLEM STATEMENT

Problem Statement: Collection of Information on harkhetkopani

Ministry/State : Ministry of Water Resources, River Development and Ganga Rejuvenation.

Sector: Infrastructure

Category: Software

Roles:

- > Data Providers : Farmers
- > Consumers : Irrigation Department, Water Management authorities.

Solution Expected :

- > Each farmer should be able to login through the app using their Aadhar Card number.
- > Register their farm details.
- > For each farm, irrigation details should be entered from time to time.

* The contents of this slide are taken from : https://innovate.mygov.in/ministry_state/ministry-of-water-resources-river-development-and-ganga-rejuvenation/

ABSTRACT PROVIDED

One of the objective of the Prime Ministe's '*Krishi Sinchai Yojna*' is to ensure '*harkhetkopani*'. However, the information regarding areas which are receiving irrigation water is not readily available. This is one of the important bottleneck in identification of areas needing immediate help from the above scheme. It is proposed to develop a mobile based platform for entry of data by common public regarding the status of irrigation coverage of his farm land. The concerned person may be given with the facility to enter data like source of water for their field as well as quantity and quality. This platform will be very helpful in identifying areas needing immediate attention.

*The contents of this slide are taken from https://innovate.mygov.in/sih_ps/collection-of-data-in-respect-of-dams-in-distress-conditions-2/

PROPOSED SOLUTION

- **Android Application:**
A platform for creation of a database by obtaining information from the farmers about their farmland's need.
- **Web Application:**
Plays a pivotal role for the irrigation officials to analyse and act on the data collected.

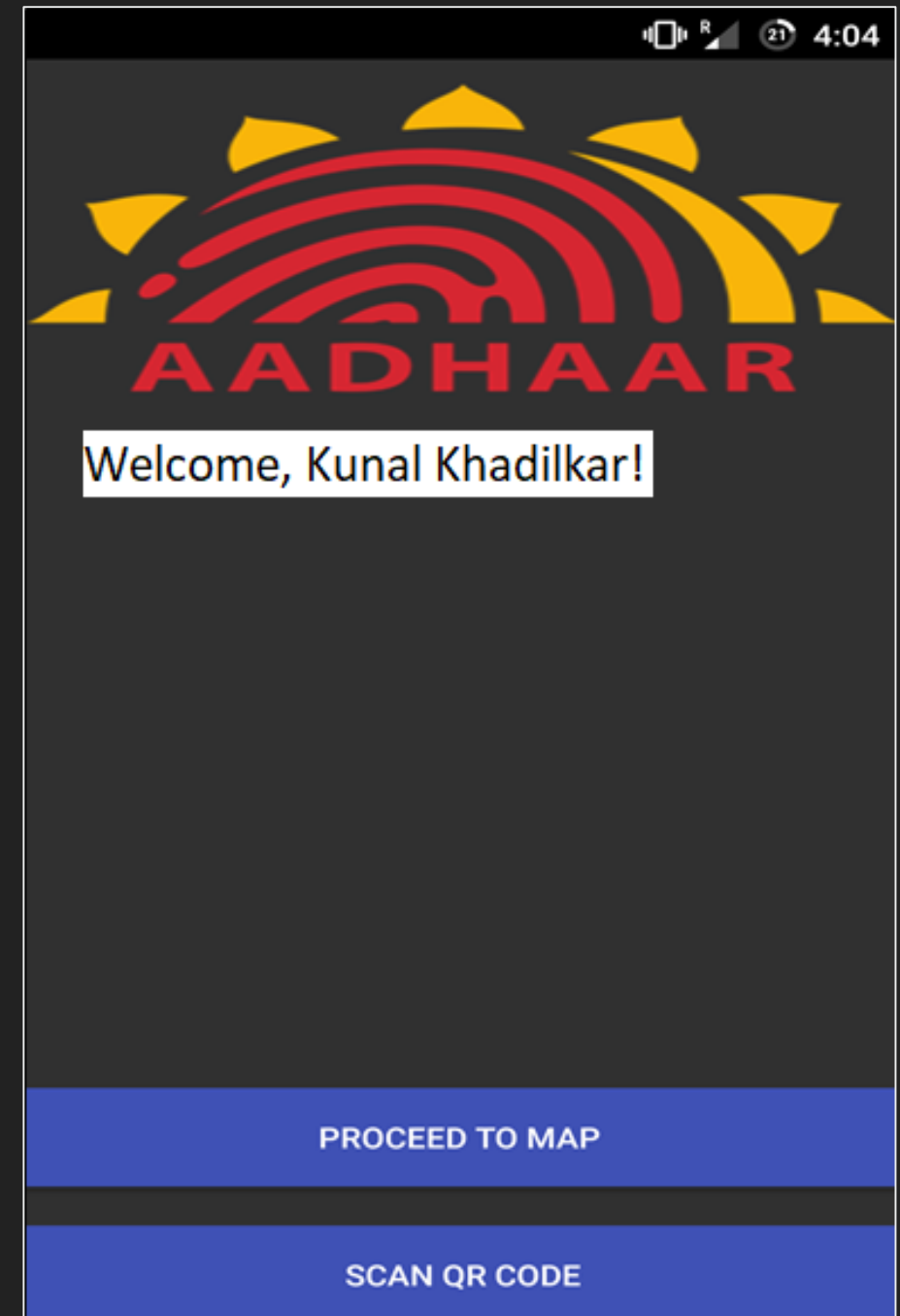
WORKFLOW

> Android Application:

- Registration/Login via Aadhar Card.
- Plotting of the farmland area by the farmer.
- Scanning of the 'land register' document.
- Questionnaire to be filled by the farmer.
- Scanning water motor's reading.
- Notification/Alerts Screen.

