agMOOCs
Crop-weather interactions; Wheat, Rice and Maize
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Dear all. In the last class we have seen the philosophy and the science of crop-weather interaction. That is, what is crop-weather interaction? Types of crop further interaction and we have given some example. In this class we like to discuss crop, whether interaction directly for selected crops.

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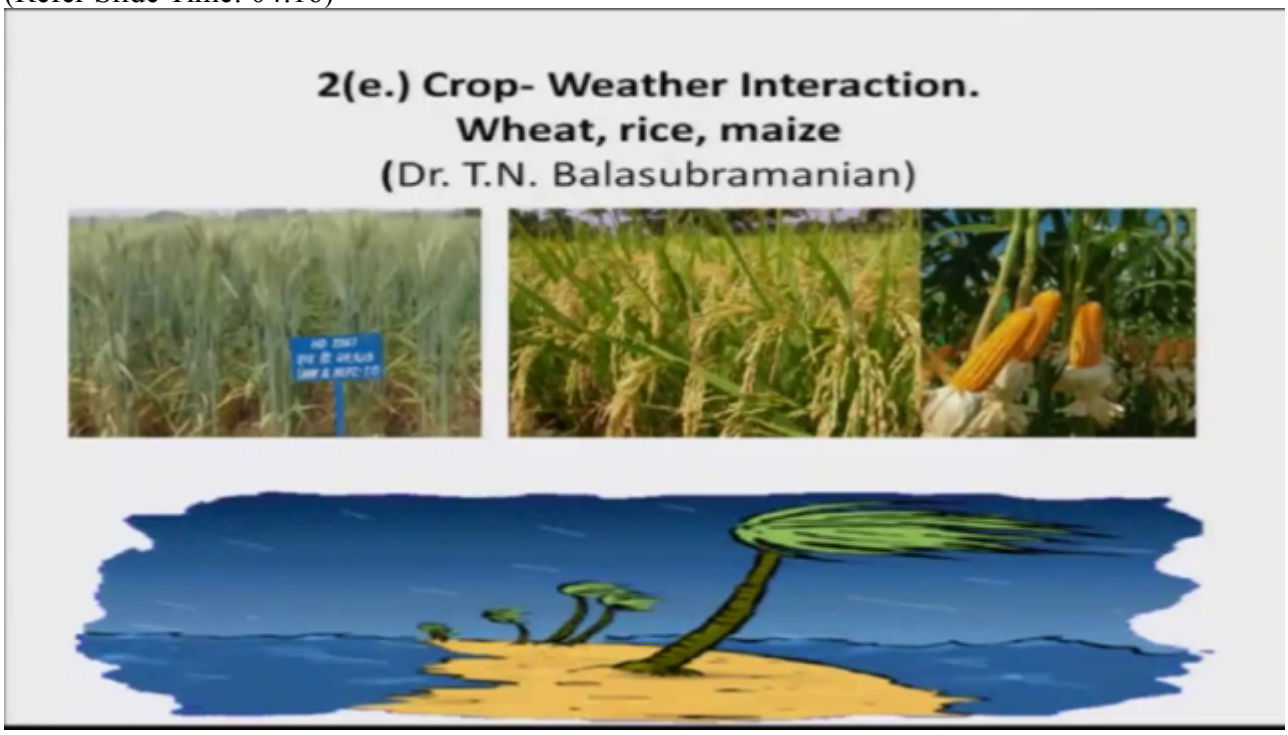

This information are mostly required to prepare our agro adversary based on the weather forecast. Past research works are available in the website as well as in many books and those how to be collected and they kept at the particular area where agro adversary is being prepared. For this class let us discuss the crop-weather interaction for read crop, rice crop and maize crops these three crops. These three crops are dominant food crops of India and wheat commonly being grown throughout the world, maize is also being grown. Those crops become stabled food crops. Unless we understand the crop-weather interaction it is impossible to prepare agro advisories based on the weather forecast.

