Rural Water Resources Management
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Lecture 54
Solving case studies in rural water resource management Part - 4

Hello everyone, welcome to in detail course on Rural Water Resource Management. This is week 11 lecture 4. In this week, we have been looking at data to collect for understanding rural water resource management and all these data follow the same teaching that was focused in class, which is the key parameters, the hydrological cycle and how these parameters are related to each other.

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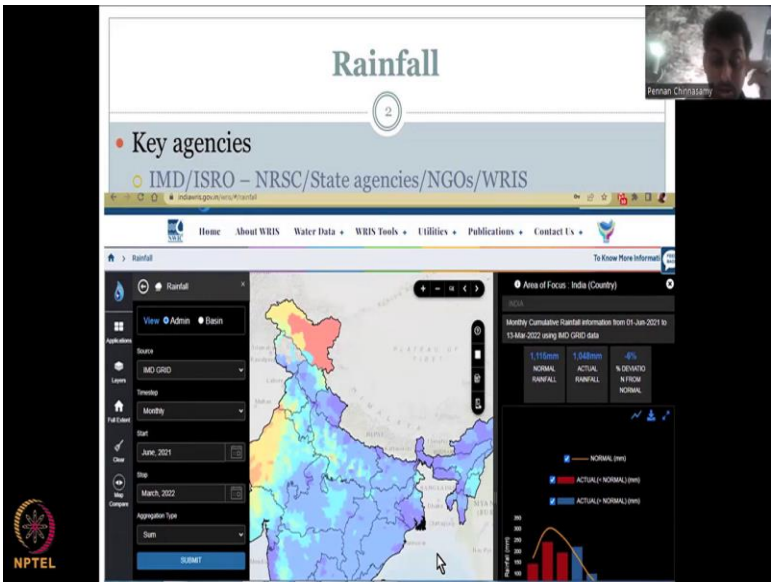

In the last class, we looked at rainfall and the key agencies that collect rainfall are IMD, which is the Indian metrological department and ISRO. The space agency which is the predominant agency for India is Indian Space Research Organization ISRO and they have multiple agencies as I mentioned of which NRSC does these rainfall products for India. Sometimes IMD and NRSC data are much as one data set or you can also download IMD separately ISRO separately and then work on.

There are other state agencies also in WRIS website. The last class we looked at this website and some norms that we discussed what is normal rainfall, what is the actual rainfall mean and what is percentage deviation mean. We also looked at the key tools which are on the left side of your

window and we looked at the basin boundaries, admin boundaries. In today's lecture, we will focus on downloading one data set for info. So, let us start by going to the website.

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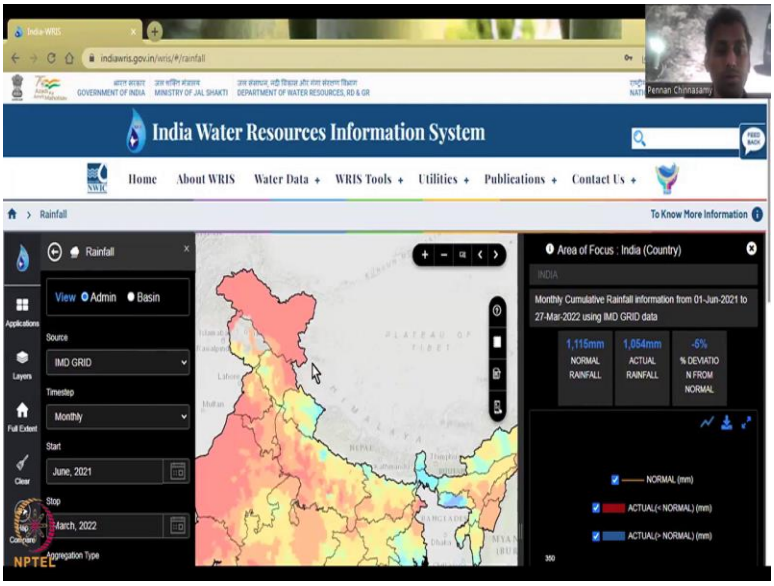

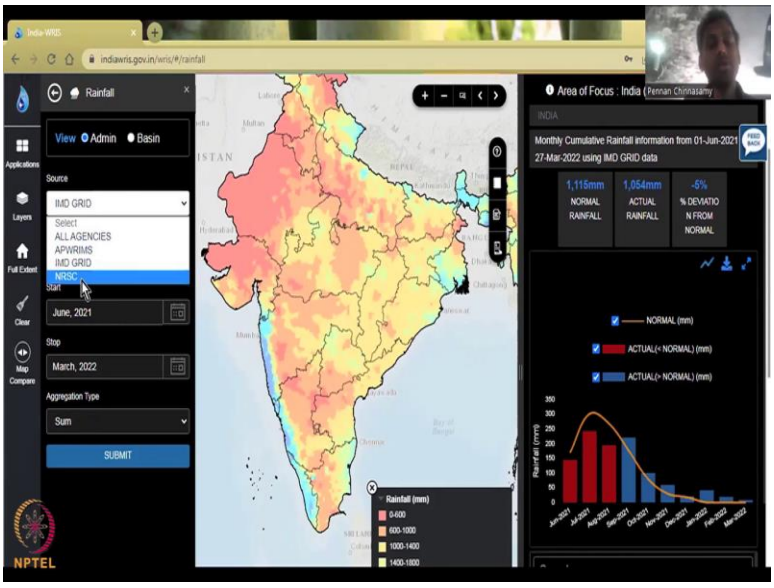

Because it does take some time to download and assess these data please make sure you have good internet when you have to download this data. As I said it starts with a monthly cumulative rainfall information which is given from 01 June to 27 June 2022 using IMD Grids. And what we will do today is focus on one good rainfall area which is Maharashtra on the Western Ghats and also one maybe in Rajasthan where rainfall is low.

So, what you see here is a rainfall heat map. What does a heat map show us when it is red like a heat and also a map of where it is happening, red indicates very low rainfall, 0 to 600 mm per year. Whereas blue indicator good rainfall. So, let us look at one thing is the sources. As I said there is IMD grid, there is an NRSC grid and you could download and see what do they mean by the manuals in above page. You can also give feedback here. So, my point is let us do some understanding of the dataset. In this if you type in let us say Thane, a district name it will not come because it is at a state level I will show you how to get at district and block levels.