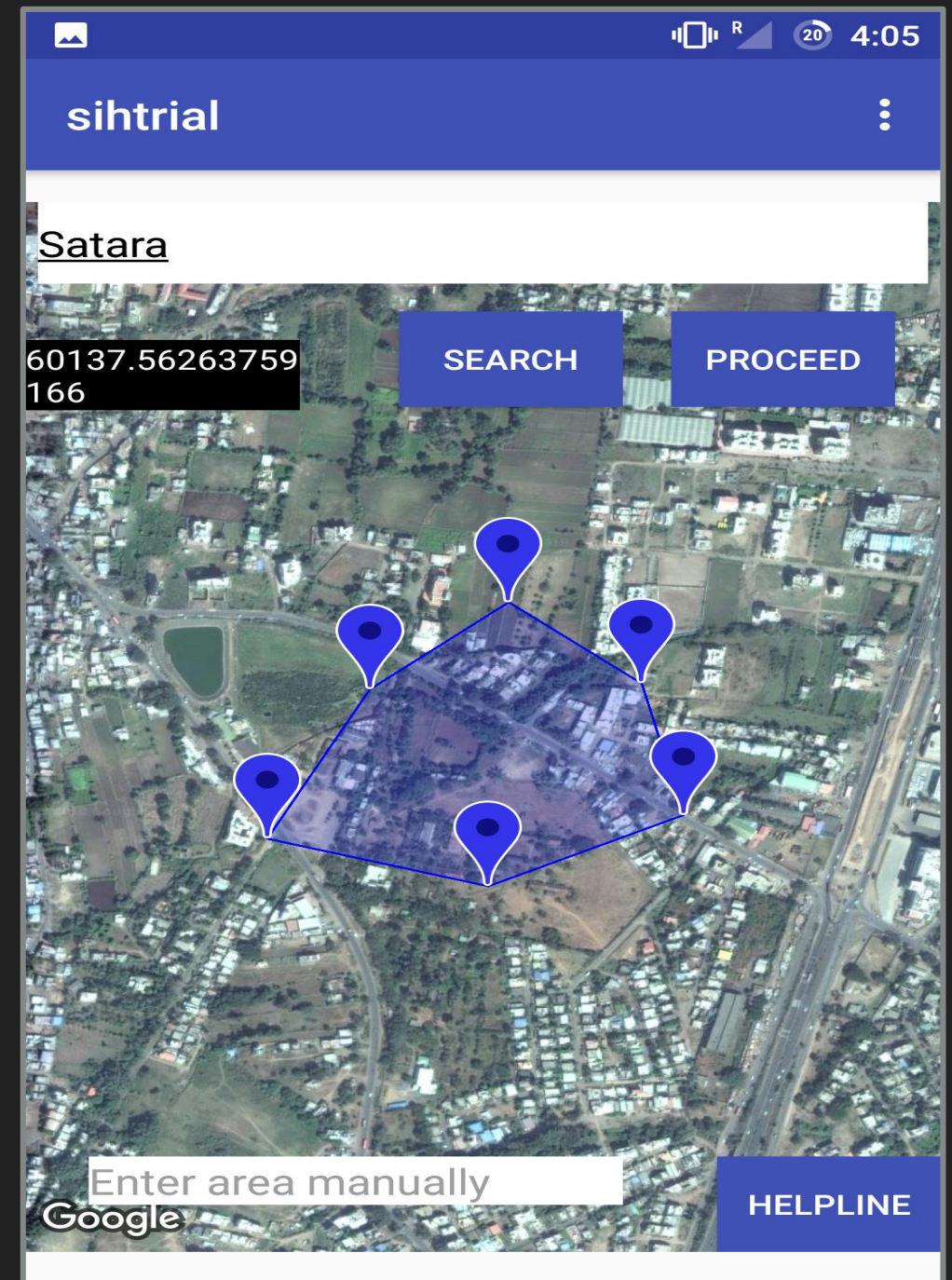
QR BASED AADHAR AUTHENTICATION

- A farmer is expected to register using his Aadhar Card for the first time.
- The *name* and the *address* of an individual are extracted and stored in the database.



