

agMOOCs

GIS in Ag-Essentials and Applications

Climate and Scale of Change

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Welcome and in second part of our activities, the agriculture production and the food security depends not only on the water and other fertile conditions of the soil, but also it is being threatened by the proposed or anticipated climate changes on the global.
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Climate change impacts on agriculture sector (source IPCC 2007 & FAO 2008)

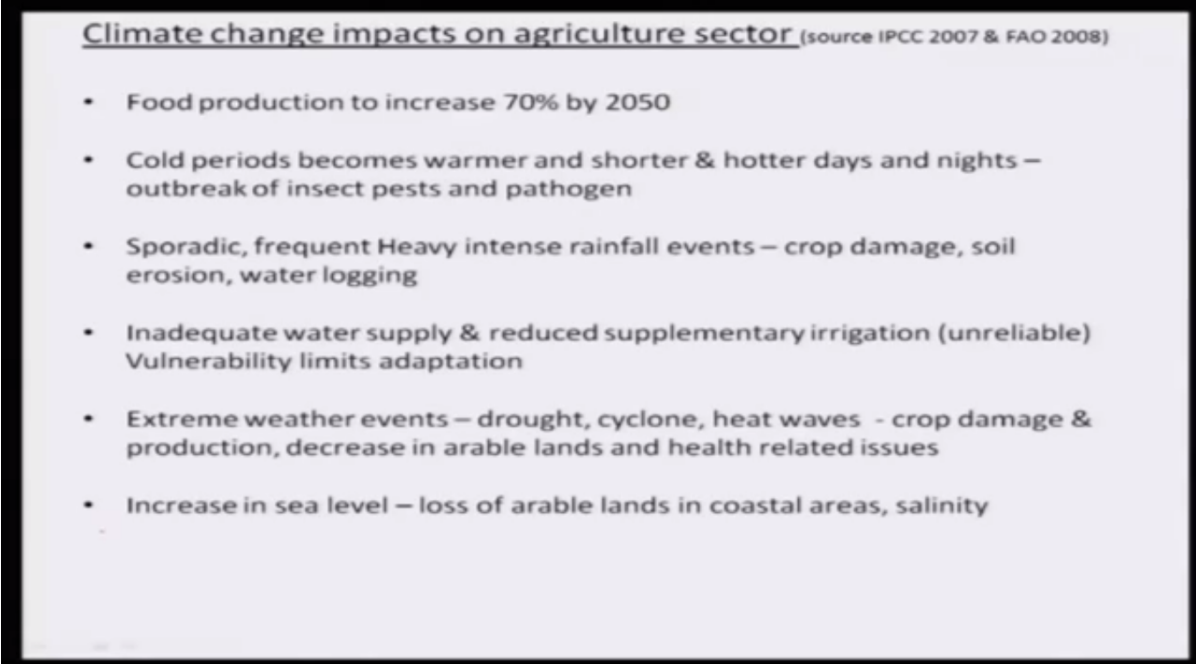
- Food production to increase 70% by 2050
- Cold periods becomes warmer and shorter & hotter days and nights – outbreak of insect pests and pathogen
- Sporadic, frequent Heavy intense rainfall events – crop damage, soil erosion, water logging
- Inadequate water supply & reduced supplementary irrigation (unreliable) Vulnerability limits adaptation
- Extreme weather events – drought, cyclone, heat waves - crop damage & production, decrease in arable lands and health related issues
- Increase in sea level – loss of arable lands in coastal areas, salinity

So IPCC 2007 as well as FAO 2008, it has been said that food production has to increase from the present day level by 70 percentage to meet the population growth whereas in the cold periods, what is happening now is in the cold periods, it becomes warmer that is winters are like getting warmer as well as the summer and summers are getting shorter, and day and night temperatures, there is a wide variation, which helps in the breeding of insects, pesticides, as well as the pathogens.

Another impact is sporadic, frequent, heavy intense rainfall events are likely to happen because of the atmospheric air mass changes. This type of events which is likely to cause a crop damages and heavy rainfall, intense rainfall will cause heavy soil erosion that means whatever the fertilization which we have added to the agriculture field, that will get washed away. And in some places, it may create a water logging condition, which is not suitable for any crop growth.

Another impact is inadequate water supply as well as reduced supplementary irrigation. What does it mean by that inadequate water supply in the sense so that may not be in rain-fed agriculture conditions, the intense rain waters or water will not be there for the crops to use it, and there is a need for excess supplementary irrigation, which is -- which has -- which normally comes out from the reservoirs as well as from the groundwater. This leads to vulnerability. This leads to the adaptation to this type of condition. What does it indicate is this type of condition I need to have enough water resources or enough quantity of water to supplement my own agriculture growth. If it is not there, there is every possibility for the crop to failure or it may lead to yield reduction.