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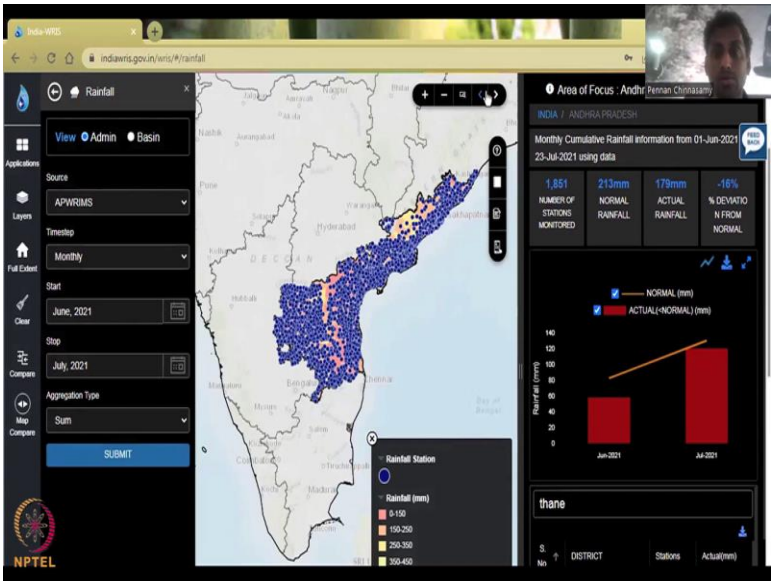

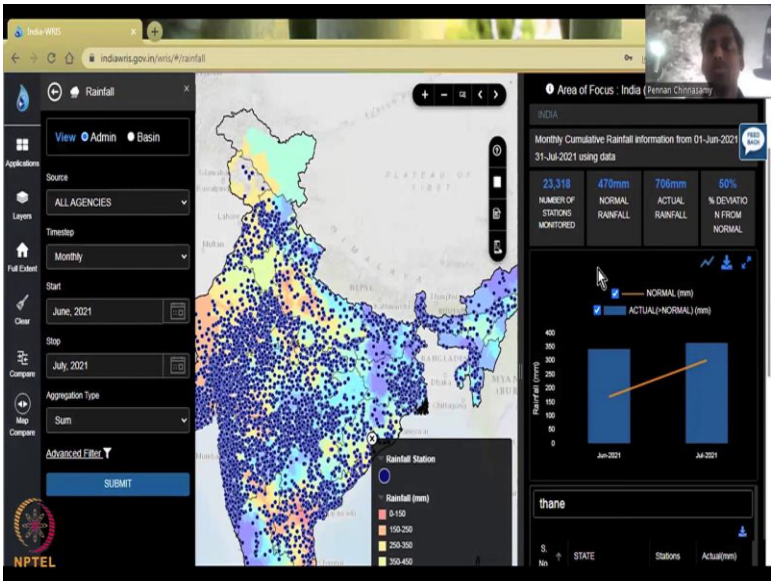

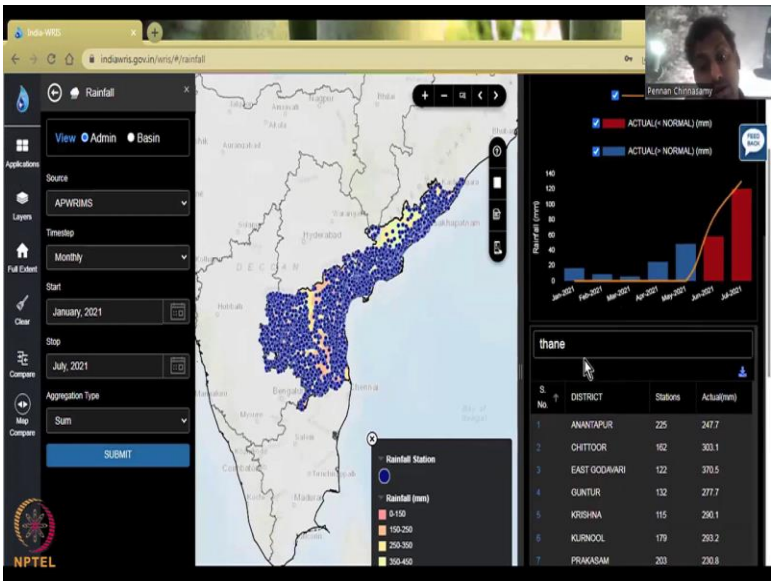

So first, let us know this APWRIMS. So, AP stands for Andhra Pradesh. And then I am going to say from June to July what is it let us just leave it as is and hit submit. So, do not change anything else just change the location or source of APWRIMS. So, what you find is that suddenly the AP which is Andhra Pradesh state has been highlighted. And the stations where the data is collected has been highlighted, located and the data has been plotted.

So, you could see that. Compared to the previous India scale Andhra Pradesh is getting a little bit more rainfall annually because we saw it was somewhere around 1200 at an average. So, just if you want to see you can go back to this button, you can go back one more time and say all data all agencies, and then it just populates everything, hit submit, for whole India it will take some a

little bit time, but then it will populate it. So, all of India has given and then for this period, June to 2021 to 2021.

This is the average rainfall and just within 2 months, so June, and July, it will give you also the date as June 1 to July 31, cumulative data. Now, we are going to focus on only one data set, which is the state data set, I am not going to use that for entire India, what I tried to see say here is, if you click on the date, and let us say Jan to July, to get some data points for the AP, and you will see that oh, wow, all this state has been covered, a lot of stations have been covered.

And you can come down to see the district now the district names come up. And if you say Anantapur district, you just click on the district, then the station names will come it will also zoom in to that particular district and all these station names come. So, you could see that this is Anantapur. And you could see all the station names and what are their measurements, actual. Actual means the current. And normal is the normal for that period.

So, actual is the 1 Jan to 23 July, which is what you put as actual date, whereas normal is the 10-year average kind of. All long-term averages keep it long term average. So, for now, let us go back to all agencies, if you want to quickly to come up, you could just hit refresh the page. Sometimes if you go too much into the web page, it does get stuck. Or it is better to just refresh the or clear all the filters that you would have put.

So, what filters did we use, we used the state as AP and also a time. So, I hit refresh and the other AP was having around 1800 whereas here you see 1100. So, overall, AP is higher in rainfall compared to the overall India and normally you do not compare overall India for rainfall why because we are blessed with a lot of diversity in rainfall.

For example, if you can see that our high, high rainfall regions in the north and then one of the most wettest points on the planet is also in the east, whereas the west has some desert and so less rainfall, whereas a central India is kind of average to above average rainfall. So, let us do this. So, this is the date given from 1 June to 27 March 2022. I will see this is the values. What I am going to do now is focus on a one particular state.

