Surface Rainfall - Run off Assessment & Model
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Welcome to agMOOCs lectures. This week we are going to talk about GIS in estimation of water availability for effective planning that is what we wanted to do in this wake is water availability for the different crop area planning activities and although for the farm they related issues and how it could be assessed as well as how it could be made use of it that is what we are planning to do it in this year.

This way we are going to talk about the surface or enough assessment and what are all the different models that are you being used for water availability studies. Now if you look at the what are all the different problems in those days it is considered as a global hydrological cycle that means that the water is transferred between land, ocean and the atmosphere that is one aspect which covers the water availability. Second aspect is, it is the land-based hydrological cycle that is the water movement from one place to another place in a physical chemical and other interactions with the earth material that takes place and the biological processes that could conduct the effect that moment then the third process is the hydrological processes that involves space in classes of space as well as timescales and this is the usual thing which is there in the basins over the larger the areas where water availability is estimated and used for planning purposes.

Now what are the different; instead of for global hydrological processes what we are interested is only on the hydrological processes. This hydrological processes is explained like this you have the precipitation which falls on to that as soon as the precipitation falls it gets; there are two varieties one is the infiltration and the another thing is that a vegetation canopy and the related activity the third thing is the surface runoff which moves from one end to another end; this surface runoff takes place immediately after moisturizing the surface soil conditions and then it moves further down. Taking through the streams and drainages and it gets filled up even in the pond or in the soil profile or in tributaries or streams.

So this is what we are interested with us this is the hydrological processes which takes place immediately after the rainfall that takes place. Now after that this is what we are interested in the streams as well as in the pants how much amount of water which is being stored that is important for the surface water availability. So which can be channelized and made use of it for our agriculture purposes another type of utility which we can have it whatever seepages that takes place either from the ponds are from the streams. So that is moves on to the aquifer and even in the shallow aquifer that is being used as a groundwater sources. So the water, the rainfall availability analysis is more important as well as the how much is the surface water which is likely to be stored under the particular rainfall skin as well as how much is being circulated into the groundwater or the shallow aquifer that can be used as a supplementary irrigation from the next cropping patterns now the basic thing which we are talking about is the water balance. What is the water balance is normally people they talk about well in the quantity the precipitation the quantity evapotranspiration and what is the thing.

So now everything is made in the form of when you want to calculate it how much is the precipitation? How much is the evapotranspiration, how much is the runoff. So what is the balance which you are able to get it out so this is what is being done for year-wise in 97 for a particular purpose there is a balance of 1:08 that means whereas 2009 it is about only 138 is being added. So in this is; if there is going to be a rainfall of 983 but what the ability to get is the runoff is going to be about 443 millimeters and the rest of it is in the form of a loss or if it is per it is stored elsewhere. So that is what we are trying to view in this diagram is some pathetic is the total rainfall out of this how much is being evaporated and how much is being available in the form of a runoff. This is the water balance approach which normally people use it between the relationship between the rainfall and that runoff relationship is being used in agriculture as well as in the hydrological processes.

Now when you look at it one of this areas where in in this particular region it is the minimum rainfall. It is the minimum rainfall that is going to be a 63 percentages used as a evapotranspiration whereas only 34 percentage is available for the utility as a water which can be used similarly in the dry year there are 78 percentage is the loss as well as only 29 percentages available for the utility purposes. So irrespective whether rain is more or not what we are luckily to use from that rainfall is; it's about 30 to 40 percentage and if that temperature is more than the availability is very less. This is the water balance approach which people now use it for calculating.

Now what are the different kinds of data inputs which we need is we need a elevation model so that it is used in the water movement then we have the other models like index indicators as well as we need cropping system cultivation, what type of cultivation it is happening whether it is a irrigation system and serving changes and all those things. All these parameters are added or used as an input in between the water requirement purposes. When we talk about runoff, what is the surface runoff? Surface runoff occurs in the rainfall input exceed losses such as interception losses; that interception takes place because of the crown in the three crowns as well as the some immediate infiltration as well as the evaporation and surface storage losses.

This surface runoff, you will be able to measure it in the form; by having a gauge in the river gauge stations; they measure this surface runoff. Now there are different models which you use it for making up for calculating what is the surface runoff under a given rainfall condition under given terrain characteristics. Terrain characteristics includes the relief then what is the land use pattern and what all the different conditions ups and downs which is happening in this area. So, this is done normally for a sub River Basin. So then we have to understand what is the watershed what is the river basin. See, watershed is the smallest unit where in because of the elevation difference around it whatever the water gets, wherever the rainfall falls over that it comes over to the normal screen and then moved on that is the smallest unit of a water river basin river basins may be thousands of kilometers or it maybe 1000s of kilometers of that kind of category.

So, what are the different models which are used in basin analysis is; one thing is a conceptual model. The conceptual models they talk about the physical conditions and

associated processes that are there in the hydrological cycle what are the different models which are being used by the water resources engineers is their soil conservation SES model then we have the tank model we have the top model and we do have SWAT model.

These are all the few models that are being widely used in the water availability estimation of an watershed or of a river basin. Now what we have seen till now is we have; we are interested in knowing what is the water availability under a given rainfall based on that water availability is it possible for us to store and then use it up for that purpose what is needed is the rainfall amount and how much it can, how much it generates the surface runoff which can be stored and there are this is the surface runoff is dependent on the interceptions by the trees or tree canopies as well as surface vegetation condition as well as the surface cover factors.

So we will see further about how do we classify all the; how do we estimate on a river basin scale in the next lecture. Thank you.