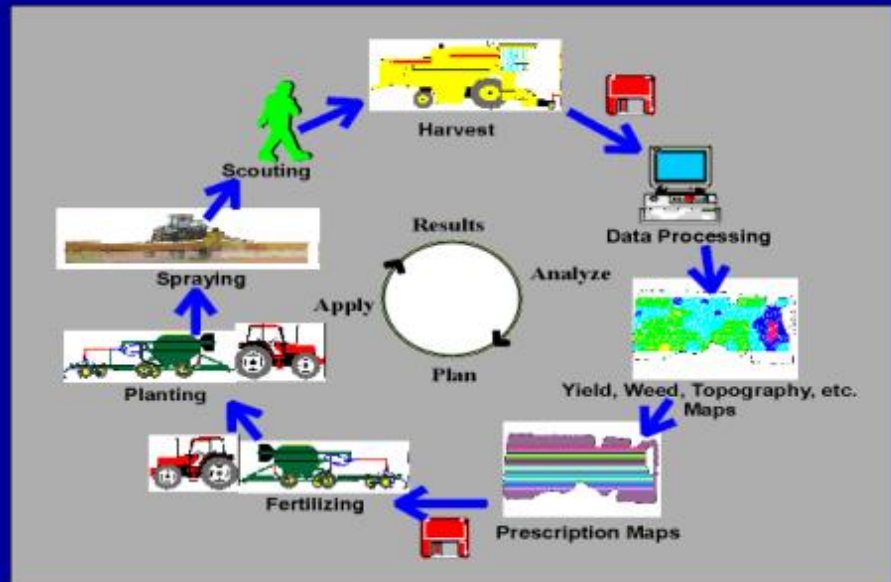




Precision (Site-Specific) Agriculture

- ⌘ Yield monitoring and mapping
- ⌘ Soil condition mapping (variable rate fertilizer)
- ⌘ Weed mapping

What about precision management of arthropod pests ?



<http://www.agric.gov.ab.ca/sustain/precision.html>

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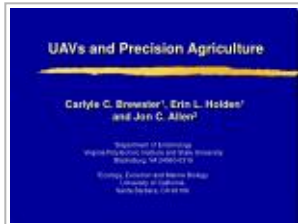
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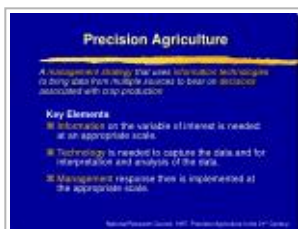
Carlyle C. Brewster¹, Erin L. Holden¹ and Jon C. Allen²

¹Department of Entomology Virginia Polytechnic Institute and State University
Blacksburg, VA 24060-0319

²Ecology, Evolution and Marine Biology

University of California

Santa Barbara, CA 93106



Precision Agriculture (<https://image.slideserve.com/833550/precision-agriculture-n.jpg>)

A management strategy that uses information technologies to bring data from multiple sources to bear on decisions associated with crop production

Key Elements

- Information on the variable of interest is needed at an appropriate scale.
- Technology is needed to capture the data and for interpretation and analysis of the data.
- Management response then is implemented at the appropriate scale.

National Research Council. 1997. Precision Agriculture in the 21st Century.



<http://www.agric.gov.ab.ca/sustain/precision.html>

(<https://image.slideserve.com/833550/precision-site-specific-agriculture-n.jpg>)

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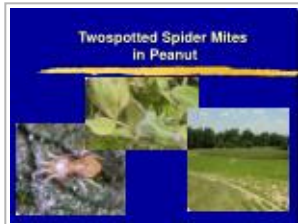
- Yield monitoring and mapping
- Soil condition mapping (variable rate fertilizer)
- Weed mapping

What about precision management of arthropod pests ?



The National Research Council (1997) (<https://image.slideserve.com/833550/the-national-research-council-1997-n.jpg>)

The potential of precision agriculture is limited by the lack of appropriate measurement and analysis techniques [and that] support is needed for the advancement of data acquisition and analysis methods, including sensing technologies [and] sampling methods...



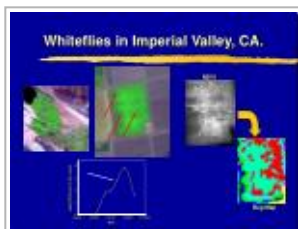
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GPS Controlled Bug Mapping(Manual Scouting) (<https://image.slideserve.com/833550/gps-controlled-bug-mapping-manual-scouting-n.jpg>)

Bug Mapping of Spider Mite Population in Peanut



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Bug Map

Whiteflies in Imperial Valley, CA. (<https://image.slideserve.com/833550/whiteflies-in-imperial-valley-ca-n.jpg>)



Unmanned Air Vehicle (<https://image.slideserve.com/833550/unmanned-air-vehicle-n.jpg>)