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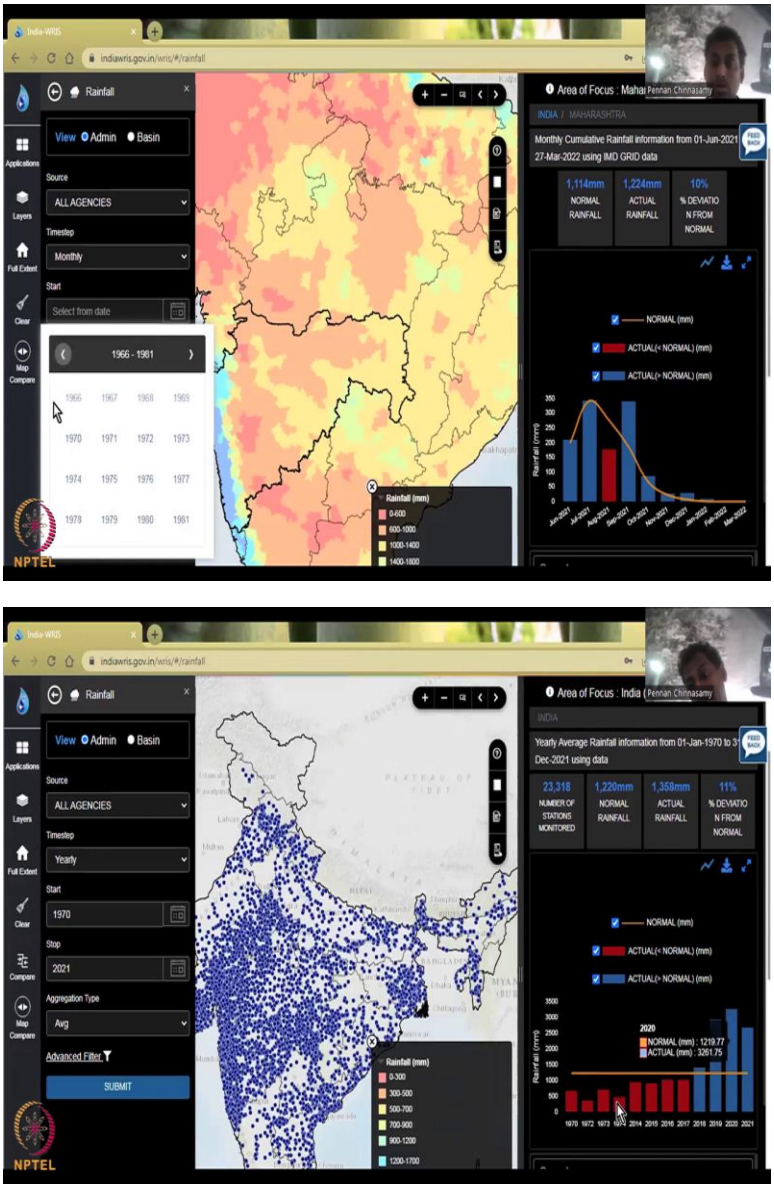

So, first I will click the state to focus on it, Maharashtra. Let us go step by step. So, here I want to click all agencies. I want all agencies for Maharashtra not IMD not NRSC. So, when you download the data, sometimes you will be given this is IMD data, this is NRSC data or sometimes it will be clubbed as one data because IMD also uses a lot of satellite products for rainfall assessment.

So, moving on, what we started seeing is a monthly timestep. So, the data is collected daily. So, all rainfall data is collected daily. For example, let us say if you do monthly, like groundwater or evapotranspiration and other parameters, what will happen is sometimes your rainfall happens

only in 3, 4 days in a month. So, if you wake up and say, every 15th of the month I am going to collect, what happens if there is no rainfall on that day, does that mean like, for example, March 15, you collect data and if there is zero rainfall, does that mean the average four month is 0, no, it just tells me that day there was no rainfall.

So, for that, it is always good to do a daily estimate. And in this website, all the data is clubbed and made as a cumulative monthly data. So, you can see the graph here it is June, July does not go every day, because it is too much space and it will slow down the internet slow down your computer. So, they will at the backend they have already accumulated and cumulative as months, some depth not average, because again, if it is average, then you will say that March 15, there was no rainfall and so average it is 0.

So, for that, it is always important to have daily rainfall data, the data comes in daily and sub daily levels like hourly or multiple times in a day, but just because of this availability, we will be doing it as daily and daily is converted to month and then monthly to annual goes by this line, daily data is collected, it is cumulative as month and in the month is cumulative as yearly, cumulative means sum. You add it up for a month.

So, every day the data is populated, if you miss the data, that data is some statistics is used to fill the data and then a month submission is done. And then you have an annual submission. Then if you divide the average, then you get the normal rainfall. So, Maharashtra I click just for this period, you could see that 1114 millimeters rainfall, actual rainfall a slightly higher, 10 percent higher than the normal rainfall I am going to do monthly.

When you do monthly, what happens is you get access to the months. For example, if I do yearly, the month is gone. So, you can see that if I click this, there is no months, it is only years, if I click 2015, for example that comes. So, let us do monthly. And then I have to select the start date, let us do a 10-year average. So, each time we cannot press this, it might be time consuming. So, when you want to jump years, just click on the year.

And then you can see is jumping. What did I say, I want 2012. So, you can click it again, if it does not move, go to the arrow mark and then push it now it has been pushed 1998. What is the earliest data we have just keep on pushing. And these dates are not highlighted, it is not black, it is grayed out. So, when I move the pointer does not turn to a finger. So, only 1970 turns.

So, from 1970 to 2022 we have data more than 50 years of groundwater data we have. So, I am not, again this can be done but as I said okay, let us do it for a year. So, 1970, 1970 to 2021. And then average. There is also advanced filters will do, but see. So, this is the rainfall that happens and then you could see it is going up. So, every year annual rainfall is there and suddenly the annual rainfall has picked up across India and across India all the stations that is available on the website is shown.

This does not reflect the actual or all the total rainfall gauges because as I said the state also does monitoring if you do not include that in this website does that does not mean that there is no gauges. So, there is a lot of gauges which are not present here. So, what I have done is a 1970 to 2021 every year data is there and then suddenly there is a jump 1974 to 2021

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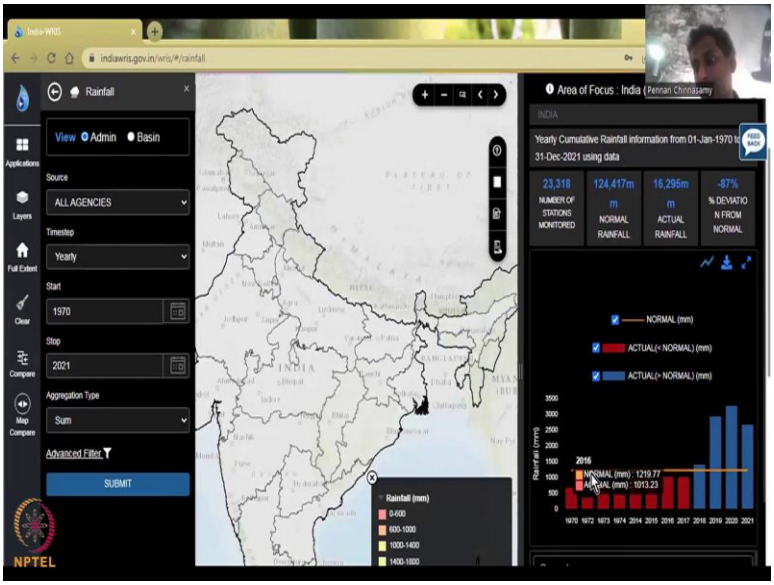

So, let us say sum it up. Still it is showing like this, there is some issue in the data we could look at the line graphs if we can find it. Again, there is a break here so that happens when there is no data or data was not input properly in the hardware system, hardware and software. So, let us ignore it for now.

