SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore – 35

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A++' Grade
Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

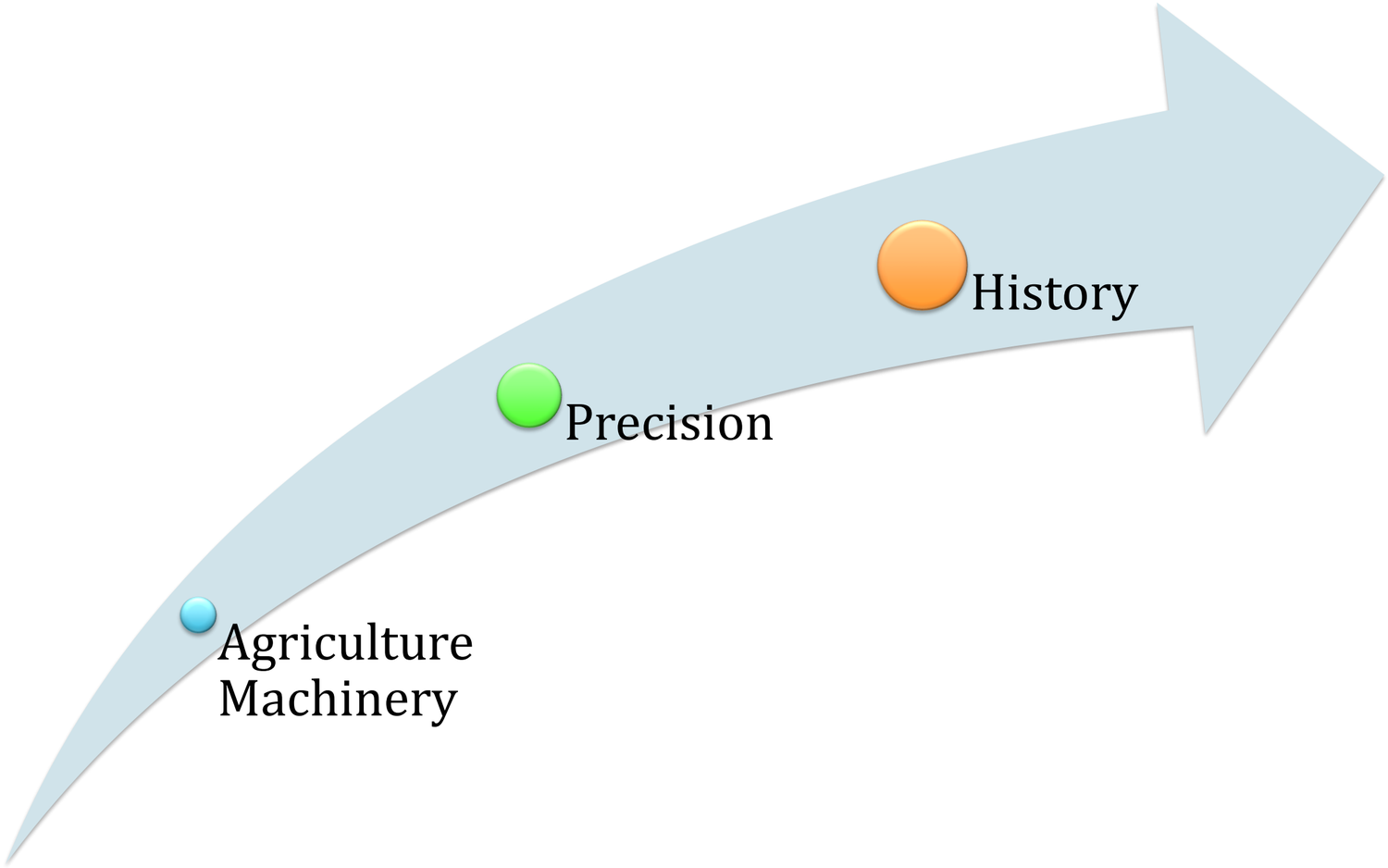
19AGT203 – AUTOMATION TECHNIQUES IN AGRICULTURE ENGINEERING

II – YEAR IV SEMESTER

UNIT 1 – ADVANCED MACHINERY/EQUIPMENT IN AGRICULTURAL ENGINEERING- I

TOPIC 2 – PRECISION MACHINERY & EQUIPMENTS

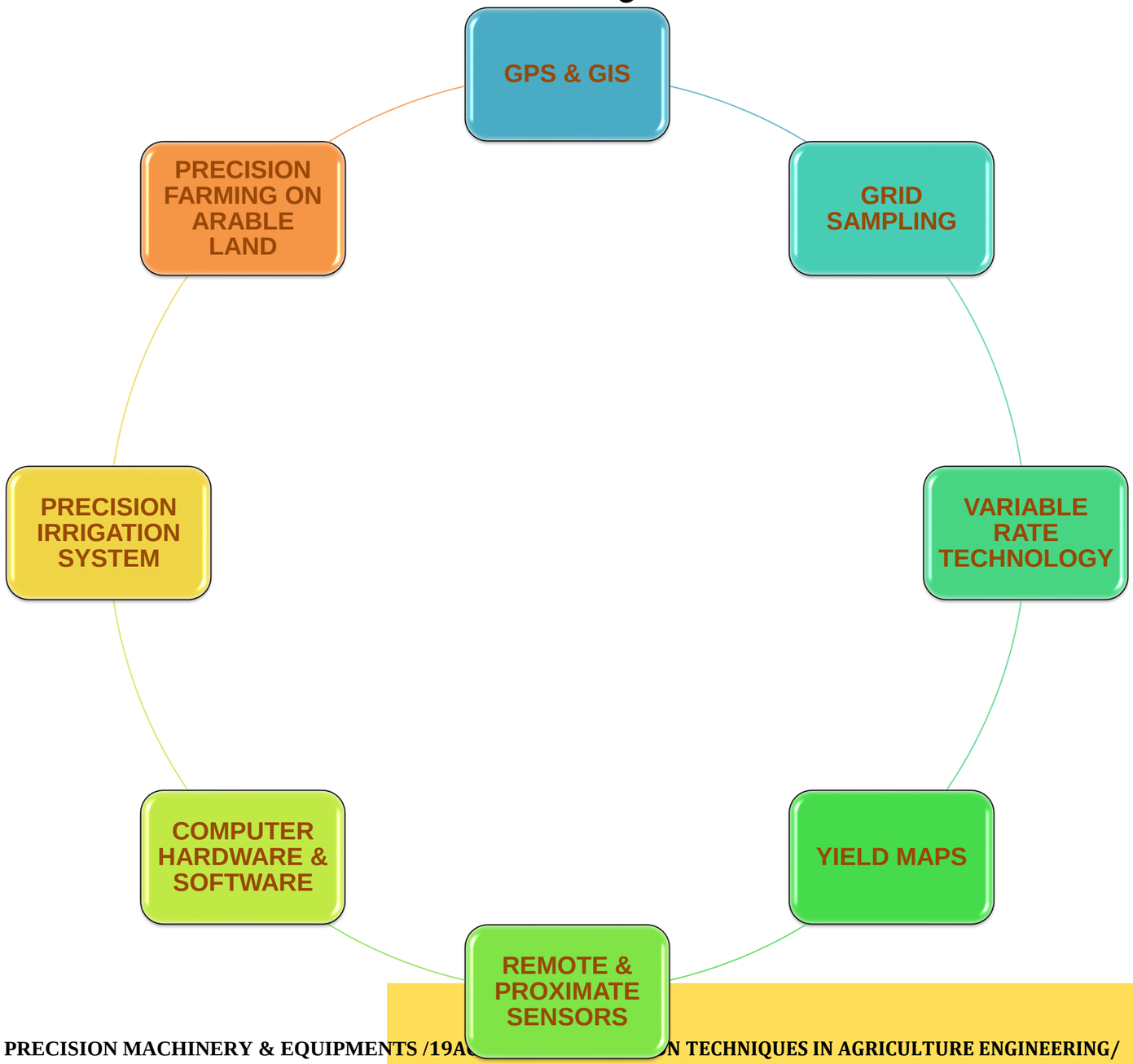
Last Class Review



Why????

- To enhance productivity in agriculture with respect to profit.
- Prevents soil degradation in cultivable land.
- Reduction of chemical use in crop production
- Efficient use of water resources
- Dissemination of modern farm practices to improve quality, quantity & reduced cost of
- production in agricultural crops

TOOLS & EQUIPMENTS



Global Positioning System & Geographic Information System

- Set of 24 satellites in the Earth orbit
- Sends out radio signals that can be processed by a ground receiver to determine the geographic position on earth
- 95% probability that the given position on the earth will be within 10-15 meters of the actual position
- Allows precise mapping of the farms and together with appropriate
- Software informs the farmer about the status of his crop and which part of the farm requires what input such as water or fertilizer and/or pesticides etc
- Software that imports, exports and processes spatially and temporally geographically distributed data

Grid Sampling

- Method of breaking a field into grids of about 0.5-5 hectares
- Sampling soil within the grids is useful to determine the appropriate rate of application of fertilizers
- Several samples are taken from each grid, mixed and sent to the laboratory for analysis