One more thing I like to add that the whatever crop-weather interaction, I have given some example, this are not so complete, many gaps are there still research is required to find out the crop-weather interaction for rice, wheat and maize also. With these few introduction I like to go for the rice crop. I have given only example, these are not complete, still we have to do some more research.

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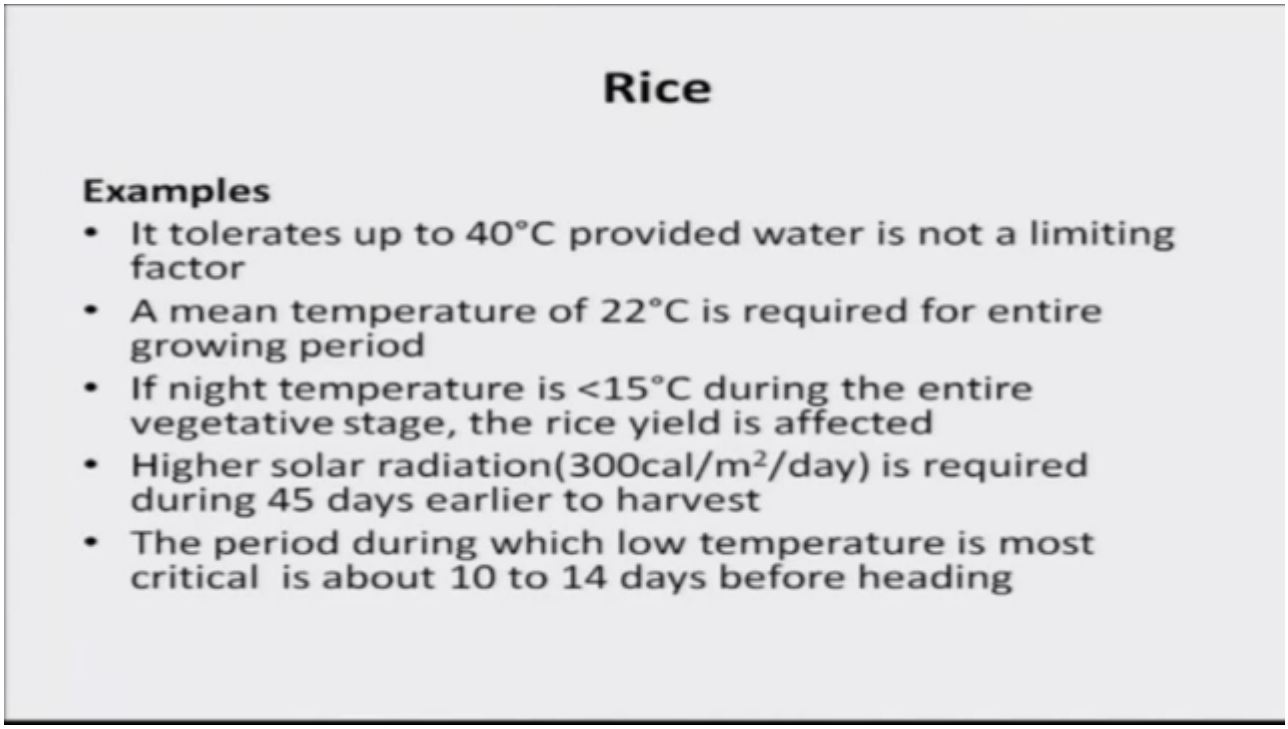

As we discussed in the Cardinal temperature the rice crop tolerates up to 40 degree centigrade provided water is not a limiting factor. Water is absent suppose the rise is being raised in the dry land situation or Rainford situation where moisture is not available but the temperature goes 40 degree means the rice yield has to be sacrificed. It has loose the yield. But under irrigated condition there is a adapt and strategy, there is a weather-based decision. The temperature goes beyond 40 degree centigrade means go for irrigation then you can amal irrigate the dysfunctional aspect to be derived from even increased the temperature at 40 degree centigrade.