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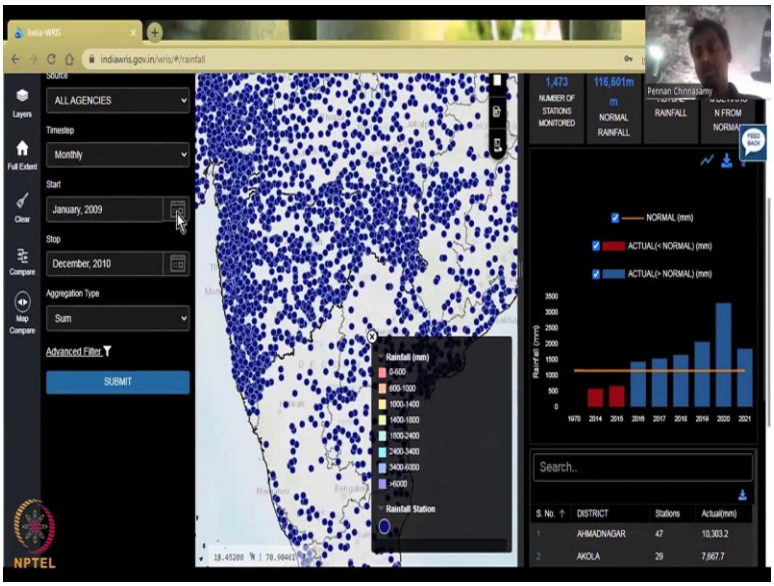

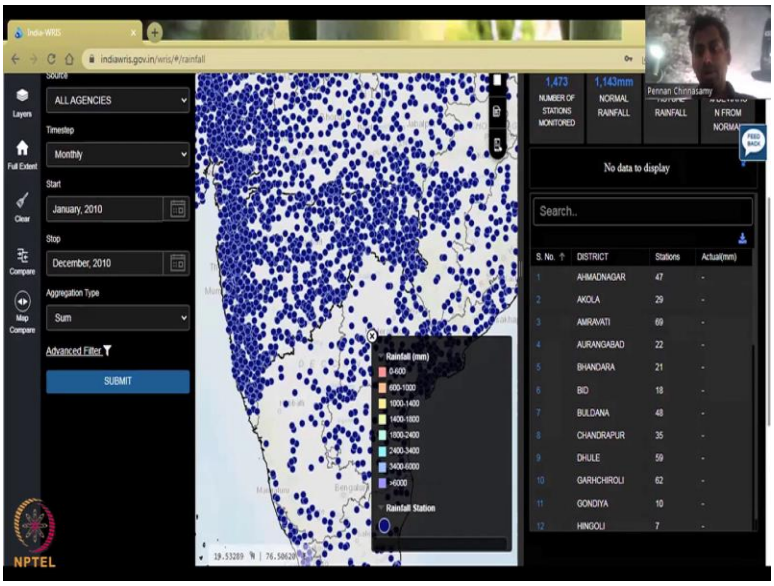

We are going to just jump on to one agency, sorry one total. And then why is it better to have all agencies is because you have the possibility of filling a gap. If there is a data gap in IMD for example, then NRSC data can be used to fill it up. So, we are going to do monthly just for the Maharashtra state. So, I am going to click Maharashtra. So, accidentally it went to one location so I am just going to click this Maharashtra, you can, if it is too cumbersome, just go here and clear, clear map selections.

So, now we are back and all agencies, monthly, I am going to just click on Maharashtra, or I can just come here and click Maharashtra and let us do one more time, yes, now Maharashtra is picking up, there is no well I selected and then let us go into do monthly. So, now monthly, again let us do 2010. So, I am going to click on the year we will go back 2010 Jan, let us do 2 years, let us take 2009 Jan, Jan 2009 to 2010, 2010 December, so I am taking 2 years.

So, two years data are going to take, just over one year because we are going to just see how it will set it up. So, any point you have questions you can come back and see how I am using my mouse changing the dates clicking 2010 Jan, so I did not put a date but you will see soon that it is going to do it so sum is what we need. Advanced filter has other aspects but I think most of it is here so we will just click summit. When you click summit this movement should happen, which means that the data is being populated and is working. So, now you could see it is 1 Jan 2010 to 31st Jan 2010. So, as I mentioned, I did never give the date as only a month and the year I gave, I did not give a date.

So, because the data is collected every day automatically it has taken from 1st Jan and summed every day. So, Jan 1 plus Jan 2 like that, it goes until December 31. And that is the total you get is 1143 millimeters of rainfall in the normal scenario, but for this actual scenario the rainfall is missing, maybe the data is not available. So, that is the first thing you should see.

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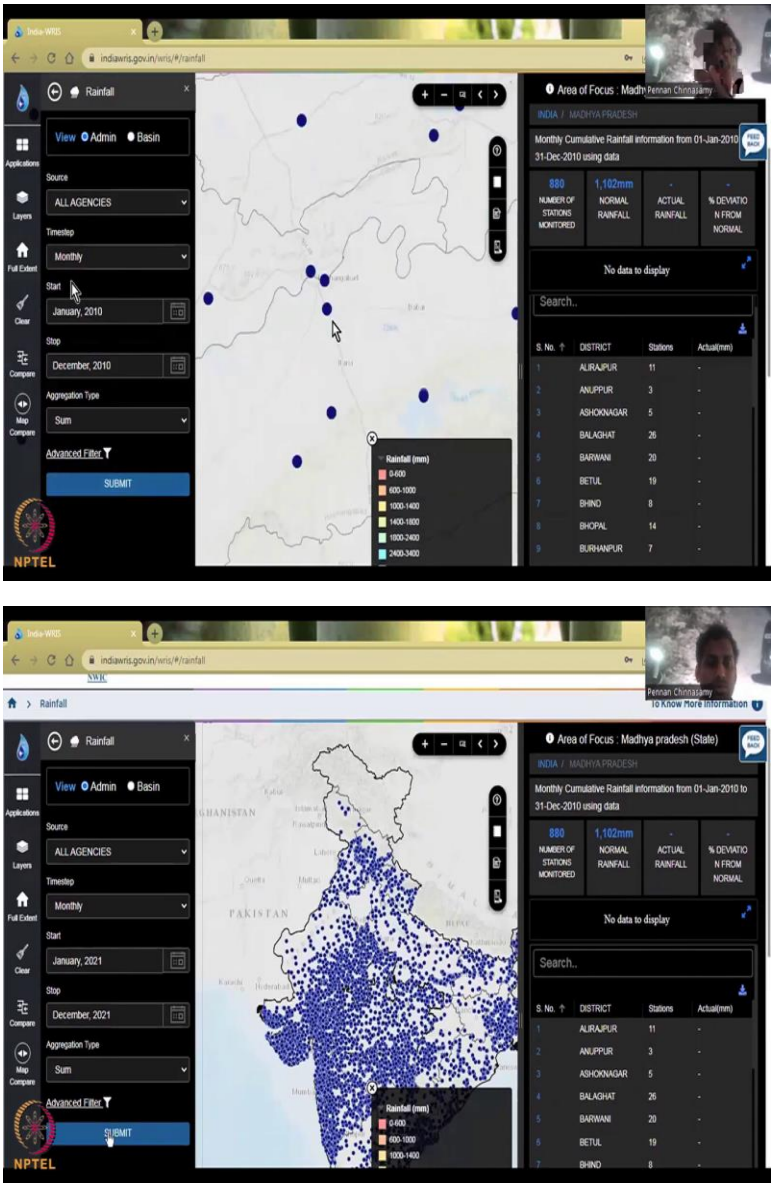

Let me check another state for example. Sometimes as I said, you will not have the data for that region. It is okay. And now I want to click UP or Madhya Pradesh. Yes. Yeah. So, Madhya Pradesh is selected. Now, I am going to hit submit. So, it is India slash Madhya Pradesh, again that rainfall year is not available.

