agMOOCs

Basic aspects of wind, wind direction and their application in crop production

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Okay. Well, among the many weather elements we have discussed on rainfall, temperature relative humidity in the past three classes. For today we like to discuss on wind speed, wind direction and how wind is defined.

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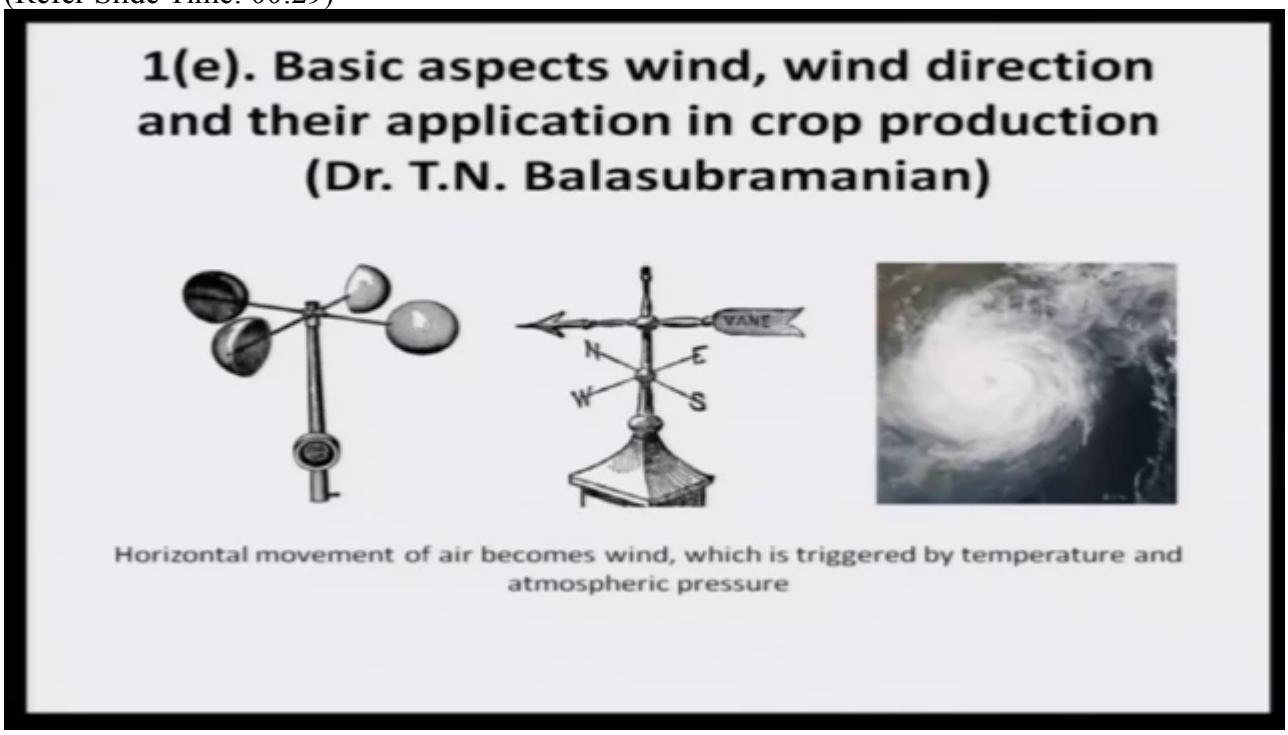

Normally in simple way when air is put in motion then we call it as wind. So wind is nothing but a horizontal movement of air. Why not vertical? That happens in the collision theory also cloud droplets moving going, but normally horizontal movement of air becomes it, which is triggered by temperature and atmospheric pressure, this is very important, a good relationship between the temperature, atmospheric pressure as well as speed.

When the temperature goes on increasing what happens the pressure gradient between two location gets vary. Then there is a low and high being developed as a result wind moves from the higher to lower. Normally it moves from the higher gradient to lower gradient. So in that way wind is very very important. You may ask the question why wind is very important for crop production, not only for crop production for anything else, very very important. As I indicated in my first class when I like to characterize the atmospheric, the atmosphere also contains carbon dioxide. That is very, very important.