Variable Rate Technology

- The existing field machinery with added Electronic Control Unit (ECU) and onboard GPS can fulfill the variable rate requirement of input
- Spray booms, the Spinning disc applicator with ECU and GPS have been used effectively for patch spraying
- During the creation of nutrient requirement map for VRT, profit maximizing fertilizer rate should be considered more rather than yield maximizing fertilizer rate

Yield Maps

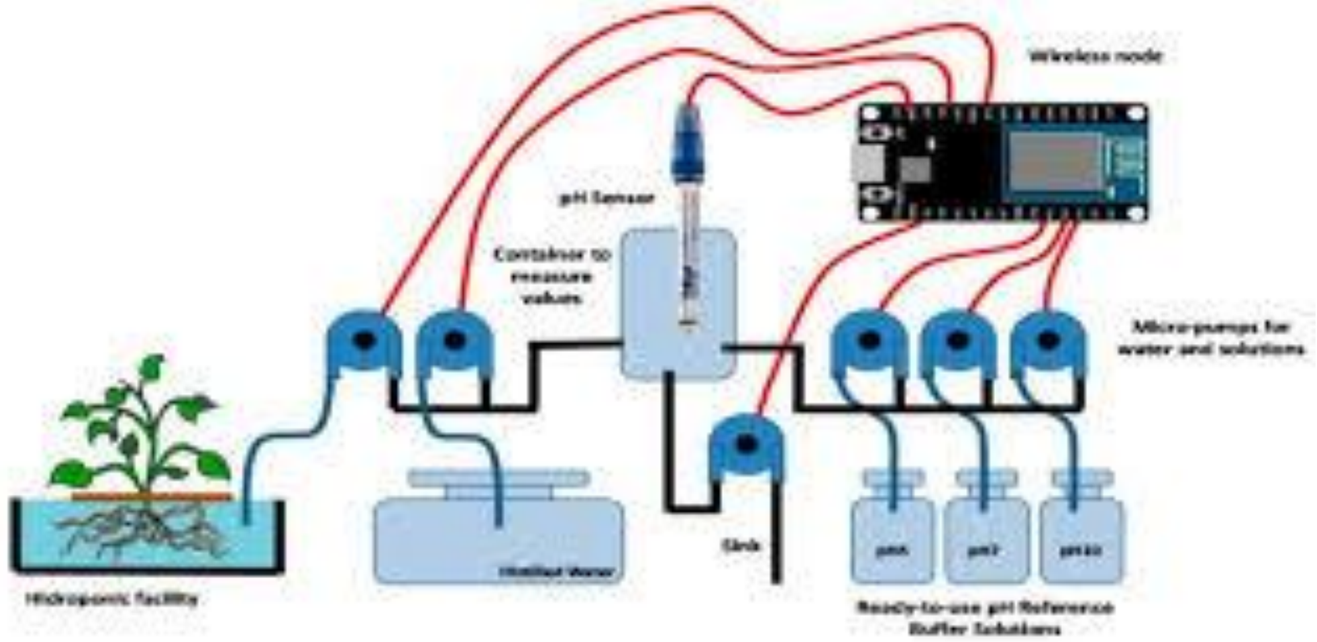
- Yield maps are produced by processing data from adapted combine harvester that is equipped with a GPS, i.e. integrated with a yield recording system
- Involves the recording of the grain flow through the combine harvester, while recording the actual location in the field at the same time

Remote Sensors

- They can indicate variations in the colours of the field that corresponds to changes in soil type, crop development, field boundaries, roads, water, etc
- Aerial and satellite imagery can be processed to provide vegetative indices, which reflect the health of the plant.

Proximate Sensors

❖Used to measure soil parameters such as N status and soil pH) and crop properties as the sensor attached tractor passes over the field



Computer Hardware and Software

- In order to analyze the data collected by other Precision Agriculture technology components and to make it available in usable formats such as maps, graphs, charts or reports, computer support is essential along with specific software support.

Precision irrigation system

- Recent developments are being released for commercial use in sprinkler irrigation by controlling the irrigation machines motion with GPS based controllers.
- Wireless communication and sensor technologies are being developed to monitor soil and ambient conditions, along with operation parameters of the irrigation machines (i.e. flow and pressure) to achieve higher water use efficiency.

Precision farming on arable land

- The use of PA techniques on arable land is the most widely used and most advanced amongst farmers.
- CTF (controlled Traffic Farming) is a whole farm approach that aims at avoiding unnecessary crop damage and soil compaction by heavy machinery, reducing costs imposed by standard methods.
- Controlled traffic methods involve confining all field vehicles to the minimal area of permanent traffic lanes with the aid of decision support systems.
- Another important application of precision agriculture in arable land is to optimize the use of fertilizers especially, Nitrogen, Phosphorus and Potassium.

See You at Next Class!!!!