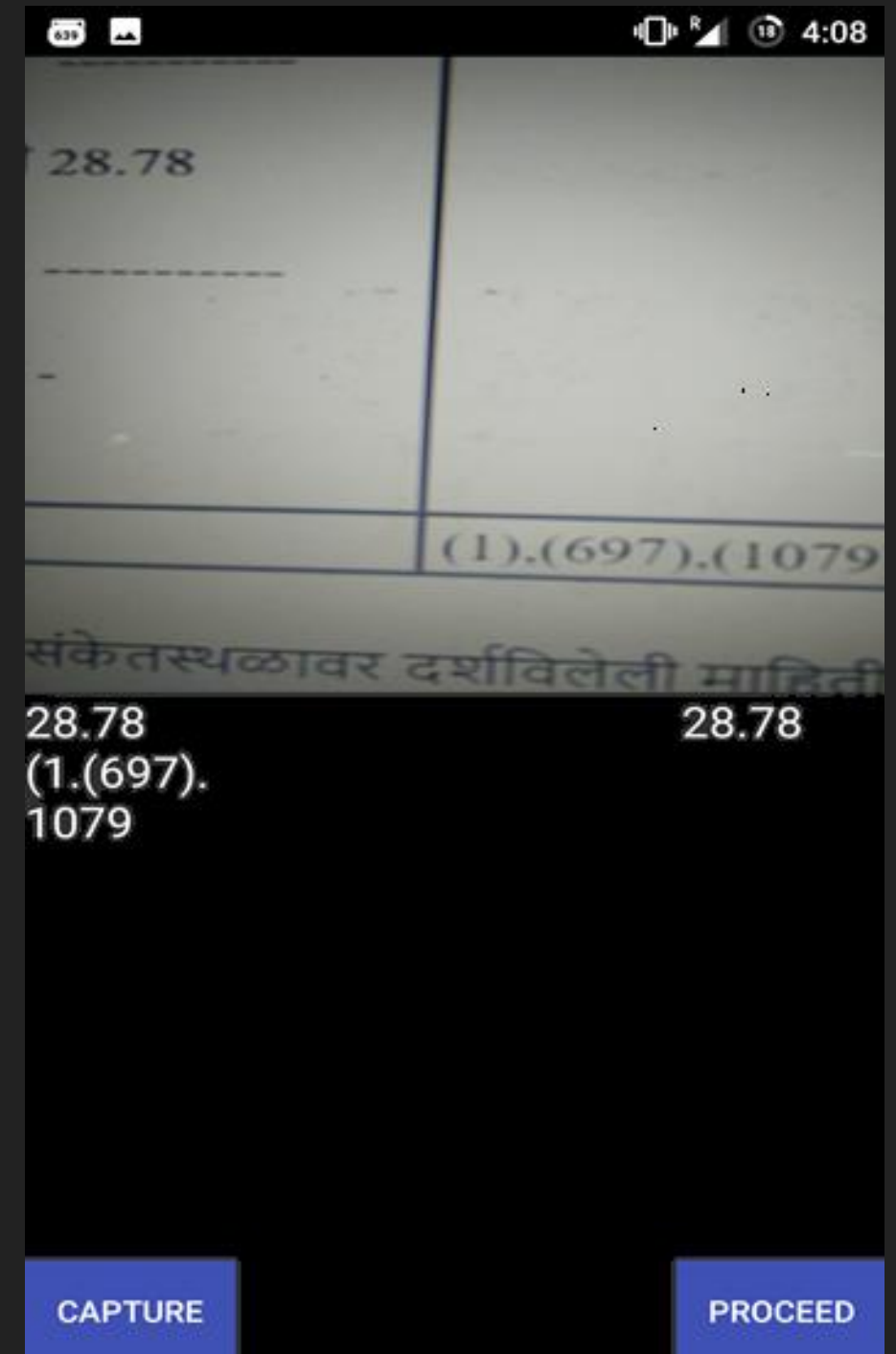
GEO PLOTTING

- The *Geo Plotting* feature enables the farmers to plot the area of their farmland on a map interface.
- The area of the marked land is calculated.
- Also, provision to enter farm area manually has been provided, in case the farmer faces difficulty in plotting the marker points on the interface.
(+) Suggestion (Evaluation Round I) implemented.
- Area of the land is calculated to ensure that a farmer isn't demanding resources against the land that doesn't belong to him.



TEXT EXTRACTION FROM LAND DOCUMENT

- The area entered by the farmer is then authenticated against the area on the 'Land Document' (eg. Satbara Utara).
- Every farmer owns a copy of the Land Document which is an official record of the area owned by a particular farmer, provided by the Revenue Department.
- Along with the area owned, the following information is extracted:
 - Type of soil.
 - Types of crops cultivated.



QUESTIONNAIRE

A series of questionnaire to be filled by the farmers.

कृषि सिंचाई

Please fill in basic farm information below:

Q1 Enter Aadhar No

Q2 What is the total farm area?

(ACRES)

Q3 What is the quantity of water obtained daily?

(LITRES)

Q4 Crop type:

☐ Fruit

☐ Rabi

☐ Kharif

कृषि सिंचाई

Q5 What is your daily requirement?

Q6 Water sources?

☐ Well

☐ FarmPond

☐ Borewell

☐ Spring

☐ Canal

☐ River

☐ Lake

☐ Reservior

☐ Dam

Q7 Soil Type?

☐ Red

☐ Black

☐ Brown

☐ Clay

कृषि सिंचाई

Q8 Choose Crops:

☐ Wheat

☐ Mustard

☐ Linseed/Cumin/Corriander

☐ Onion

☐ Potato

☐ Tomato

☐ Carrot

☐ Other Vegetables

Q9 Enter Soil Health Card No : ?

Q10 Enter Tubewell Meter Reading:

SUBMIT

- > Linking Soil Health Card no. (Owned by farmers and contains information such as the type of soil, the acidity/alkalinity of the soil, fertilizer dosage, etc)
(+) (Suggestion (Evaluation Round II) implemented)

LOCAL LANGUAGE SUPPORT

- The application supports four (Hindi, Marathi, Gujarati,) regional languages of India.
- Dynamically adapts to the user's current mobile language.

4:03 PM ... 2.00K/s 4G VoLTE 74%

કૃષિ સિંચાઈ

કૃપા કરીને નીચે મૂળભૂત કૃષિ માહિતી ભરો:

પ્રશ્ન 1 આધાર નંબર દાખલ કરો

પ્રશ્ન 2 કુલ ખેત ક્ષેત્ર શું છે??

_____ (એકડો)

પ્રશ્ન 3 દૈનિક પ્રાપ્ત પાણીનો જથ્થો શું છે?

_____ (લિટર)

પ્રશ્ન 4 પાક પ્રકાર:

☐ ફળ

☐ રબી

☐ ખરીફ

3:57 PM ... 0.00K/s 4G VoLTE 73%

કૃષિ સિંચાઈ

કૃપયા નીચે બુનિયાદી કૃષિ જાનકારી ભરે:

પ્રશ્ન 1 આધાર નંબર दर्ज करें

પ્રશ્ન 2 કુલ ખેત ક્ષેત્ર क्या है?

_____ (एकड़)

પ્રશ્ન 3 દૈનિક પ્રાપ્ત પાણી की मात्रा क्या है?

_____ (लीटर)

પ્રશ્ન 4 फसल का प्रकार:

☐ फल

☐ रबी

☐ खरीफ

3:57 PM ... 0.00K/s 4G VoLTE 73%

કૃષિ સિંચાઈ

પ્રશ્ન 8 फसल चुनें:

☐ गेहूं

☐ सरसों

☐ अलसी / जीरा / धनिया

मृदा स्वास्थ्य कार्ड -

मृदा स्वास्थ्य कार्ड किसानों को 3 साल में एक बार मुद्रित रिपोर्ट कार्ड है, जो 12 मापदंडों के संदर्भ में अपनी मिट्टी की स्थिति का संकेत देता है। यह भी विभिन्न उर्वरक और अन्य मिट्टी के मिश्रणों के बारे में एक सलाह के साथ है जिसे वह करना है.

પ્રશ્ન 9 मृदा स्वास्थ्य कार्ड दर्ज करें: ?

પ્રશ્ન 10 टूबवेल मीटर की पढ़ना दर्ज करें:

जमा करें

QUESTIONNAIRE

- The farmer has to update his responses in the questionnaire during the first five days of each month.
- Failure in doing so will trigger a notification alerting the farmer to do the needful as soon as possible.

(+) Suggestion (Evaluation Round II) implemented.

EXTRACTING TUBE-WELL METER READING

- Farmers are provided with a commercial electricity connection for their farms.
- Majority of the farmers use a motor in order to draw water from the irrigation source to water their crops.
- Analysing the water meter reading on a monthly basis gives an understanding of the deficit/excess of water drawn to the farm land.
- Google Vision API has been used to extract the water meter reading.