Now under climate changes scenario it is going on increase, getting increased that is on the other side. But here CO2 carbon dioxide is very very important for photosynthesis, carbon there is it is being taken by the plant through your stomata, we also discussed when I talk about past subject. So by hill reaction water is getting spilted into hydrogen/oxygen and the mixed with the carbon dioxide we have carbohydrate production by the plants. So in the absence of the carbon dioxide there is no photosynthesis. So wind transports carbon dioxide from one side to the plant side that's why plant guts enough carbon dioxide for it’s a

photosynthetic production. Temperature also gets transferred from one place to other place with wind, so for example when the temperature is more in a particular place that temperature being diluted by going with a moving window from other places.
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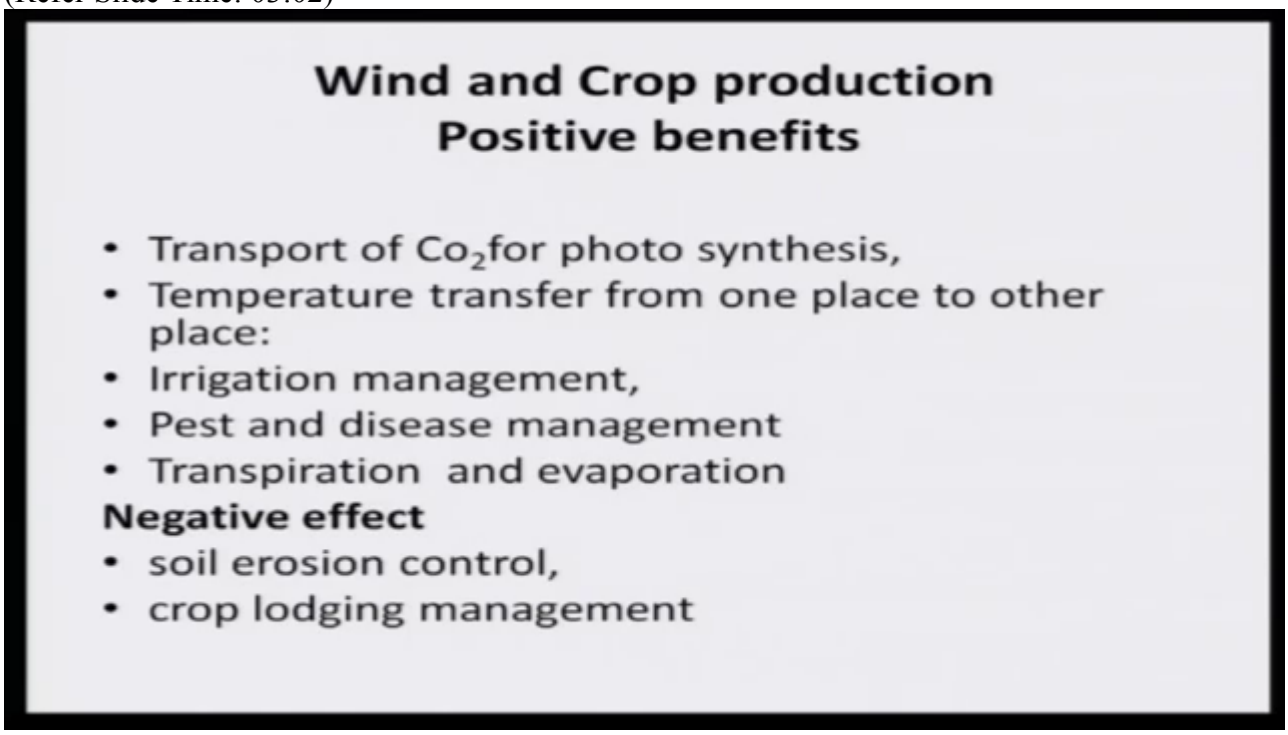

Then irrigation management, this is very very important. When the wind is speed is more or wind is more means you need more irrigation. And also there is a physical damage to the crop through your wind also. The other the area is pests and disease management. This is a very, very important. You know white flies? It is a very very dangerous insect. It sucks the SAP of the plant and makes the plant dry. It is a mobile insect. It does not move on its own. There is no wing. So when wind goes it goes. In northern part of India example, grasshopper, they come from one place to other place through wind also, so wind is very very important.

Then transpiration and the operation, this is very very important. I was discussing about the crop requirement. When ET is more your production would be more, rise ET is around 1400 millimetre the yield was (inaudible 00:04:02) per hectare. In the case of pulses the ET is 250, the yield is also 200 to 300 kilo per hectare. So when wind movement it tiggers the evapotranspiration as a result you may get a higher yield if the plant architecture is so good, not like that of you are pulses. These are also positive impacted. The negative impacted would be silo erosion, wind it takes soil, top soils and all erosion occurs sheet erosion, rill erosion like rainfall and gully erosions. So wind also causes a soil erosion very greatly where is there is no inhibiting effect.