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Climate change impacts on agriculture sector (source IPCC 2007 & FAO 2008)

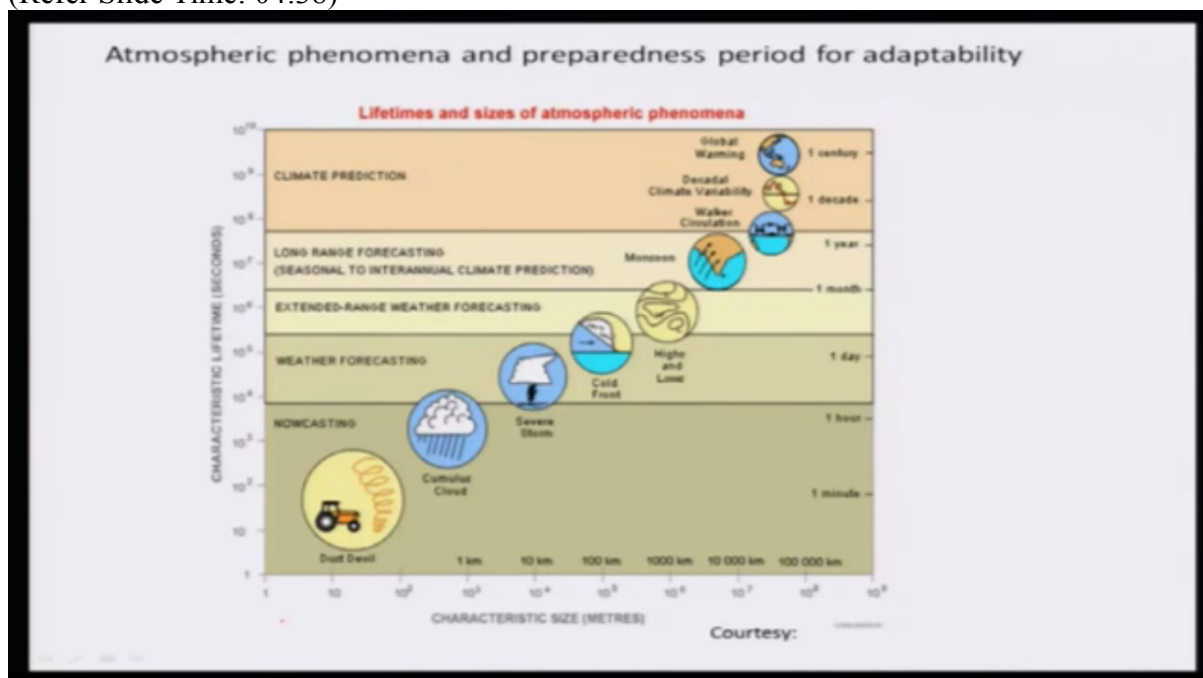
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Now the another one is about the extreme events. Extreme events are nothing but either a high intense rainfall, high heat, high cold, and higher, lower the temperatures, what happens? It leads to drought. We all know drought is a water shortages. Cyclones. Cyclones are associated with the heavy wind as well as heavy rainfall conditions. The heat waves. The heat waves are not advisable because excess water is needed for the crops to take care of the heat conditions. This is likely to be damage the crops under production as well as the arable lands

which we are using it, and the health related issues for the human beings are expected because of these conditions.

Another one for the areas, which are closer -- along the coastal areas of any country or India in particular, the sea level is likely to be increased by a marginal or to middle level content. So that sea level what it does? It is likely to submerge the arable lands, which we -- which is there all along the coastal areas and also salinity, the water from the sea coast, from the sea, it may come on to the surface and then entire soil is becomes saline as well as the water sources which are there in the coastal areas, they become saline, and it is not usable for these things. So these are all some of the climate impacts on the agriculture which we expect from the impact of climate changes.

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The next slide will show you about -- we have seen the climate change. See this climate change is going to be on a global level. Global level means northern hemisphere where we are living in as well as it is likely to affect on the southern hemisphere is also. So now the question is if there is going to be a global change, globally that entire planet is going to have a different climate, then how I am going to get affected? Is it too much or it is too less or I am people -- I am getting nervous about that?