(+) Suggestion (Evaluation Round II) implemented.

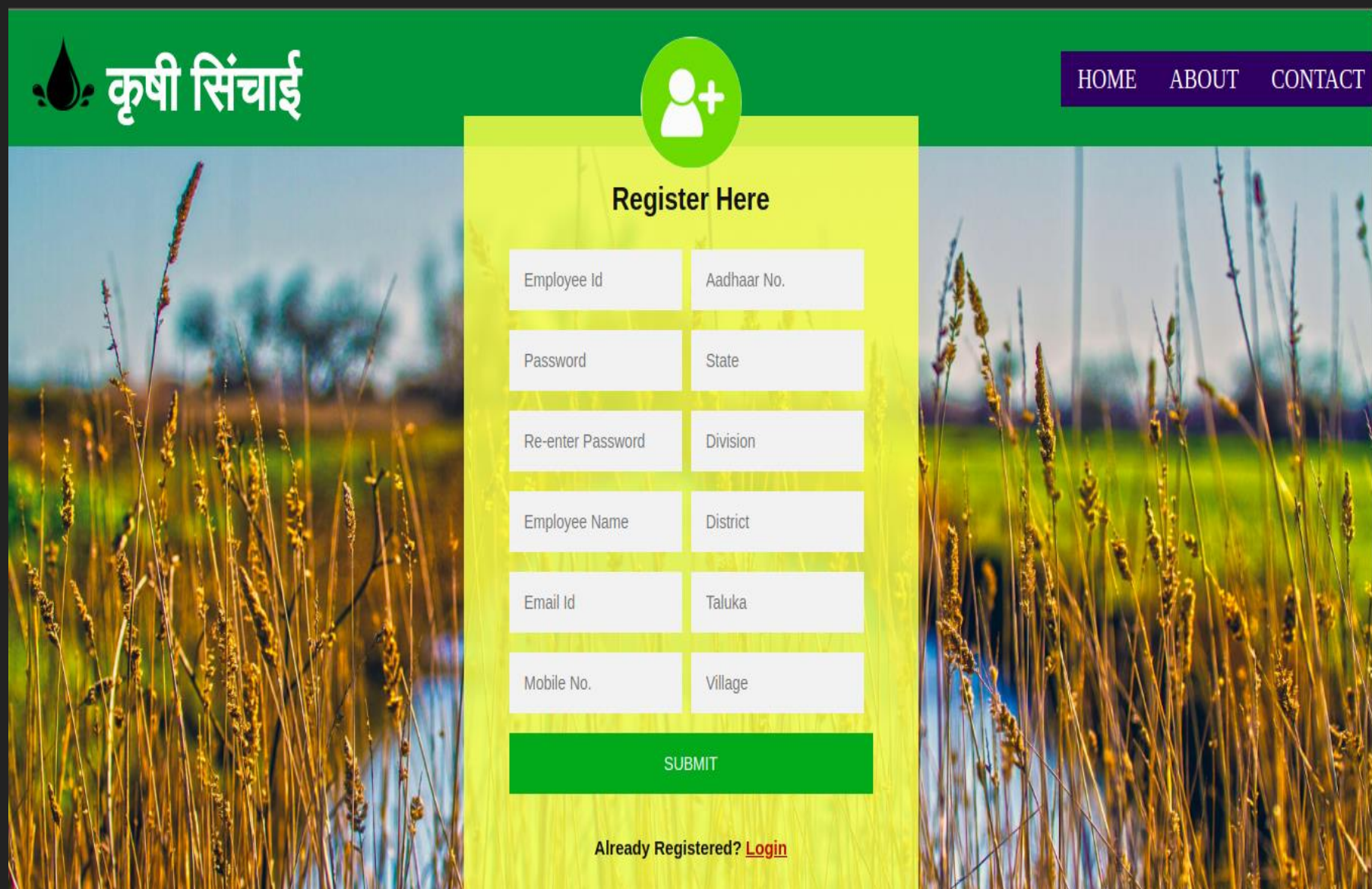
WORKFLOW

> Web Application:

- Login/Registration and Authentication for the irrigation officials.
- Analysing the data received from the Android app.
- Geotagging farm area.
- Allocation of duties to Irrigation Department Employees.
- Predictions and Visualization.

REGISTRATION

The government officials login in to their respective accounts according their job profile.



The image shows a web registration form for 'कृषी सिंचाई' (Kisan Sanchai). The form is centered on a yellow background with a green border. It includes a header with a logo and navigation links, a registration form with multiple input fields, a submit button, and a login link for existing users.

कृषी सिंचाई

HOME ABOUT CONTACT

Register Here

Employee Id	Aadhaar No.
Password	State
Re-enter Password	Division
Employee Name	District
Email Id	Taluka
Mobile No.	Village

SUBMIT

Already Registered? [Login](#)

GEO TAGGING

- The data received from the farmers is analysed and farm areas are geotagged into three different categories:
 - Scarcely irrigated
 - Moderately irrigated
 - Sufficiently irrigated



Activities Google Chrome Sat Mar 31, 15:57

krishisinchai.com x

localhost:8080/Sinchai/profile.jsp

Sr.No.	Task	Taluka	Village	Block No.	Status	Submit
1	Supply 2000 litre water	Aurangabad	Kachner	213	Under Review	Submit
2	Ground water levels at par	Vasmat	Karanji	1147	Choose	Submit

Logout


- Assigning duties to the officials based on their positional hierarchy.
- Functionality to check the progress of the work.

REACH OUT

Activities Google Chrome Sat Mar 31, 16:06 58 %

krishisinchai.com x Popup contact form x

localhost:8080/Sinchal/contact.jsp

 कृषी सिंचाई

HOME ABOUT

Contact us today, and get reply with in 24 hours!