And the next one is a crop lodging, very, very important. In the case of the tall crops, in the case of the heavy crops like banana, tall crops like sugarcane, wind does larger crops when the crop is, crops are at maturity. So these are all some disadvantages because of the wind flow.
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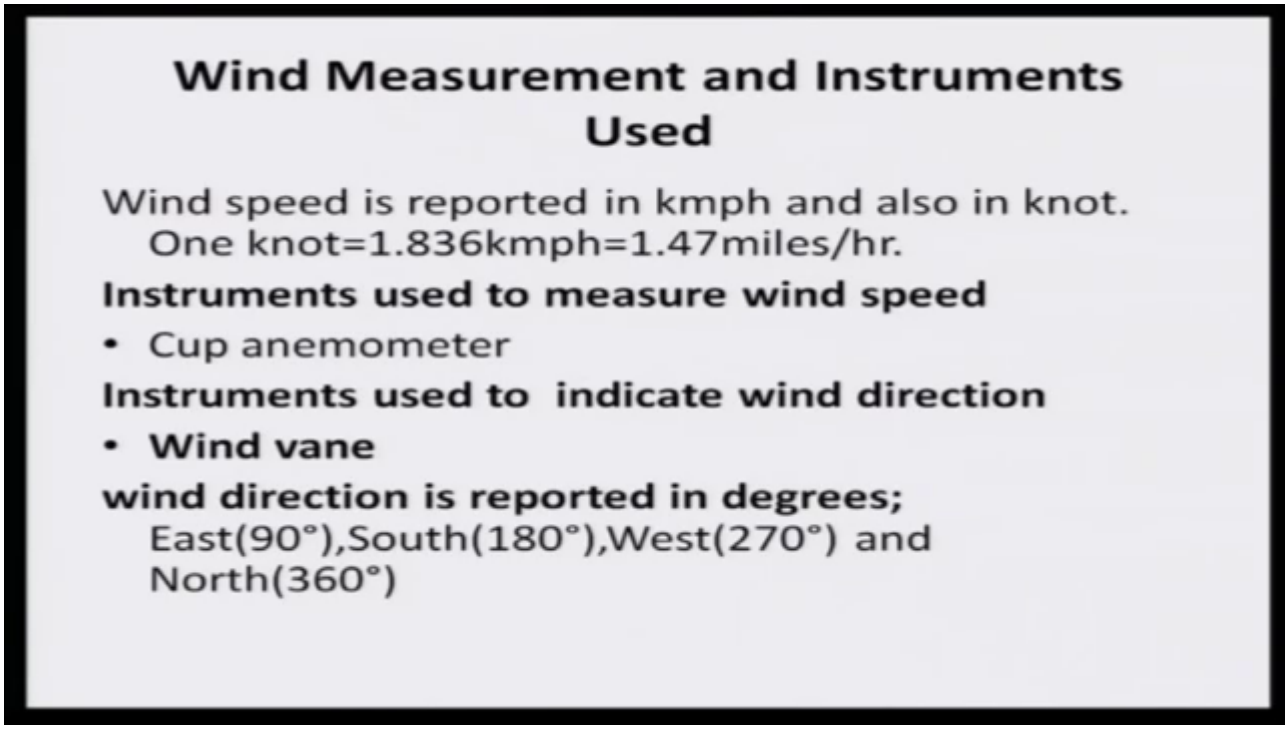

How wind is measured and reported? So wind speed is reported in kilometre per hour that is very very important. And also in knot, knot means in being used in navigation and also other things. One knot equal to, I have given 1.836 kilometer per hour that is equal to 1.47 miles per hour. This can be converted. Miles is the old unit, now we use kilometre per hour. What are the instruments being used. Manually we can measure the wind speed through cup anemometer. So this speed is being -- it is like instrument being fitted in motorcycles and other area the wind displayed can be measured the difference between the initial reading and the 24-hour reading will give the wind speed over 24 hours and divided by 24 then you can get wind speed kilometre per hour.

There is also another one is a wind direction, wind a direction is very very important. Where from wind becomes, where wind goes this is very, very important. When we were discussing about the temperature transfer plus one place to other place windward direction, wind leeward direction also very very important; the windward direction is nothing but the wind where from it comes. With leeward direction means wind where it goes. So this is expressed in degrees in 90 degree, East, South, 180 degree, West, 270 and the North 360 degrees. So the wind direction is very very very important, for especially for a giving plant protection. If you want to make a spray you should not move against wind direction. You should go through a leeward direction then only there will not be any drifting and the input efficiency would be there. So in that way windy is very very important for our weather forecast and other things. In case of something else you talk about cyclone and everything, there the core component is the wind speed.

