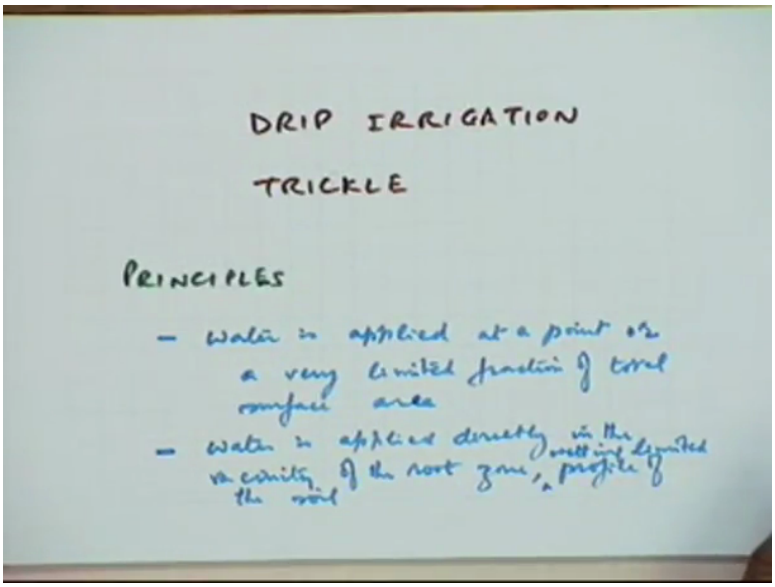
Water Management
Professor Dr. A. K. Gosain
Department of Civil Engineering
Indian Institute of Technology Delhi
Lecture 37
Drip Irrigation System

(Refer Slide Time: 01:20)



Let us move on to the next topic of our discussion which is the drip irrigation system, there are different names given to this system is known by drip irrigation system or sometime is also called trickle irrigation system as the name suggest you can visualize that in this particular system the rate of application is very small that is why either the water is trickling or is dripping drop by drop. So the order of magnitude of the application is very very small.

The various principles we have though discussed earlier at the time when we were discussing the various methods of irrigation we had in general we had discussed about the various aspects of this particular irrigation. Let me let me take few minutes to go through at least some of the major principles of this particular irrigation system which is becoming quite popular for some specific types of crops.

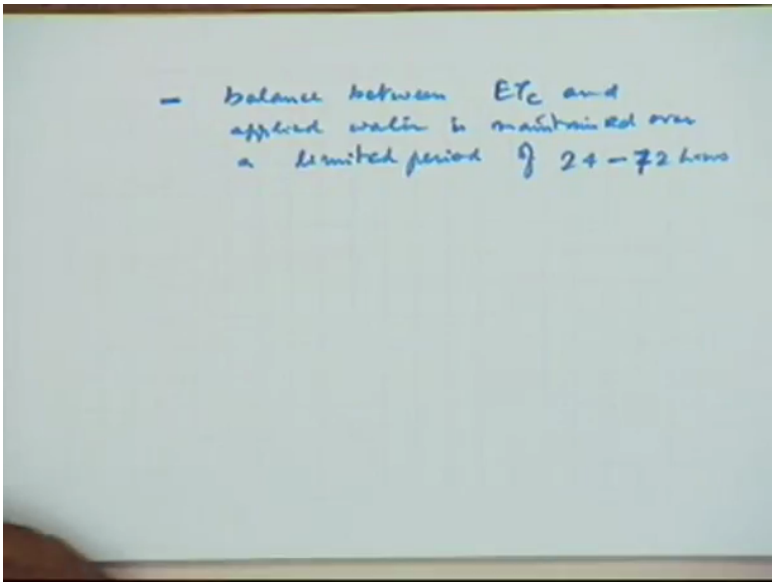
The basic principles which are significantly different then the conventional irrigation systems or even including the sprinkler irrigation system these are first one is that the water is applied at a point or in some cases or a very limited fraction of total surface area and in some cases is only applied at a point and the field and that point is selected to be next to the plant of the specific plant of the crop depending on which type of crop you are using is dependent on the

fact if you are using a row crop then in that case you might you might use instead of a point you might use combination of points which can take care of which can (())(4:13) to the complete row that we will come to subsequently when we will look at what are the various types of application devices which are basically used for the drip irrigation system we will come to those aspects.

But in general is either the point or a very limited fraction of the total area you are not you are not wetting the total area which you are doing in all the other irrigation systems whether they are the surface irrigation systems, the conventional surface irrigation systems though you might say that in the case of furrow irrigation method you are not wetting the total area but still in comparison to this particular method in the case of furrow irrigation system also you are wetting majority of the area when you are applying water in most of the cases when the furrows are very closely spaced you are wetting very big proportion of the total area. In this case the fraction of the total area which is wetted is very small.

Then secondly the other difference is the water is applied directly in the vicinity of the root zone and there by wetting a very small surface area as well as the profile of the soil wetting limited wetting limited surface area and the profile of the soil. So in the depth as well as in the horizontal dimension you are trying to restrict the quantum of soil which is going to be which is going to be increased in the moisture content because you are trying to (())(6:49) to only the root zone depth or that particular volume of soil which is which is effecting the root zone in terms of the moisture availability.