Name

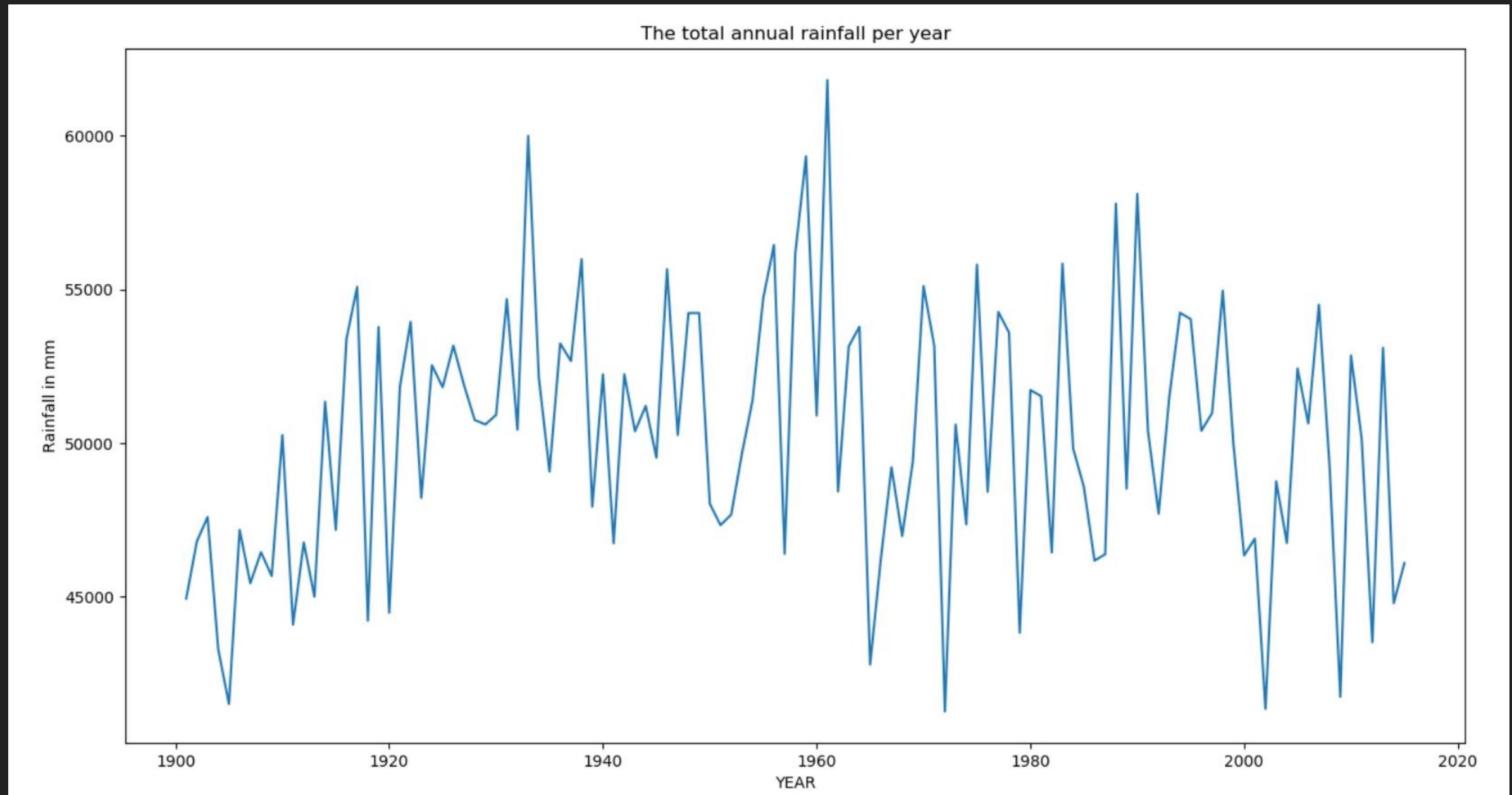
Mobile Number

Type your Message Here....