So, now you can clearly say that there is some issue with particular dataset, which is fine. So, now let us go to the current year. Last year, we will go Jan 2021. And then this has to be December at least one-month post Jan. So, and then I get submit. I am going to just do Madhya Pradesh. Let us see if the data is available. It is searching for the data. And it says 1 Jan to 31st Jan 2021. So, again it did not get a little bit stuck. So, I am just going to do a refresh.

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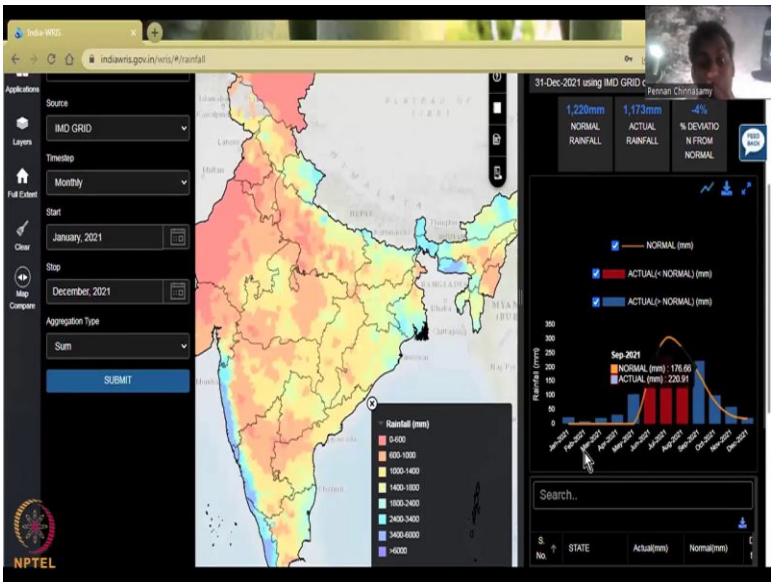

And whatever data they are going to give us, let us take it. I have downloaded the data for this period. But as I said, I wanted to give you a live demo of this website. So, it is better to show you how the data is taken. So, for example, right now it says monthly from 1 June to 27th is available. So, let us do Jan 2021. Just to check if it is available.

And then we have December 2021. I click Summit. Yes, the data is available Jan, Feb, March so every month is available. And you could see that it is below normal during the monsoon, but then the monsoon is shifting, or kind of the peak is happening this side and there are two peaks, which is kind of not okay.

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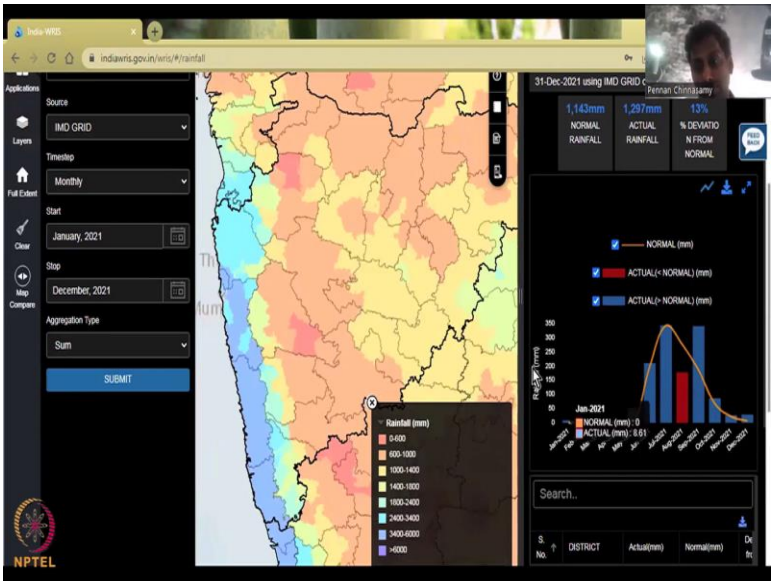