- UAV:
 - 2 x 1.5 x 0.25 ft
 - 1.25 lbs
 - 18 to 45 mph
 - 0.5 hour duration
 - 1500 ft altitude
 - 0.9 mile radius
 - Radio control 8 channel PCM uplink on 72 MHz
 - Altitude hold and wing leveling autopilot
 - No GPS guidance
 - Hand Launch, Skid landing

www.spyplanes.com



Remote Sensing System

(<https://image.slideserve.com/833550/remote-sensing-system-n.jpg>)

- Remote Sensors:
 - 2 CCD analog video cameras (color and NIR). A third color camera used for guidance control
 - 330 lines resolution
 - 90 degree FOV
 - Data link of 72 MHz, 2.4 GHz downlink
 - Ground station: 2 video receiving and recording stations (one for each camera)

Near infrared & Color sensors

www.spyplanes.com



Test Flights at VT Kentland Farm

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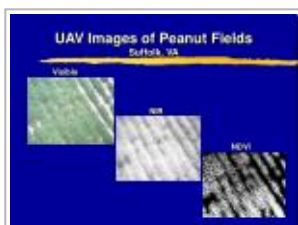
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Visible

NIR

NDVI



UAV Images of Peanut Fields Suffolk, VA

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Visible

NIR

NDVI



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Agriculture Field Day (Tidewater AREC)

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UAV Remote Sensing in Precision Agriculture (and Pest

(<https://image.slideserve.com/833550/uav-remote-sensing-in-precision-agriculture-and-pest-management-n.jpg>) Management)

Lot of potential, if...

- The craft does not sustain damage or flies away easily
- Sensors can capture very high resolution (digital) data (either as still images or video)
- GPS capability is available
- We can perform near real-time or real-time analysis of the data. This would depend on
 - Software
 - Equipment
- We can easily relate the cause of stress to the crop to the within-field variable of interest (i.e., whether soil condition, drought, insect, or disease, etc.)



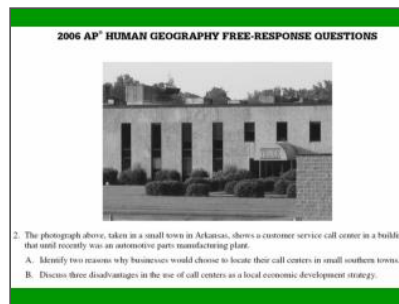
Acknowledgments

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- Dr. Ames Herbert & Tidewater AREC, Suffolk, VA
- Kentland Farm, Virginia Tech
- Virginia Agricultural Experiment Station
- USDA Southern Region IPM program

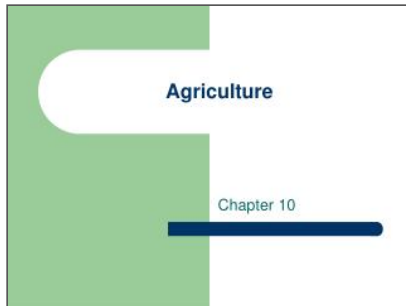
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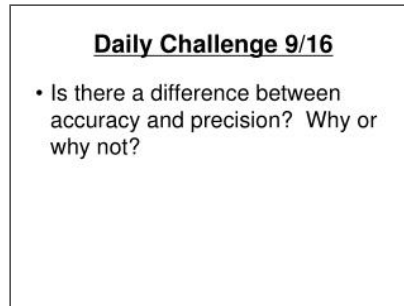