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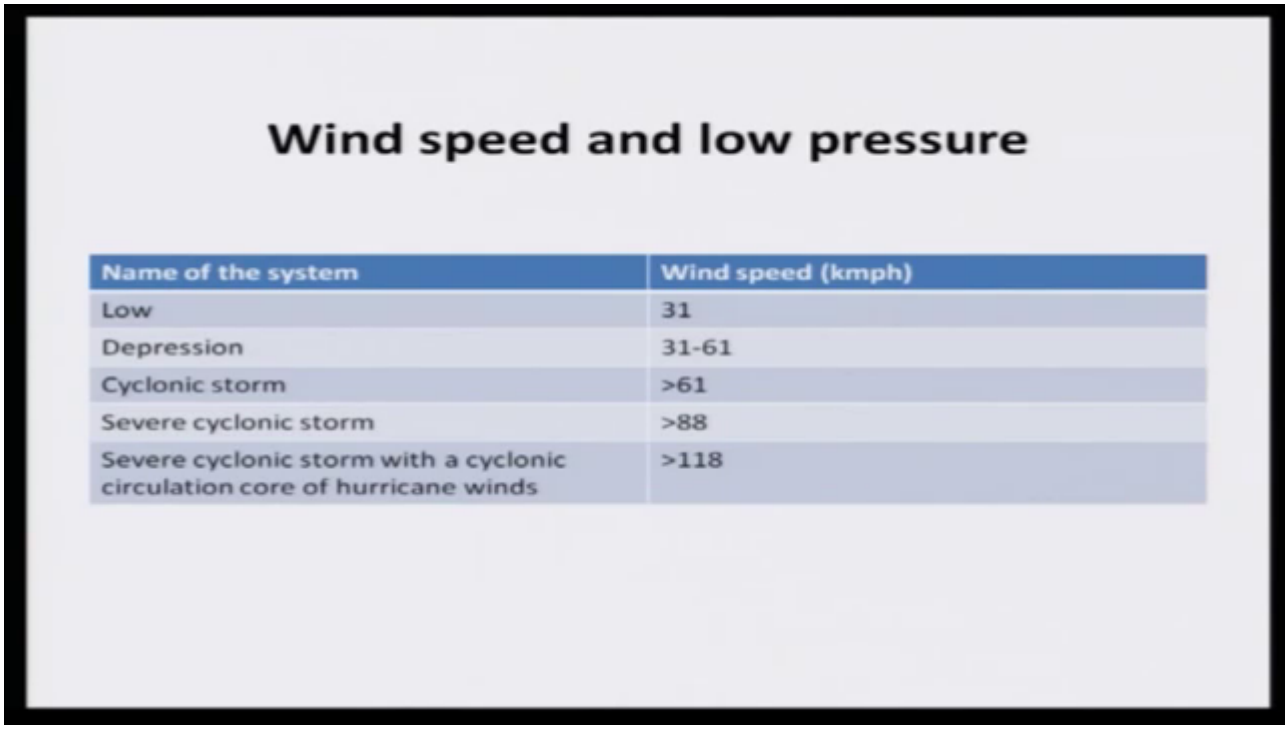

The low is developed when we were discussing about our cyclone for rainfall process. We were discussing that that is extensive air masses which may converge an adiabatic cooling. We were discussing -- we have discussed already. So in this case in low is develop, low means the wind speed would be 31 kilometre per hour. Normally if you go by flight means, say it is a 800 kilometre per hour. If you come to bus means 60 kilometre per hour. If you go for walking, five kilometre per hour, so the wind speed is 31 kilometre per hour means it is classified as low. The low gets intensified then it becomes a depression, the wind is 31 to 61 kilometre per hour.

Then it gets again super empowered as a cyclonic storm, the wind speed is greater than 61 kilometre then severe cyclonic storm greater than the 88 kilometres and severe cyclonic storm with a cyclonic circulation core of hurricane it is more then 180 kilometre per hour. So based on the wind speed the cyclone being classified into different things and accordingly we can able to adapt to a manoeuvre the situation. So in that way wind is very very important. In respect of a India, example, we have all those monsoon season. We have northeast monsoon season. So here the things are entirely different. Southwest monsoon wind normally does not go above 60 kilometre per hour, but in the case of the Northeast Monsoon we get cyclone, it is more than 100 kilometre per hour during last October first week I hope there was a cyclone crossing between our Karaikal and Puducherry, it goes with the 80 kilometre per hour. Like that it happens. So classification of wind speed is very very important to understand and also to protect a human life as well as plant life from the damage as caused by the wind.

With this, I complete today's class. In the next class we will be discussing something different. Now we have understood what is atmosphere. How the weather elements are very very important. And the way the rainfall is very important. How temperature is measured. We always is being considered for crop production and also wind. With this we'll meet by next week. Thank you very much.