Submit

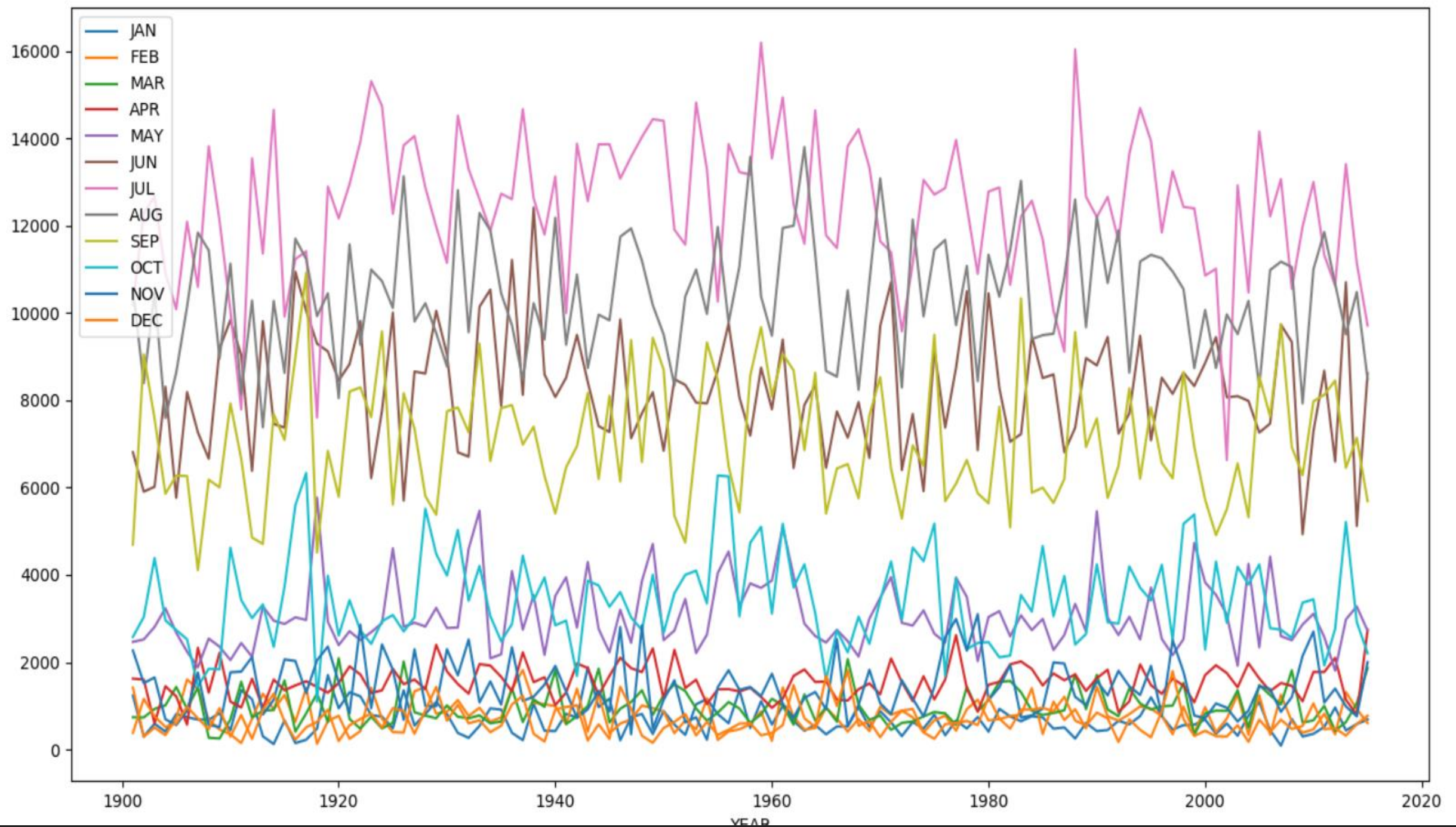
VISUALIZATIONS

Average annual rainfall from 1990 – 2016.



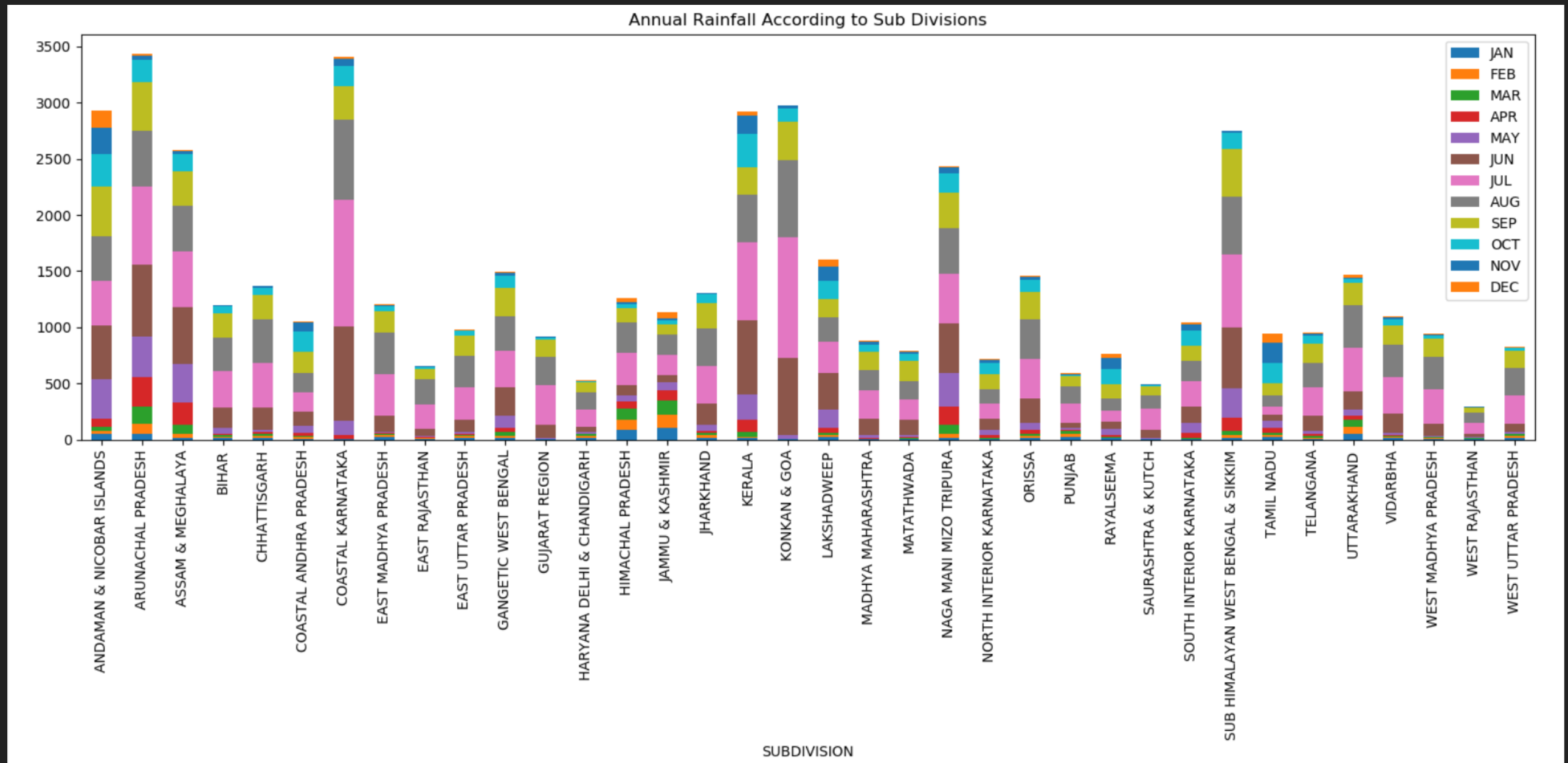
VISUALIZATIONS

Average monthly rainfall from 1990 – 2016.