(Refer Slide Time: 7:12)

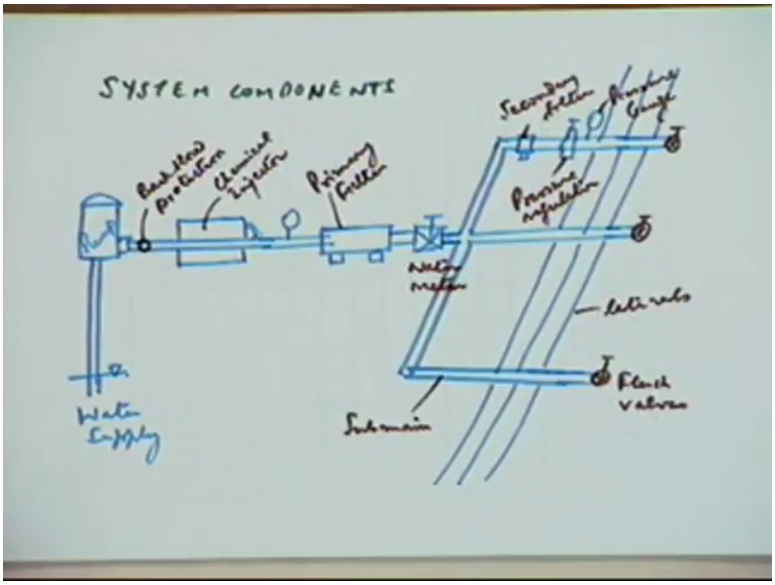


Another major difference is that the balance between the crop evapotranspiration and applied water is maintained over a limited period which might be varying between 24 hours to 72 hours which is not the case in the case of other irrigation methods you are you are doing the water balance again but then you are waiting for a very long period before you again replenish the deficit which has been created by the root system. Whereas in this particular case your frequency is much higher you are trying to have a water balance which is maintained in a very quick successions you are not waiting for the soil to deplete to the extent where is gone quite close to the welting point with respect to the crop in question.

But you are trying to replenish the deficit at a much rapid intervals and that is that creates a lot of difference in terms of the response of the crop, in terms of the yields that is what has made this system very popular because in some cases because of this particular fact that you are trying to have water balance taken care of within very short spends you are trying to reduce the stress levels in the crops and that has enhance the yields it has improved the yields in many situations and that is making the farmers very happy and they are adapting this system.

There are many other advantages and disadvantages which we have already discussed in our previous section where we had discussed the various methods of irrigation I will not go into those things again.

(Refer Slide Time: 9:57)



I will straight away come to the the question of system components, what are the various system components which are essential or at least they are commonly prevalent in most of the

drip irrigation systems whenever you use the drip irrigation system you will have majority of these components installed. I will start with the fact that since in this particular case also the water has to be under pressure you will need a pump.

So the first requirement is that you have to have a pump which is which has to tap the water from some water source. So this can be water supply some existing level whether is a well or some other source and then you have a in this particular overall layout you will find that the gadgetry is much more elaborate then normally is even in the case of the sprinkler irrigation system and there is the reason behind because in this particular case you are talking in terms of you are dealing with very small small sizes of the tubes which you are going to use for the laterals and if the water is not very very pure, if it is having lot of silt then you will find that the there will be very high chance of these laterals or these devices which are to be used for ultimately making the water available onto the ground surface which are known by emitters they will have a tendency to get plucked and that will create a lot of problem.

So here you will have a protection device which can take care of the backflow, backflow protection device is there, then you have another system where which you are using for the application of manure or any other chemicals which have to be injected. So this is this system is or this is the chemical injector which has to be followed with a filter so you have a filter device here known as primary filter it have a pressure gauge here also for the filter to know how much is the pressure and then you have a water meter.

These are some of the gadgets which are you will find the necessary and then from here you have this is the this was this is all put on the main line and then on this you might have the sub mains which are running let me say that these are the sub mains which are put on this main line then you will draw the laterals from this these sub mains and the laterals can be laying on this you can have series of laterals put on these these sub mains.

So these are the sub mains, these are the laterals and then at the end of each sub main you might have some mechanism by which you can flush this sub mains, if some interval and these are the flush valves because despite the fact that you are using the filter the primary filter and the secondary filter is quite is quite possible that there will be some some sediments which still might enter the sub mains.

So after sometime you might like to flush these sub mains free of those (())(16:52) which has got trapped in the sub mains and for that purpose you will like to have these flush valves

available. Now before you tap these sub mains with the laterals you will have some additional gadgets on each of these sub mains which can include the gadgets like a secondary filter this is a secondary filter which can if there is still some some fine material left after the primary filtering is upto the water has come through the primary filter that can be trapped in the secondary filters.

You can also have a pressure regulator and ultimately a pressure gauge also, so this is a pressure regulator and a pressure gauge. These these gadgets will be also available on all these sub mains before you are taping these these means with the laterals. This is the general overall layout or the various components which are which are available in a in a drip irrigation system then once you come to the level of the laterals on each lateral you will put some devices which will be then extracting the water from the laterals and temping it onto the ground those devices are known as emitters or drippers, okay we will discuss those things in the next class we stop here today and if there are any questions I will I can answer those questions, thank you then.