Ministry of Agriculture , Livestock and Irrigation
Department of Agriculture
Land Use Division

Precision Agriculture

By

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What is the Precision Agriculture?

Precision Agriculture (PA) **is a now a term used throughout agricultural systems worldwide.**

But what do we mean by "Precision Agriculture"?

What is the goals ?

How do you decide the management strategy?

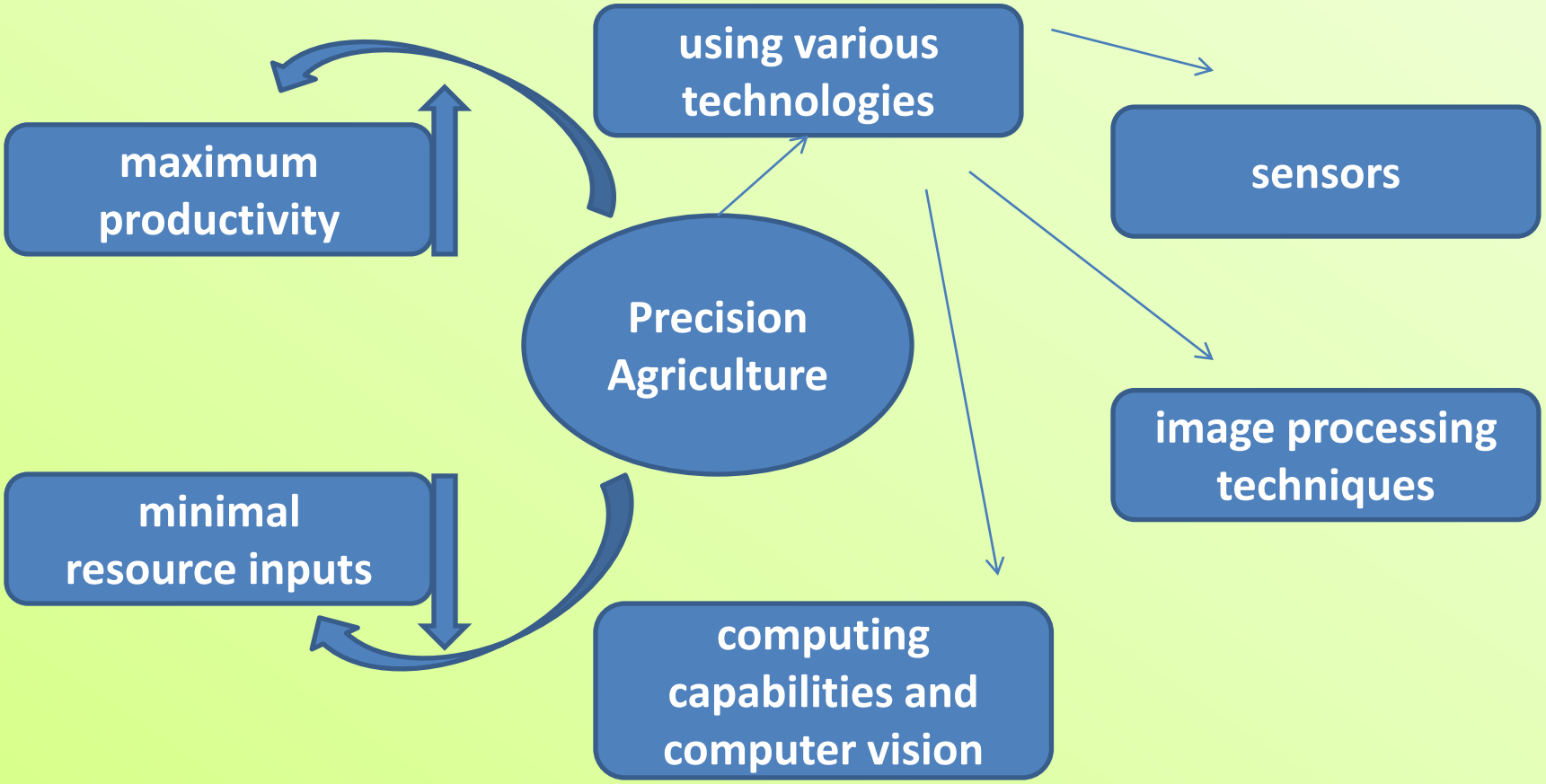
What are the steps require to adopt PA in cropping systems?