VISUALIZATIONS

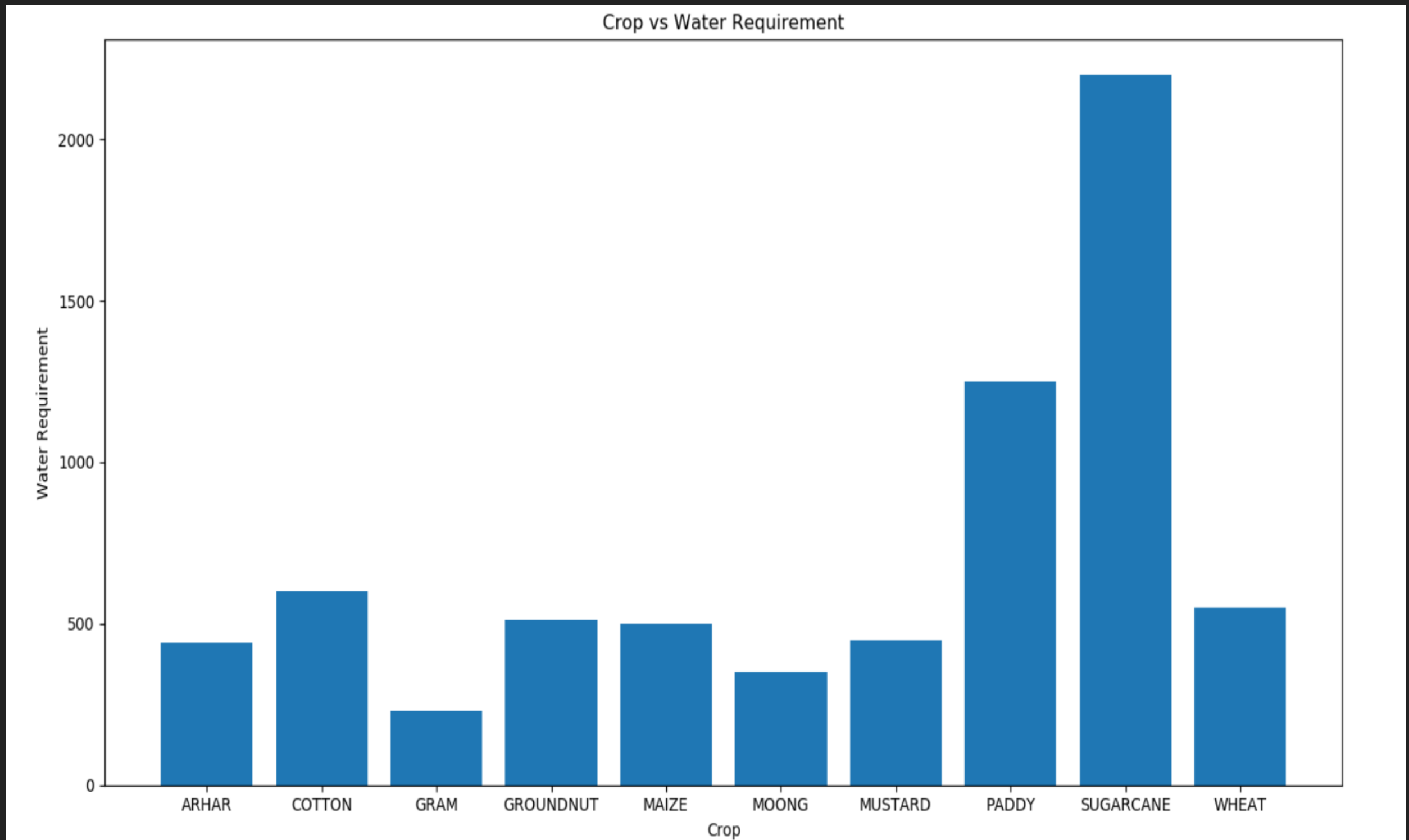
Monthly rainfall for the 36 sub-divisions of India.



*Dataset taken from : <https://data.gov.in/catalog/district-rainfall-normal-mm-monthly-seasonal-and-annual-data-period-1951-2000>

VISUALIZATIONS

Most commonly cultivated crops vs water requirement (in mm)

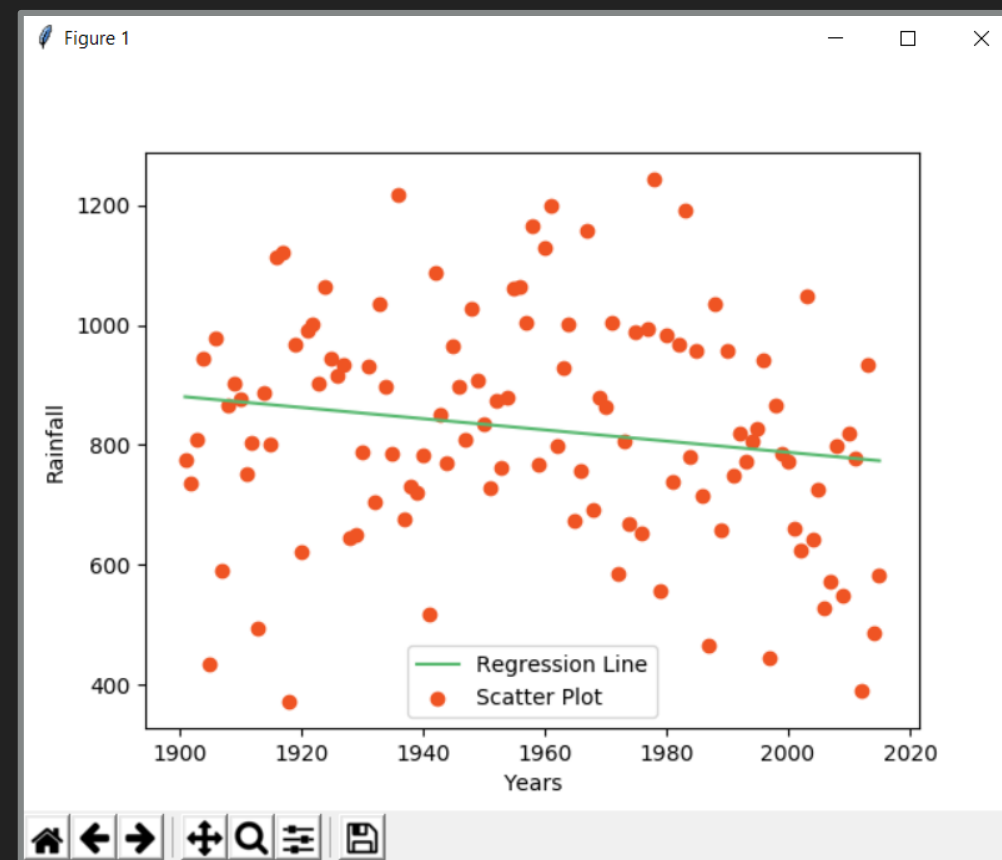


MACHINE LEARNING

Use of Linear Regression in order to predict the daily, monthly, seasonal and annual rainfall for the 36 sub-divisions of India.

