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**Capstone Project:**

**Discussion:**

The Different layers of the Atmosphere based on temperature are: Troposphere, Stratosphere, Mesosphere and Thermosphere.

The Long wave radiation (Green house gases) is primarily absorbed by water vapor and carbon dioxide. The atmospheric window is the range of wavelengths not absorbed.

The temperature gradient develops as the surface warms. The energy transfer upward through convection is induced by the temperature gradients.

The energy is transferred downward at nights.

There are two processes in fluids that generate convection. They are: Free convection and forced Convection. The incoming and outgoing radiation generates the earth’s radiation equilibrium.

The equation of state describes how pressure, Temperature and density are related to one another.

The air density and pressure are directly proportional at constant temperature.

The increase in temperature causes an increase in pressure under constant density.

The movement of air is provided by the pressure gradients. The large areas are concentrated

With small gradients. The large pressure gradients across small areas are displayed by hurricanes

and tornadoes.

With the altitude, the pressure gradients always decrease. The mass is proportional to gravitational force. The pressure gradients lead to hydrostatic equilibrium for warm air.

The pressure gradients lead to hydrostatic equilibrium for cold air. When the atmosphere is saturated

,it generates saturation vapor pressure.

Saturation vapor pressure depends on temperature. The saturation vapor pressure increases rapidly

at higher temperatures.

The addition of water vapor, moist air causes the air to become saturated. The addition or removal of energy is done by the diabatic process. The adiabatic process is the process in which cloud formation

involves temperature changes. The decrease in air temperature with height is referred by the environmental lapse rate.

The formation of clouds and precipitation is the result of adiabatic cooling. The adiabatic cooling is the result of the upward movement of air. Collisions and coalescence occur when the collector drops fall

and overtake small droplets. The adiabatic cooling is a result of the upward movement of air. Frontal lifting occurs when two air masses converge. Clouds are formed when warm air advances towards

the cold air. The air is formed to rise when the air converges to the Earth’s surface. The air is caused to

lift, when differential heating occurs at the surface. This causes cloud development. When the air is lifted and moves in spite of saturation, the air becomes unstable.

Cloud drops occur from the condensation nuclei, when they have been attracted by water. Collisions

Occur when the collector drops overtake the small droplets. At temperature below zero degree, ice crystals are formed. At temperature above zero degree the subfreezing conditions occur.

The cool cloud precipitation depends upon the existence of ice and supercooled water. When the water

freezes into ice crystals, a phenomenon called rimming occurs. When the ice crystals bond with the

Surface water, it results in aggregation. Ridges are formed when the heights extends towards the poles.

The troughs are formed when the heights extend towards the equator.

**Conclusion:**

Weather forecast has influence in the yield of crop. Weather aberrations may cause soil erosion. The

Weather has an impact on every aspect of crop culture. The spatial variations in an area at a given time are showed by the climatological basis weather factors. The selected interval and the year to year fluctuations have to be considered for the cropping purposes. The variability is greater degree, The time unit is of shorter degree. Rainfall is the most variable over the short periods of time. For optimal productivity, the hazardous weather has to be avoided. There are higher frequencies of normal weather deviations every year. The adverse effect of weather can be managed if the weather forecast is available on time. The crop culture practices are adopted to minimize the effect of hazardous weather.

The medium range forecasts help in carrying out cultural operations. With the latest technologies coming up the farmers are getting better weather forecasts. High cost decisions like organization and execution take some time. The mid seasonal forecasts must be communicated five days prior.

The control operations against pests and diseases and irrigation are high cost decisions. Weather forecasts are expected to be accurate and timely. Rains are required for the sowing of crops and soil moisture. Rains contribute to the crop water needs. The use of dependable precipitation is suggested for delineation of start and end of crop growth period. Clear weather must be preceded with soil moisture storage. Forecasts of dry spells and wet spells are required for disease control measures.

The radiative cooling will be maximum under cold nights and minimum with warm night temperatures.

The meteorological conditions are described by the weather forecast over an area and time. Because of the crop weather there are variations in the cropping practices. Dominant technologies, broad casting needs are some of the criteria on which weather forecasting is defined. Short range forecast and long range forecast are some of the different types of forecast. Rainfall, snow, dew point temperatures are some of the different parameters of weather forecast.

Animal husbandry, crops and forestry can be referred to by specialized forecast. The initial forecasts need to be modified for the further forecasts needed for agricultural purposes. Some standard classes like clear sky, overcast can be used to define the forecast of sky coverage. The information of prevailing clouds is also important. In order to make the information more useful, probabilistic approach can be adopted. The two most difficult forecasted variables are snow and rainfall. The crop water needs are met by the fog which can be measured by the rain gauge. The fogs at the airports are predicted by the namograms. At daytime, nocturnal times the crop species exhibit a phenomenon known as Thermoperiodicity. The data of maximum and minimum temperatures is used to derive mean day and night temperatures. Relative humidity is better understood by the users than the other measures like water vapour pressure. Relative humidity is used to give the ultimate forecast. Wind direction gives us the variability in speed and wind direction. Rainfall or Dew produces leaf wetness. Different crops react

differently for the same temporal distribution of weather. The anomalies are location specific for a given crop. Special weather forecasts are given where the crops suffer from freezing. The soil temperature, moisture determines the seed germination.