PA, sometimes called ⟹ **site-specific management**

is an emerging technology that allows for adjustments to address within field variability in characteristics such as:

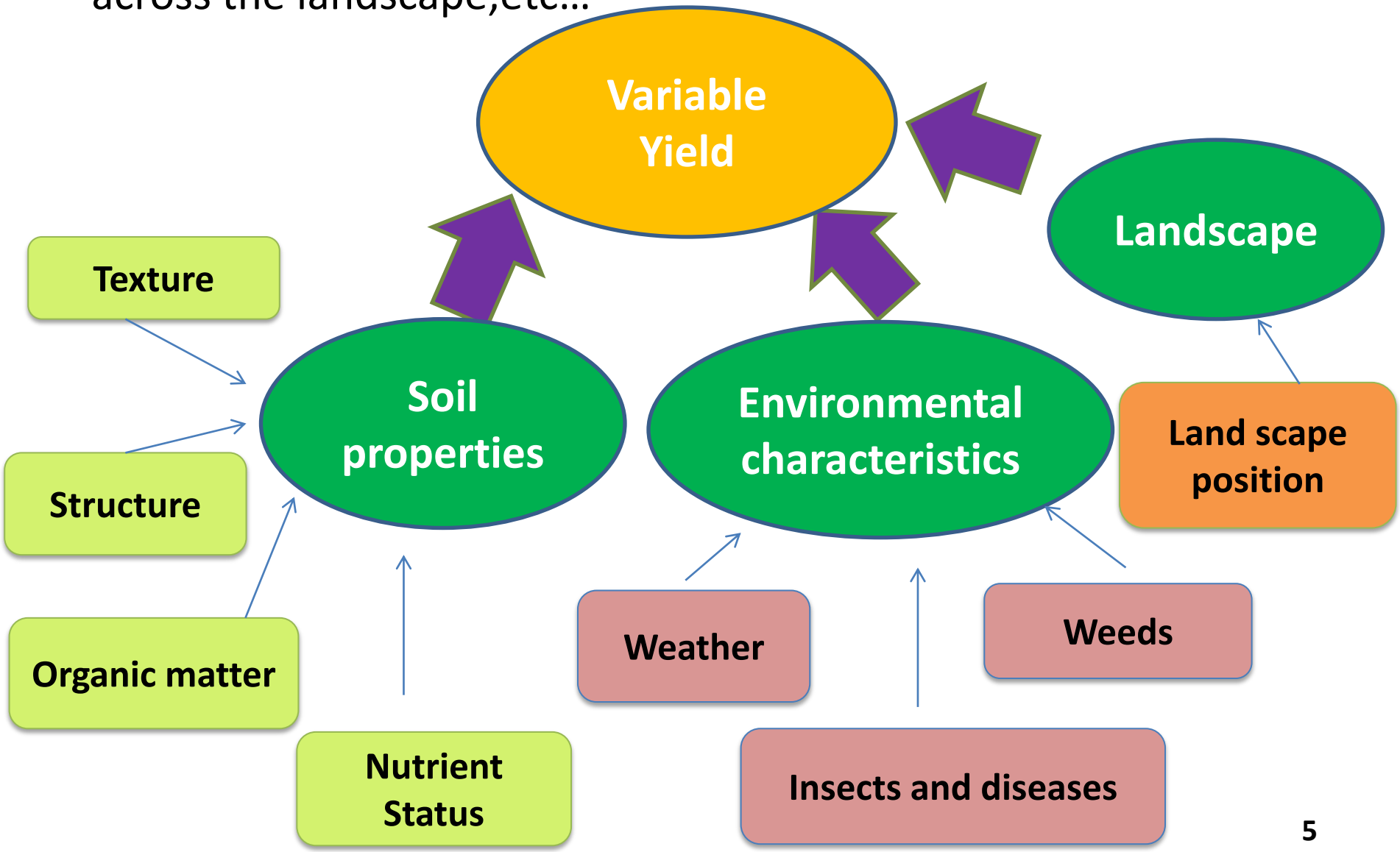
- ❑ **soil fertility,**
- ❑ **soil moisture,**
- ❑ **weed intensity and**
- ❑ **insect-pest infestation**