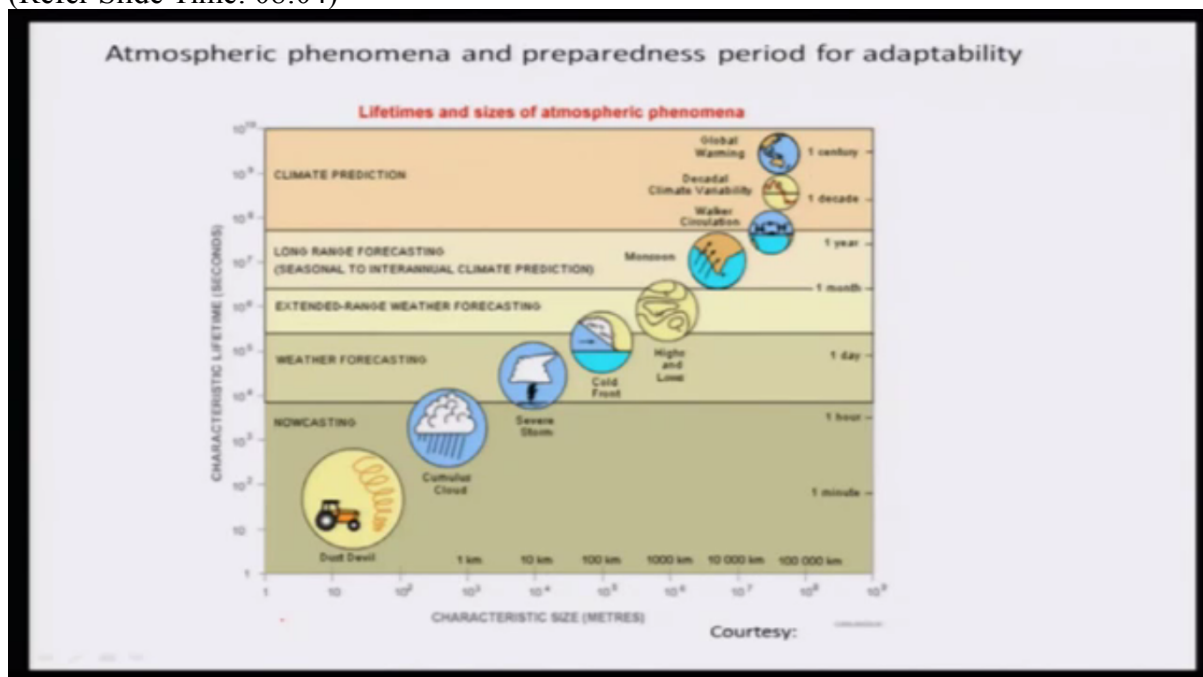
So for this purpose, this particular drawing, which shows about what is the atmospheric phenomena, atmosphere is nothing but 10 kilometres of air mass, which is lying above the air surface which controls the movement of the air mass movement here and there, as well as pressure temperature variations.

Now this, it looks like that this is the size. Size is nothing but the resolution. This is about the lifetime in seconds. Now if I am there as a person which I am interested in this type of my own field that is at a lowest level or on the grass root level, then now what happen is the global warming, so this is the global warming. The entire global is likely to be affected. So now the changes which are likely to be made, so the global warming may take one centuries or more than that, whether the changes which are going to happen in my field during tillages and other activities, it may take a few minutes or in a few hours.

So now what is happening is the predictions what we are talking about the global predictions, global climate predictions, they may take from decades to centuries, okay, whereas the monsoonal changes, monsoonal changes are nothing but it is the -- monsoon is nothing but a trade wind, which brings in rainfall along with this. These changes, since it is a monsoon is a yearly basis, so these changes will be from a month towards one year whereas when it come down to the forecasting which we are talking about in these areas, they may be in a month's time period only.


Now the weather forecasting. What is the difference between the weather as well as climate? See climate is a 10 years average weather conditions whereas weather is a day to day affair and minute to minute the weather may change. So the weather is related to temperature, pressure, sunshine and other activities, which happens over a geographical position whereas the climate in the same area, if it is continuously this type of seasonal like weather is a day-to-day affair and it will change with season. It may change with year together. So this type of variation that is what we are talking about weather phenomena is predicting the weather conditions either the rainfall or sunshine over a period or over an hour. So this type of things the changes will be in a monthly conditions, in a day wise conditions depending upon the cloud movements and other air mass interactions in the atmosphere.

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Now this is how when it is if the -- already if the climate is getting warmed up over the century, then I -- I may get my own. Otherwise, there are chances that it is in the warming period. That is why the climate change whether it has started or not we are yet to ascertain its own activities now, but whereas it may come down to us in a decadal time, it may be for you on the field. So that is why we may have to get adjusted to the climatic conditions and its impacts.

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The anticipated climate change and weather events have lead to us to think locally and understand the global issues towards future course of practices

What we have done till now is the anticipated global climate change and the weather events that is likely to impact the agriculture production and what we have to try to understand is what are the conditions which we are doing it that is a degradation potential activities which we are doing it, and what will happen to those type of activities in the terms of global issues and we may have to take lot of course corrections in our agricultural activities. This is what we have seen in this -- in this lecture. Thank you.