And rice also requires a mean temperature of 22 degree centigrade for the entire growing period. That means the mean temperature that we have discussed already, the maximum temperature plus the minimum temperature divided way two, average of these two. So this must be around 22 centigrade. This is a cardinal temperature for the growing period of the rice. The temperature is more means there is yield loss as we have studied in the last classes. If the night temperature is a lesser than 15 degree centigrade during the entire vegetative stage the rice yield is get affected, yes, the minimum temperature required for rice is 10 degree centigrade. So 15 degree itself is a dangerous limit, threshold limit for losing the crops Yield. So the night temperature if it is lesser than 20 degree doing the India vegetative stage rice yield is getting affected. That means that night temperature must be around 22, 23 degree centigrade.

Then highest solar radiation more than 300 calories per meter square per day is required. During 45 days earlier to RH. This I was discussing the last year. When we are discussing about the radiation, cloud free environment is required from flowering to last stage, 10 days we were to harvest, or 14 days we were to harvest. So that we were to harvest so that the flowering materials, the pollination, and seed development, milking stage, everything goes on very well with the higher solar radiation of 300 calories per meter square per day. The period

during which the low temperature is most critical is about 10 to 14 days before heading. Heading means the case of rice it is before flowering one stage. See if you take rice stages one is your nursery stage, that is you're developing saline, then your transplanting saline in the field. So this is a saline stage, then vegetative stage, this stage from transplanting to the heading, flowers start to coming out that is getting stage, another three to four days you get flowering. So within that we have got different stages. Heading means three to four days earlier to flowering. See the bulk, bulge portion is coming out from your stem portion of the rice. So in that the period during which low temperature is most critical is about ten to forty days before critical, more critical means if the temperature is occurs, this low temperature then heading may not occur. That means your optimum temperature is required for rice.

These are all some few examples. There are many examples and many gaps are there. Gaps must be address through by doing research by agro meteorologists or by agronomist.

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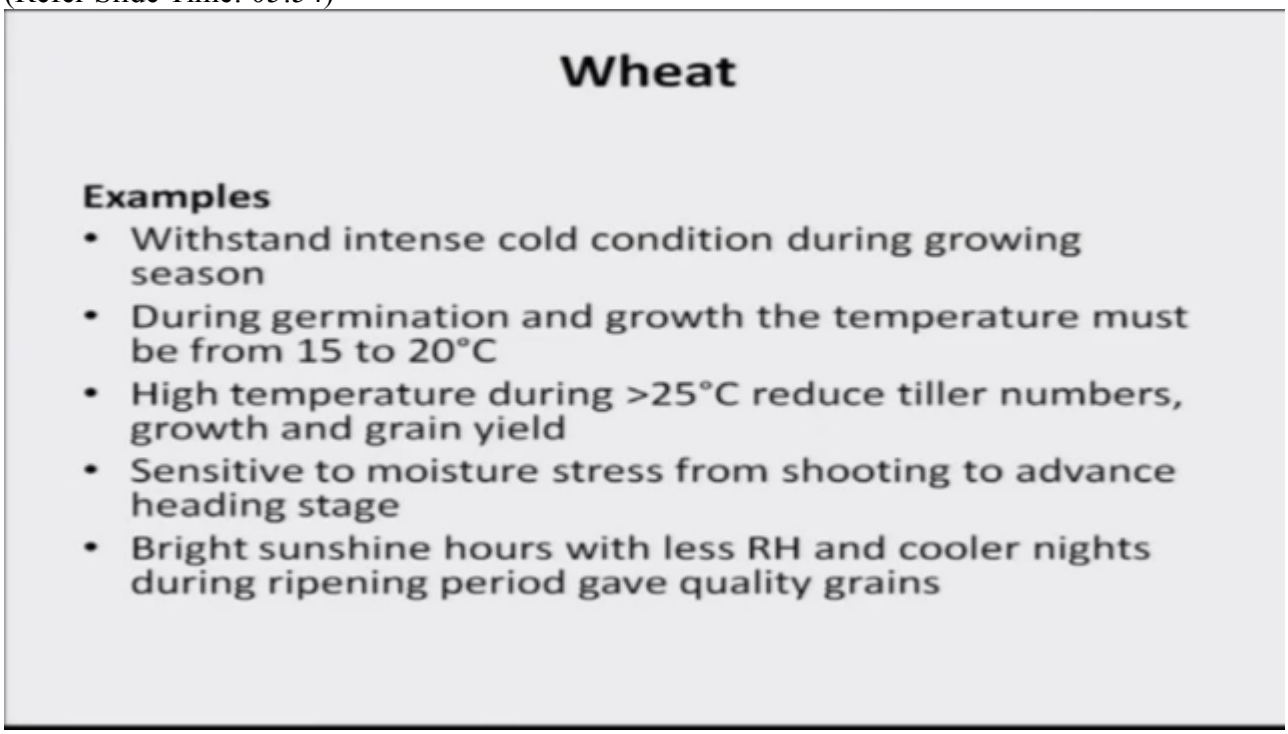