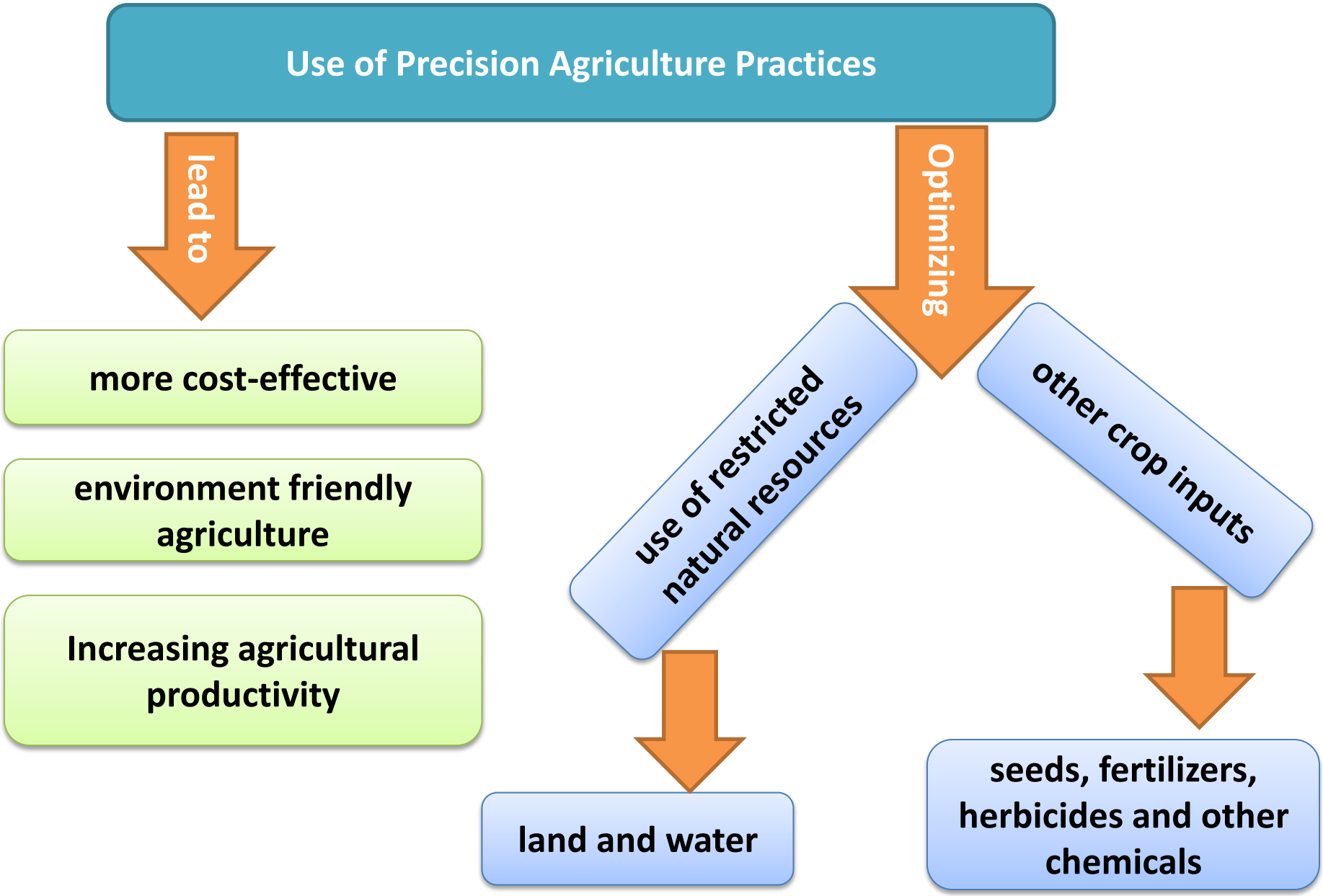
Precision Agriculture (PA) is a general term that describes a wide range of technologies and their use.



Need for precision agriculture

- **Farmers usually are aware** that their fields have **variable yields** across the landscape,etc…