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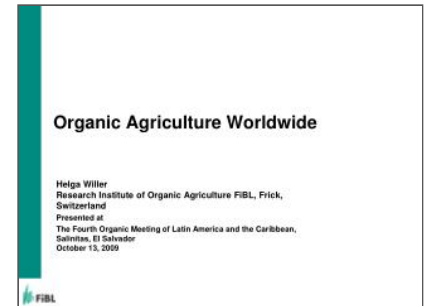
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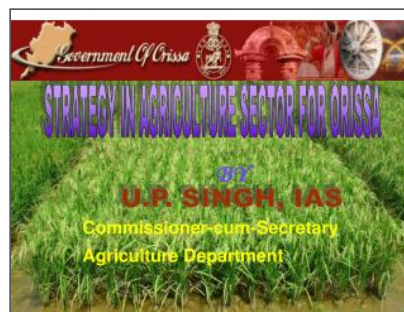
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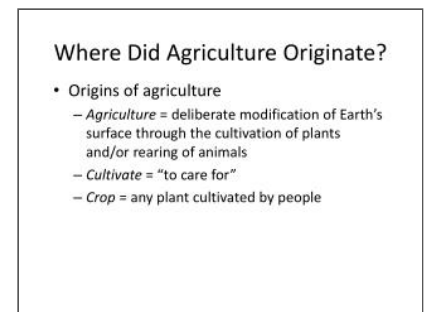
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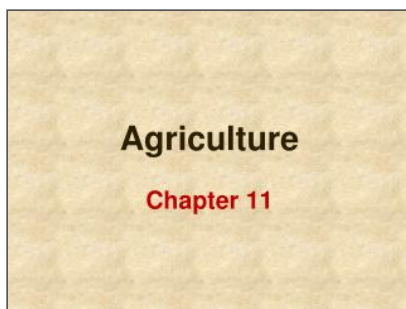
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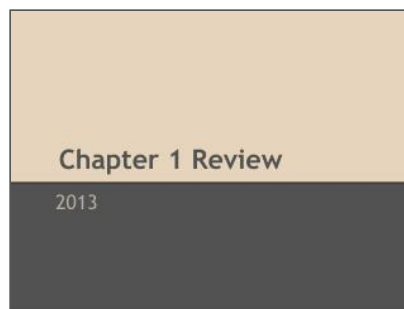
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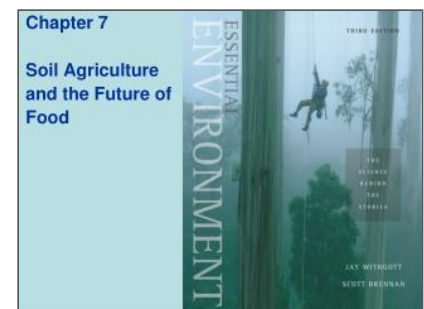
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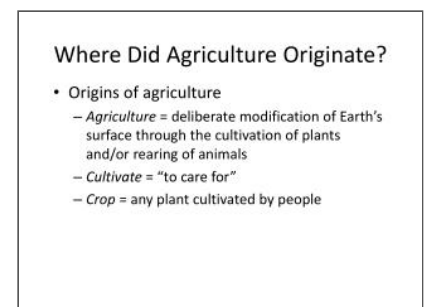
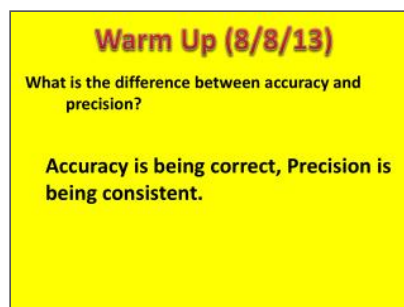
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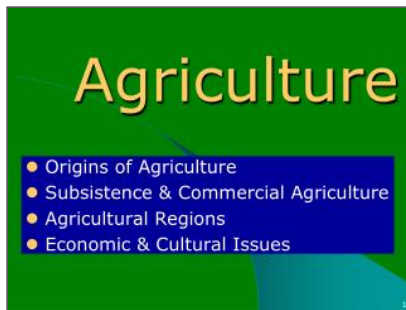
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Chapter 7 Soil Agriculture and the Future of Food -. soil: the foundation for agriculture. land devoted to agriculture covers 38% of (/jamal/chapter-7-soil-agriculture-and-the-future-of-food)



FOOD RESOURCES -. part-ii. types of agriculture. industrialized agriculture – “agribusiness ” or high-input agriculture (/nickan/food-resources)



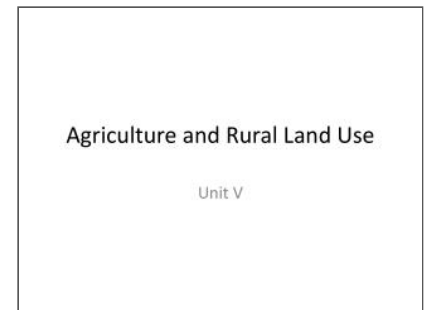
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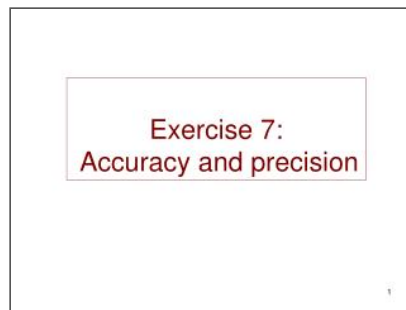
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Chapter 1 Section 2: The Beginning of Agriculture -Main idea the development of agriculture was a major turning point in (/calandra/chapter-1-section-2-the-beginning-of-agriculture)



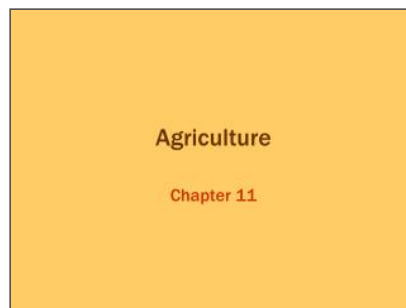
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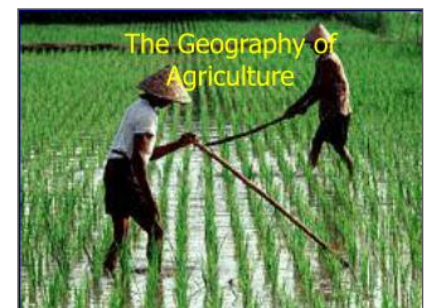
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