Now coming to the wheat crop, it is being grown now all countries of the globe, world. So similar to rice I have given some example for wheat also. So withstand intense cold condition during growing season. Anything, he able to tolerate cold condition, but does not tolerate hotness. So that is the information to be derived from this statement. And during germination and growth in the temperature must be from 15 to 20 degree centigrade as we have studied the cardinal temperature when we were discussing in the last classes.

And high temperature during greater than 25 degree centigrade reduced till the numbers growth on grain yield, this is very, very important especially this high temperature more than 25 centigrade during vegetative stage you must stop at the wheat yield. And this wheat crop is sensitive to moisture trust from shooting to underwater setting stage. This is very important.

They are under irrigated or rain tract, under irrigated condition you must provide irrigation, from shooting to advance heading stage. In the case of the rainfall agriculture or dry land

agriculture they're must be right. Accordingly the sowing window has to be organized otherwise we have to lose the yield. Then bright sunshine with less RH and cooler nights during ripening period gave quality grains. Quality means the protein content, the carbohydrate and self life of the grain and everything is okay. So for that bright sunshine hours with less RH, that is dry atmosphere and cooler nights minimum temperature must be below 20 degree centigrade during ripening period after flowering, if it occurs it gives quality grains. So these are some few examples for wheat crop like your rice crop.

So these are all required. Suppose for example how to prepare agro advisory. When the agro advisory says that and minimum temperature would be above 25 degree centigrade. And there is a cloudy environment during ripening period of your wheat. Then as per the Bible words, bright sunshine hours with the less RH and cooler nights must be required. So cloudiness you are going to get lesser bright sunshine hours and your temperature is more than convincive it will be at a hot environments. Then for that what must be done? Either you must go for some irrigation or some moment of strategy to make this environment that would be the your agro advisory.