Taking into account the factor of uncertainty, a helpline to the Meteorological Department provided.

(+) Suggestion (Evaluation Round II) implemented.



MACHINE LEARNING

Taking invaluable suggestions from our Honorable PM, Narendra Modi, we used the *real time sensor data* to predict the soil moisture content which will allow the farmers to water the crop only when it is necessary.

	A	B	C	D	E	F	G	H	I	J	K	L	
1	Location	Date	VW_30cm	VW_60cm	VW_90cm	VW_120cm	VW_150cm	T_30cm	T_60cm	T_90cm	T_120cm	T_150cm	
2	CAF357	5/19/2009	0.299	0.321	0.359	0.331	0.314	11.87	10.1	8.7	7.61	7.09	
3	CAF357	5/20/2009	0.301	0.325	0.363	0.335	0.32	11.22	10.09	8.75	7.61	7	
4	CAF357	6/4/2009	0.251	0.334	0.375	0.351	0.334	17.06	14.03	12.13	10.25	8.97	
5	CAF357	7/28/2009	0.259	0.336	0.381	0.358	0.337	22.66	19.3	17.6	15.4	13.8	
6	CAF357	7/29/2009	0.26	0.337	0.381	0.358	0.337	22.78	19.46	17.66	15.48	13.84	
7	CAF357	7/30/2009	0.26	0.337	0.382	0.358	0.338	22.65	19.66	17.81	15.57	13.92	
8	CAF357	7/31/2009	0.26	0.338	0.382	0.359	0.338	22.8	19.77	17.93	15.67	14	
9	CAF357	8/1/2009	0.261	0.338	0.382	0.359	0.338	23.16	19.88	18.05	15.78	14.1	
10	CAF357	8/2/2009	0.261	0.339	0.383	0.359	0.338	23.4	20.14	18.16	15.87	14.19	
11	CAF357	8/3/2009	0.261	0.339	0.383	0.36	0.338	23.32	20.28	18.33	15.98	14.27	
12	CAF357	8/4/2009	0.26	0.339	0.383	0.36	0.338	23.18	20.34	18.44	16.1	14.37	
13	CAF357	8/5/2009	0.26	0.339	0.384	0.36	0.338	23.28	20.38	18.53	16.2	14.46	
14	CAF357	8/6/2009	0.261	0.34	0.384	0.36	0.338	23.61	20.45	18.6	16.3	14.5	
15	CAF357	8/12/2009	0.265	0.348	0.383	0.36	0.339	20.28	18.77	17.9	16.23	14.8	
16	CAF357	8/13/2009	0.264	0.347	0.382	0.36	0.338	19.84	18.66	17.87	16.2	14.8	
17	CAF357	8/14/2009	0.261	0.345	0.382	0.36	0.338	18.48	18.33	17.78	16.2	14.8	
18	CAF357	8/15/2009	0.26	0.343	0.382	0.36	0.338	17.47	17.76	17.6	16.14	14.8	
19	CAF357	8/16/2009	0.259	0.341	0.381	0.36	0.338	17.45	17.26	17.33	16.05	14.8	
20	CAF357	8/17/2009	0.26	0.34	0.381	0.359	0.338	18.13	17.13	17.1	15.94	14.8	
21	CAF357	8/18/2009	0.261	0.34	0.381	0.359	0.338	18.9	17.23	16.95	15.81	14.73	
22	CAF357	8/19/2009	0.263	0.34	0.381	0.359	0.338	19.62	17.47	16.9	15.71	14.7	
23	CAF357	8/20/2009	0.265	0.34	0.381	0.359	0.338	20.51	17.82	16.98	15.7	14.62	
24	CAF357	8/21/2009	0.266	0.341	0.381	0.359	0.337	21.23	18.25	17.12	15.7	14.6	
25	CAF357	8/22/2009	0.265	0.342	0.382	0.359	0.337	20.83	18.53	17.29	15.7	14.6	
26	CAF357	8/23/2009	0.263	0.342	0.382	0.359	0.337	20.18	18.53	17.43	15.78	14.6	
27	CAF357	8/24/2009	0.261	0.341	0.382	0.359	0.337	19.45	18.3	17.5	15.81	14.6	
28	CAF357	8/25/2009	0.261	0.34	0.382	0.359	0.337	19.55	18.14	17.41	15.9	14.7	
29	CAF357	8/26/2009	0.261	0.34	0.382	0.359	0.337	19.5	18.07	17.4	15.9	14.7	
30	CAF357	8/27/2009	0.261	0.339	0.382	0.359	0.337	19.71	18.05	17.32	15.9	14.7	
31	CAF357	8/28/2009	0.261	0.339	0.382	0.359	0.337	20.16	18.16	17.3	15.85	14.7	
32	CAF357	8/29/2009	0.262	0.339	0.382	0.359	0.337	20.34	18.28	17.4	15.88	14.7	
33	CAF357	8/30/2009	0.26	0.339	0.382	0.359	0.337	20	18.32	17.4	15.9	14.7	

BEST PRACTICES TO INCORPORATE

- Aadhar authentication using QR code scanning instead of using only Aadhar number.
- Image to text conversion to extract area and other farmland details from official farm documents hard-copy.
- Providing a map interface to farmers to mark points of his farmland and calculating area based on his entry.
- Dynamic multilingual app support to farmers based on current language preference he/she has.
- Analyzing data obtained from farmers to automatically assign duties to irrigation officials based on job hierarchy for optimizing water allocation tasks.
- Using Geo Tagging to identify the key areas the Government needs to focus on.
- Smart rainfall and crop produce prediction to make the farmers more aware so that they can take more informed decisions and plan ahead for the future.
- Collecting and analyzing data from soil moisture sensors to predict time at which the land will be fully irrigated, and also finding the current irrigation percent of the farmland.

TECHNOLOGY USED

- Android Studio
- Python IDLE & Libraries (Pandas, Numpy, Matplotlib, Sci-kit learn)
- Full Stack Web Development
- Image Processing (Google Vision API)
- Geotagging (Google Map API, Kernel Generation)

TEAM MEMBERS

Nikita Adkar (L)

Chinmayee Mundhe

Kunal Khadilkar

Rahul Barhate

Akanksha Kale

Akshay Jain