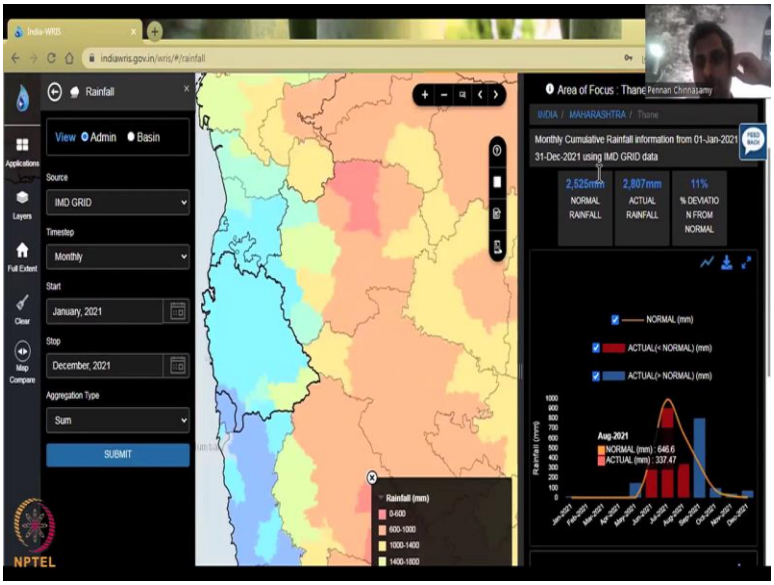

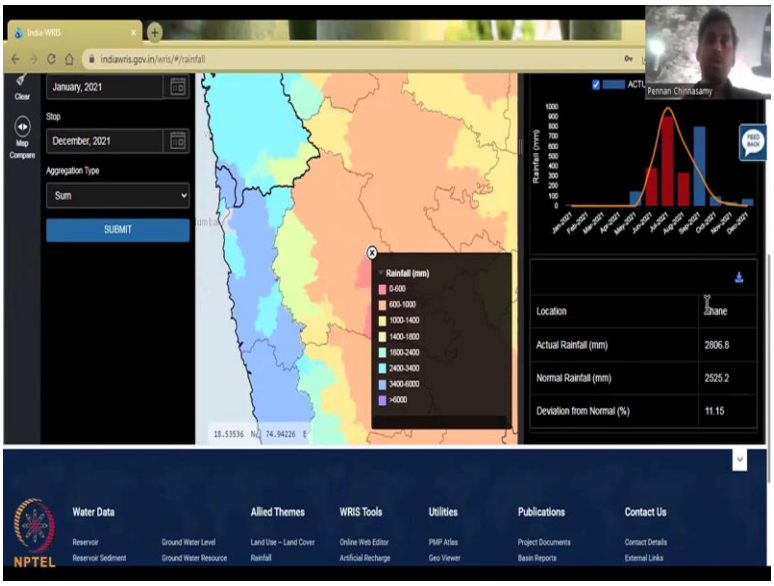
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Map Compare
January, 2021
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Aggregation Type
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SUBMIT
Rainfall (mm)
0-600
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1800-2400
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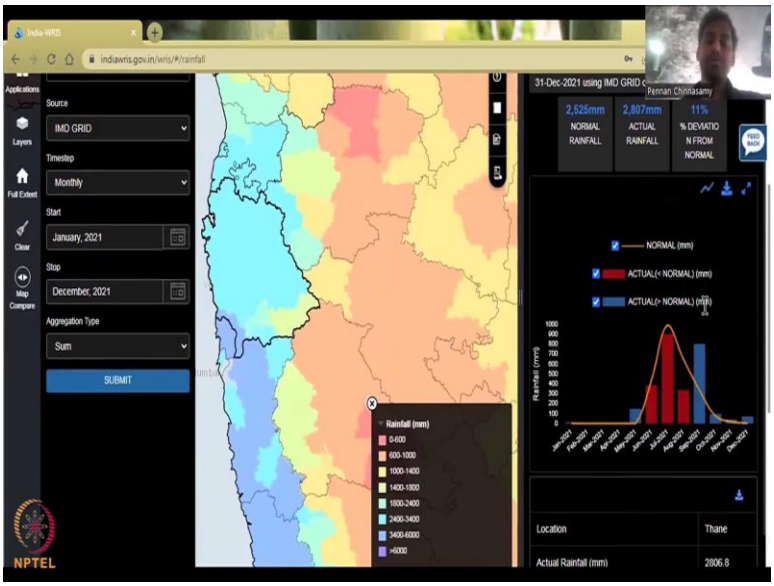
3400-6000
>6000
Pennan Chinnasamy
Rainfall (mm)
Location
Thane
Actual Rainfall (mm)
2806.8
Normal Rainfall (mm)
2525.2
Deviation from Normal (%)
11.15
NPTEL
Water Data
Reservoir
Reservoir Sediment
Ground Water Level
Ground Water Resource
Allied Themes
Land Use – Land Cover
Rainfall
WRIS Tools
Online Web Editor
Artificial Recharge
Utilities
PMP Atlas
Geo Viewer
Publications
Project Documents
Basin Reports
Contact Us
Contact Details
External Links


India-WRIS
indiawris.gov.in/wris/#/rainfall
Applications
Layers
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Rainfall (mm)
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1800-2400
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3400-6000
>6000
Pennan Chinnasamy
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NORMAL RAINFALL
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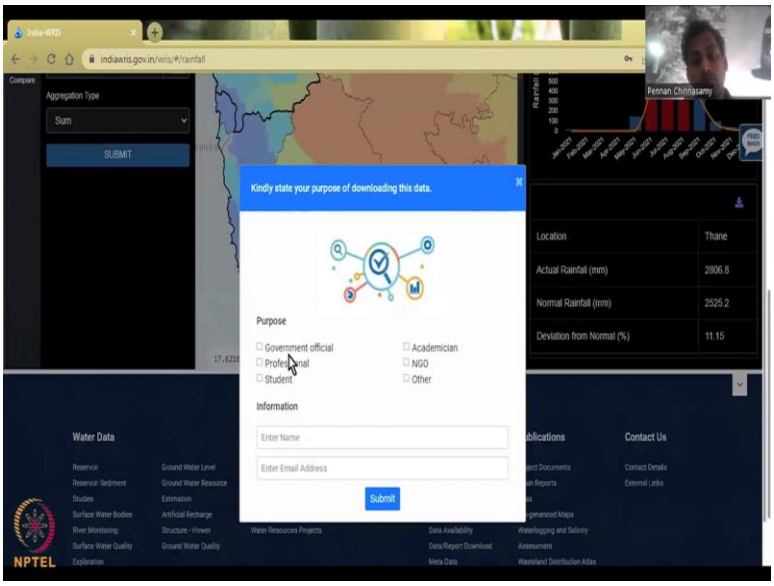

So, now I am going to click on Maharashtra to see that data still changes. Yes, now it has changed a little bit more, we all know from in Maharashtra starts in June, and then peaks in July and August. So, you do have a good spread of rainfall that is happening in this region. Now, I am going to zoom in, now you see the districts. And also, down when you come you can see the district. So, let us take one of these areas.

So, if I click on this, which is one of the blue areas, there is good rainfall. You can see it is Thane. So, Thane district has good rainfall, and that is why it is blue, it is around 3000 to 2500 millimeters of rainfall and the actual is 3000 for that year, last year was really good rainfall 11 percent deviation. So, then what can happen is you can also go and zoom into a particular data point that you want to take and download. So, this data can be downloaded, this image can be downloaded as an image.

For example, if you hit download it may ask you what format you want the data is a CSV or an image or a JPEG, see PDF or CSV. So, I will click CSV, and then you will get the data. So, the other one, you can also take the table as a CSV. So, you can collect and says CSV or what it is and then you have the we have to give for what purpose you want download data, your name and email, hit submit you will get the data.

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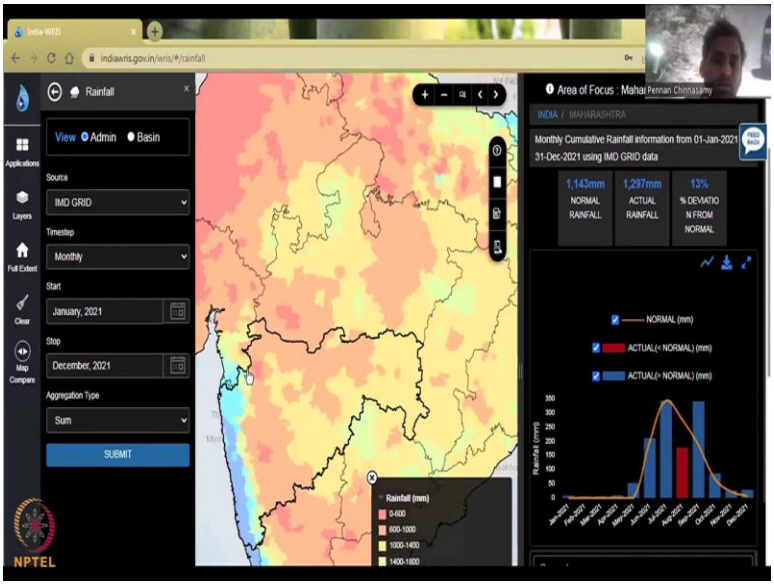

