Groundwater Availability
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The next aspect about the water availability is one is surface water availability. Surface water availability is dependent on the cloud formation and rainfall whereas another one is the groundwater availability. Groundwater what is the groundwater; water that is a that is stored within the rock and soil formations below the surface of the air and it can be extracted on a economical scale that is what is meant by groundwater.

It may be available in the shallow aquifer that means it may be available in the up to 3 meters or 4 meters whereas the deep aquifers they are there mainly in rocks; the rock pour spaces as well as rock fractures. So how do you assess this type of groundwater potential because that is; that contributes in the agriculture as a supplementary irrigation. So now this is the artificial and different environments what we are talking about is the first one which we are talking about the surface water then that is based on the river flow based on the rainfall which falls and it has been stored in certain either a reservoir of man-made or natural made that is what we were covered in the previous lecture is about the surface runoff potentials. So now what is happening is some of the one it is flowing through the surface because of the pour spaces certain portion of the water is being percolated into the system through the soil moisture and as well as it gets through the fractures and get into rock portions and what is the advantage here is naturally also it is available as groundwater and also that could be recharges can also be made in this area wherein you the additional water or excess water which is available during the high rainfall seasons that can be stored in this that can be reach out through certain artificial boreholes and then it can be stored in the aquifer which can be extracted at a later date.

Now, the few parameters which you we may like to know about the groundwater is one thing is an aquifer and the aquifer as I said it is the place it is the geological material that can hold or retain water and so that and the volume will be significantly more so that we will be able to extract it and there are different kind of aquifers that is it is depending upon the material one thing is a unconsolidated that means the grain sizes are not consolidated together or bounded together or there may be some consolidated; consolidated they are all compacted or it could be a bed rock aquifer where it is only a rock nothing else over there so this is where the groundwater is stored below the surface.

Now second thing is how are we able to withdraw it; there are two different facilities which we were using it is one thing is the open dug well wherein the diameter maybe three meters or four meters and the depth could be anywhere between the three meters to 10 meters so that the material from where what we could get water is from the soil or weathered material which can be taken out through this so here this is open dug well. It is a larger well which you will be able to see. Seepages also you will be able to see it the recharge-discharge can be measured from this areas visually.

Another facility which we have created is the bore-wells; bore-wells are nothing but a small one; six inches or 12 inches diameter bore wells because of the pneumatic drills under pressurized conditions you make a hole with the perforated things. The water which is stored at the bottom that can be certain and that is they are the bore-wells. Now this is about how we are able to extract water; this is where it is stored in the underground. So what is that then once you reach the water level then the water level need not be the same throughout the year. There may be some fluctuations if it is immediately after the rainfall the level will be up that means towards the surface.

If it is going to be summer then there is not much of recharge. So the water level will be down that is what we call it as a; that is a fluctuation is needed to understand how best we could be able to depend on these type of activities. Now what is the water level is water level is the level of water in a particular well which is absorbed. Okay? This represents one single well where is the water table is the average water level we often aquifer represented by this water levels of individual wells. So this is a surface where is this is a point level and this is the contour level type of activities which we need to understand. If there is going to be a fluctuation of water level of a well that means your utility is more, your recharge is less or vice-versa whereas if it is going to be a fluctuation in the water table then it shows that overall in that entire region there is a large-scale extraction or large-scale water is added into the system.

So this is what does it does it fluctuation of water level or water table in a particular area. Now, how do we know how much is the water, which is available for me in the forthcoming months. When you want to another parameter which we are interested is the pump test is about what is the quantity of water which I am likely to get from the bore wells or from the dug well. How do you know is that is done by the pump test. What is meant by pump test is from the well you extract water through the pumps for a known period like one hour; in one hour what was the level before starting the pump what was the level and after completing one hour what was the level. So you know the level difference, this level difference is being you just watch how much time it takes before it comes back to the original thing.

So this will tell you about when we draw some amount and how much time it takes so that that is the recharge period that will tell you about storability as well as transferability of that particular aquifer as well as the how much the well is capable of supplying water to the needs of our agriculture. So now all those things they are consolidated for the Indian conditions and this is the groundwater aquifer system mapping and it gives about how much is the yield which you can expect from a different parts of that India whereas when you look at it this is the alluvial area of Ganges where you are likely to get maximum yield whereas these are all the rocky areas where the yield is not that great. So when you are located in any of these places you should understand how much yield your well can give under normal circumstances.

This information can be used how much supplement irrigation which you can dig you from the ground water. Now this is the yield potentials, the same way and how much yield you can expect within the rock-type also there could be some variations you will be able to see that

now this picture shows about what is the water level or water table which has gone up or down over a period of time. This will tell you if it is more fault then what is happening is this area has got more withdrawal than recharge activities. So if you are in this middle portion in the red portion that means your withdrawal is more and your recharges less so there could be some surprises for you in the farm level as well as in the village level activities.

Now there are certain pictures or products which are available about the groundwater level of a particular administrative units which are given in this form one is about the Karnataka here and what is the variation between 1994 and 2003 similarly what is the fall in ground water over the period in November and with reference to the beam of our 94to 2003 there are four there are minimum variations and this could tell you about dependability of groundwater in a particular administrative unit. Similar things can be done for a particular district and this is talking about the Pune district which normally it is nominated by the volcanic Deccan Basalt and this, the different Basalt properties are given by the yield ranges are 30 to 60 litters as well as 60 litters when it is, weathered, highly weathered and poorly jointed group type of activities. So these are all some of the product which are available on the websites of our from the agencies which talks about groundwater availability in those areas based on this course information finally information about your farm are about your village can be had and then the groundwater can be used or can be considered as a partner in your agriculture activities. Thank you.