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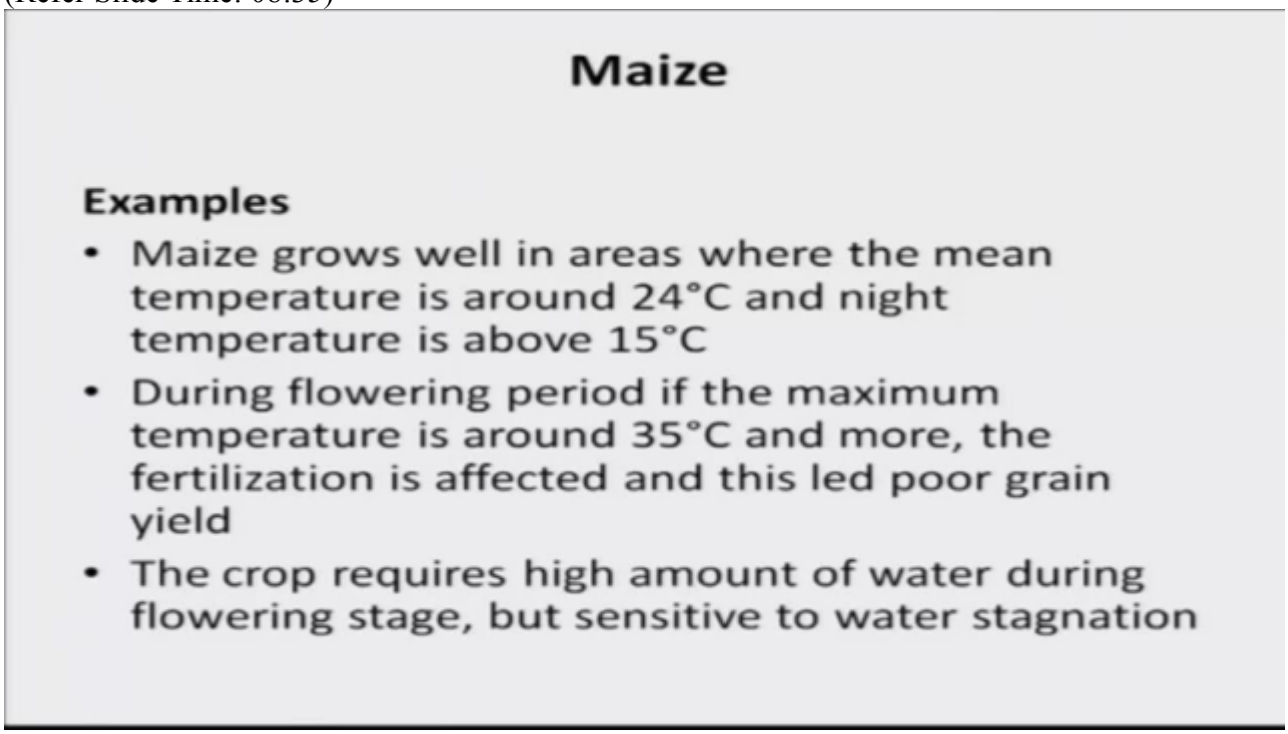

Then coming to the maize crop, another example, this is a very common international crop C4 crop or rice is a C3. Here I have given some example. Nice grows well in areas where the mean temperature is around 24 degree and night temperature is above 15 degree centigrade. So mean temperature has indicated for rice and other crops, night maximum temperature plus minimum temperature divided by 2. When this occurs 25 degree means you will be getting higher yield from Maize.

Then during flowering period if the maximum temperature is around 35 degree centigrade and more the fertilization is affected and this led to poor because what this happens the maize is a cross pollinated crop. When the temperature is more than 35 degree, number one, The designation may occur in the flowers. This may lead to stability. Another one cross-

pollination mean wind or insect must, above that we hear the insect do not come. So your cross-pollination is getting affected. So how weather plays the important role in crop production is very very important. This must be addressed before you are doing, preparing the agro advisories.

This maize crop requires high amount of water during flowering stage, but sensitive water stagnation. We need -- it needs water but does not require stagnation. Over water is not at all required. The field must be brought under your either saturated conditions. So must be some moisture, 100% moisture, available soil moisture, 100% must be available, 80% to 100% available soil moisture but there must not be any water stagnation. What will happen if water stagnation occurs in a particular crop? See the Maize route whatever the crops we go. The route also take needs of oxygen. Your water gets stagnated over the surface of the field means oxygen does not in to this soil profile. So route does not get oxygen and you'll be getting a (inaudible 00:10:46) and the crop gets filed. So that is why the crop should not be stagnated at this stage, very sensitive stage, flowering stage.

For all crops varying stages is very critical, but this crop is something different. So these are the some examples I have given. And other two or three crops will be discussed by our co-faculty member Professor Dr. Nagarajan. Subsequently then I'll meet you after his presentation. Thank you very much.