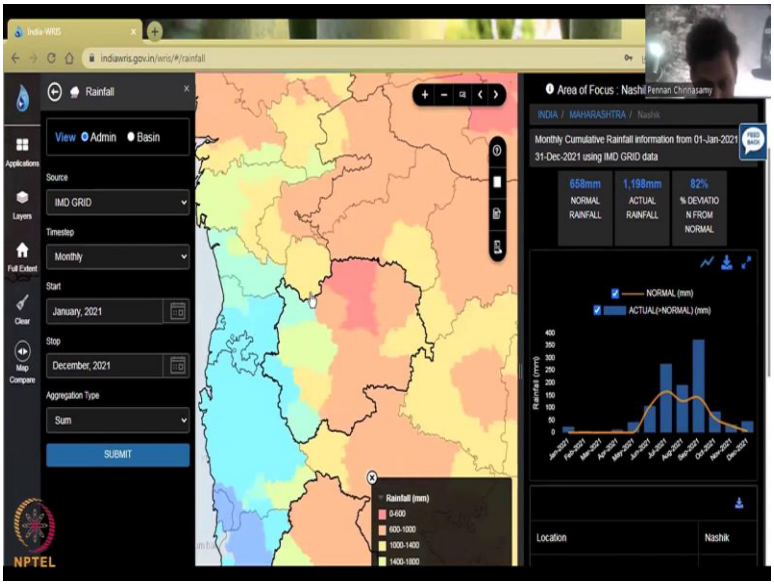

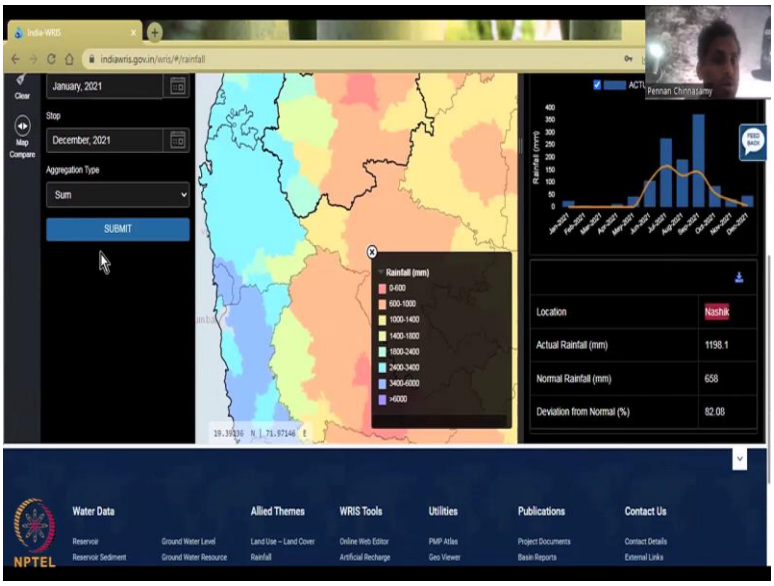

So, now what I am going to do is I am going to add layer and… so I just zoomed out. So, this is a good rainfall district let us take this district for example. Which is I still do not know, so it is still at Maharashtra. Zooming in that way to the background loads and this finger comes up, so the fingers come up, I will click it. So, the whole district is Nasik. So, Nasik has a little bit less rainfall even though it is adjoining to a high rainfall area you can see a red curve.

So, it is 658 normal, almost double the rainfall has been taken. So, this is how you would look at data and assess it. So, let us look at it down you can also go and find the district and collect the data. And most importantly you can also take the individual data out. So, I have just clicked

average to show you what is the difference and you can see the average rainfall for that period monthly average, monthly averages since 55 millimeters, etcetera.

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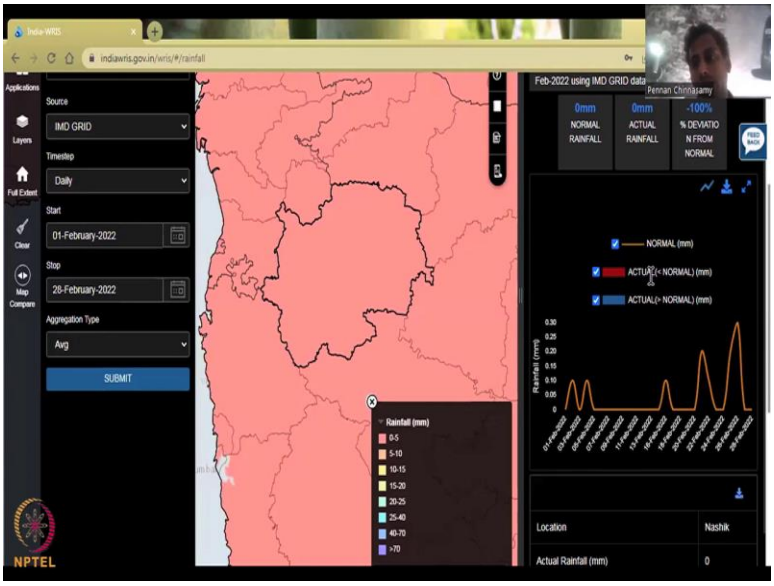

Let us do a daily a very short time. Let us do one month in February to February end and you can see the actual rainfall. So, still populating, so there has been no rainfall, 0 normal, 0 actual, percentage deviation, you can see very small about which is not actually rainfall, because it is almost 0. For February not much rainfall is happening. That is what it is saying. See IMD grid. So, IMD grid has all these different data sets.

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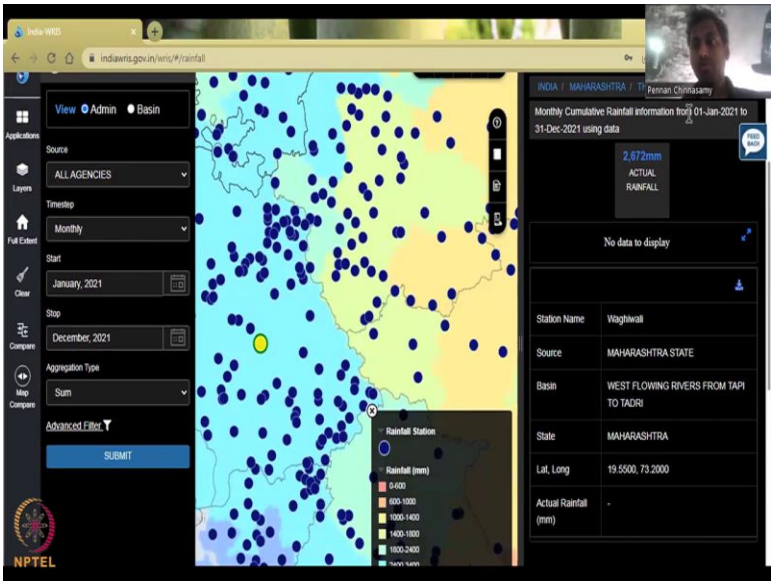

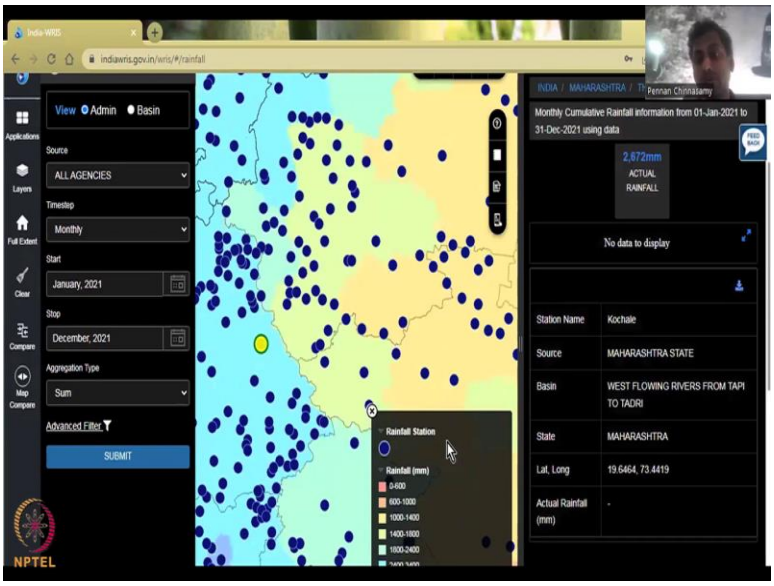
India-WRIS
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View Admin Basin
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ALL AGENCIES
Timestep
Monthly
Start
January, 2021
Stop
December, 2021
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SUBMIT
Rainfall Station
Rainfall (mm)
0-600
600-1000
1000-1400
1400-1800
1800-2400
INDIA / MAHARASHTRA /
Pennan Chinnasamy
Monthly Cumulative Rainfall information from 01-Jan-2021 to 31-Dec-2021 using data
2,672mm
ACTUAL RAINFALL
No data to display
Station Name
Kochale
Source
MAHARASHTRA STATE
Basin
WEST FLOWING RIVERS FROM TAPI TO TADRI
State
MAHARASHTRA
Lat, Long
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Actual Rainfall (mm)
-
NPTEL


India-WRIS
indiawris.gov.in/wris/#/rainfall
View Admin Basin
Source
ALL AGENCIES
Timestep
Monthly
Start
January, 2021
Stop
December, 2021
Aggregation Type
Sum
Advanced Filter
SUBMIT
Rainfall Station
Rainfall (mm)
0-600
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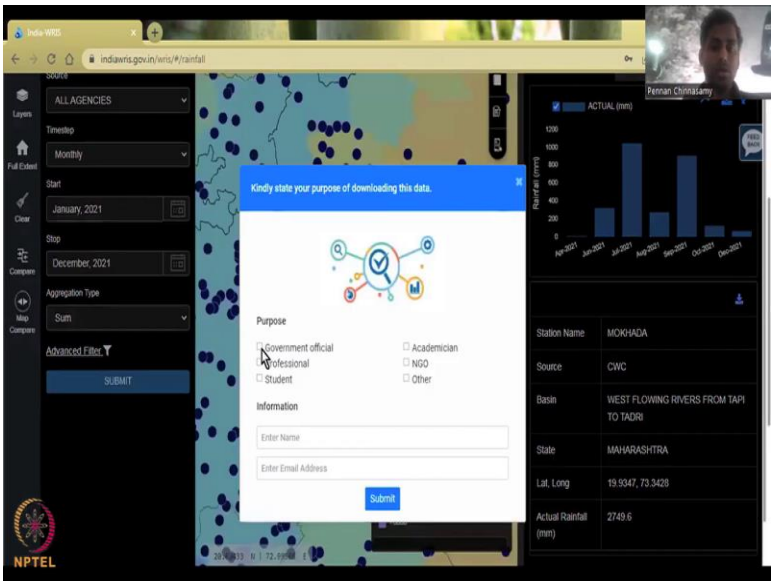
1000-1400
1400-1800
1800-2400
INDIA / MAHARASHTRA /
Pennan Chinnasamy
Monthly Cumulative Rainfall information from 01-Jan-2021 to 31-Dec-2021 using data
2,750mm
ACTUAL RAINFALL
ACTUAL (mm)
Rainfall (mm)
Station Name
MOKHADA
Source
CWC
Basin
WEST FLOWING RIVERS FROM TAPI TO TADRI
NPTEL



Now, I am going to go back to all agencies. I am going to zoom out to full extent. I can click India for example. So, the whole of India has come. Now, I am just going to click the month, I do not want daily, I want monthly. And then I am just going to do one year which is Jan to December and then apply a summation, monthly sum. What you see now is you do see the points coming up rainfall stations.

For IMD grid, you will not get the rainfall station, because IMD grid is a interpolated to a grid to a picture. If you want the point, you have to do all agencies and then you will get the points. So, now I am going to zoom into a high rainfall region, and then I am going to take out the data. So, let us do Thane for example. So, this is Thane, and let us click one point in Thane. Now, you will see a yellow color turning on and you can see that this is the monthly rainfall information for 1st Jan to 31st Jan and it is either Waghiwali station, there is a station.

The stations location has given us a lat, long. So, those are not GIS and GPS, this is the location of the station on the planet and you could see that that location has data. You can now, this is no data display, but the actual is given, fine, we will take another point. So, this is how it works not all data points you will get real data. If you are lucky, you will get one or two. So, there you are.

So, this I were just clicking on different stations and Mokhada, Mokhada station has the rainfall from April, April it picks up and then December goes on. Why April very less the other months why are they missing there is no rainfall data. So, the actual rainfall is what we are interested in not the average.

And for that period, you could see that it is maintained by CWC is a source it is a West flowing river basin, where the basin is located and this is lat, long and the average rainfall, actual rainfall for that year is given, so almost 3000 millimeters of rainfall in that particular year. One thing you will notice here is it is a CWC station, not an IMD not an NRC, that is why you have to take all agencies.

So, all agencies will include every agency that has stations, IMD grid is a station and ISRO product together so we will have a map, NRSC is a map. Only all agencies if you click you will see the different agencies that are collecting rainfall. So, here in this location it is CWC. Now, you could go to download data, download as CSV. I am just going to see how it is I am a government official so I will put government and then I am going to get my email.

Let us download but sometimes it does take a long time since we collect like monthly it might be quick and download the data. So, for today I have shown you how to exactly take the location of one station you need to be careful about this location lat, long. See do it again. So, once you give the garment or not you will have to do it again. There it is, it says it is trying to download give it some more time. So, all this is given here, India, Maharashtra, Thane, Mokhada, so every step has to be followed.

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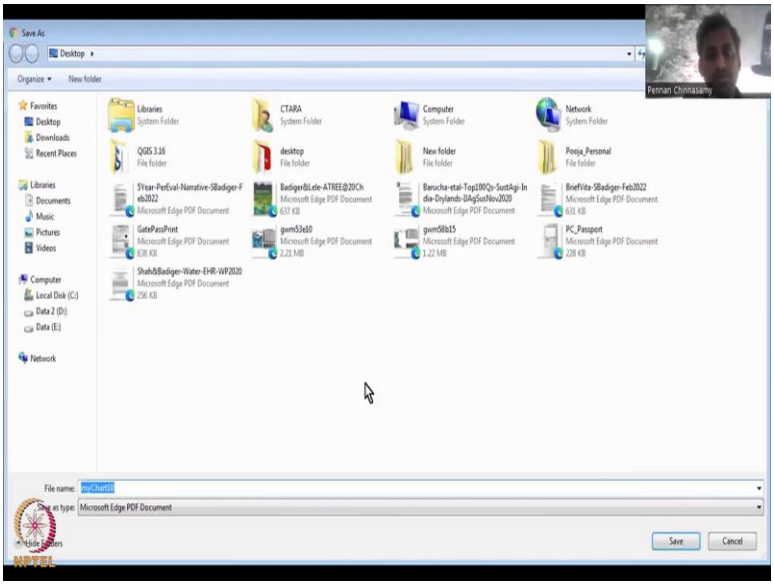

And you can download the data and there it is the download is happening. It is very slow for some reason, but it is fine. So, I am just going to store it and as a PDF. So, I will be opening the PDF because I wanted a download as a PDF and you can have the data shown as a PDF on your screen. So, with this I will conclude today's lecture, you can see that the data has been taken map has been created. You can also download as an Excel and then work it on Excel. I will stop here for today's lecture and I will see you in the next lecture. Thank you.