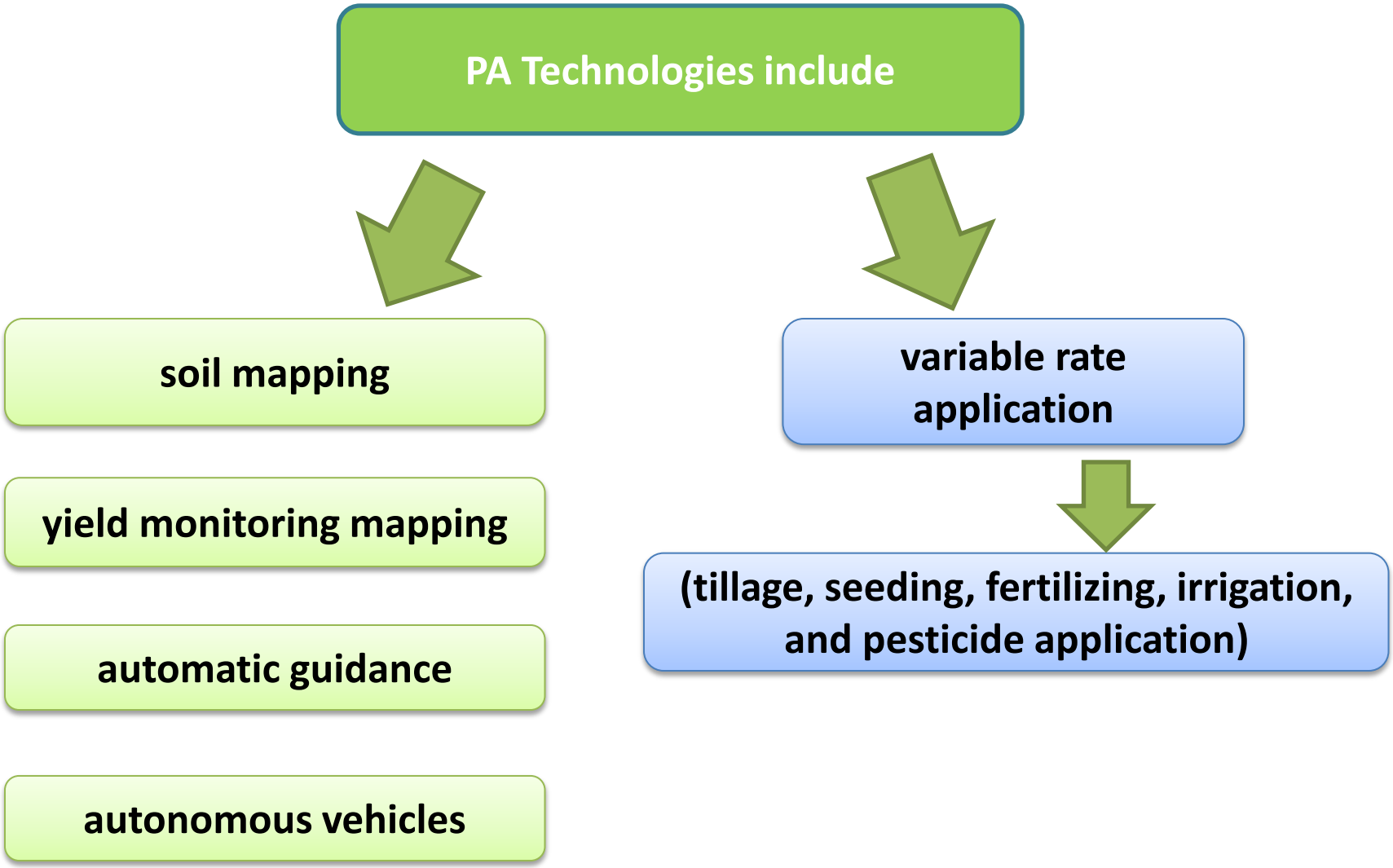



Use of Precision Agriculture Practices
lead to
more cost-effective
environment friendly agriculture
Increasing agricultural productivity
Optimizing
use of restricted natural resources
land and water
other crop inputs
seeds, fertilizers, herbicides and other chemicals

Concepts of Precision Agriculture Systems and Requirement

Precision agriculture concepts :

More precise and accurate farm work by better adjustments of settings and by improved monitoring and control mechanisms



These technologies provide detailed information about geographic location and spatial variability in soils or crops.

Crop Management by PA

Fall armyworm in maize

Precision spraying: treating armyworm infestation in China with drones

In August 2019, fall armyworms infested close to a million hectares of crops across 24 provinces in China. These pests could travel 100 km in a night and were therefore able to spread rapidly over the country. The drones removed 98 percent of the fall armyworms. They were highly effective for two reasons. One, they could fly as fast as the fall armyworms and thus be more effective than insecticide sprayers. Two, they could be operated at night when these worms are the most active.

Technologies use in precision agriculture

Some of the most promising technologies include:

soil and plant sensors

water stress indicators

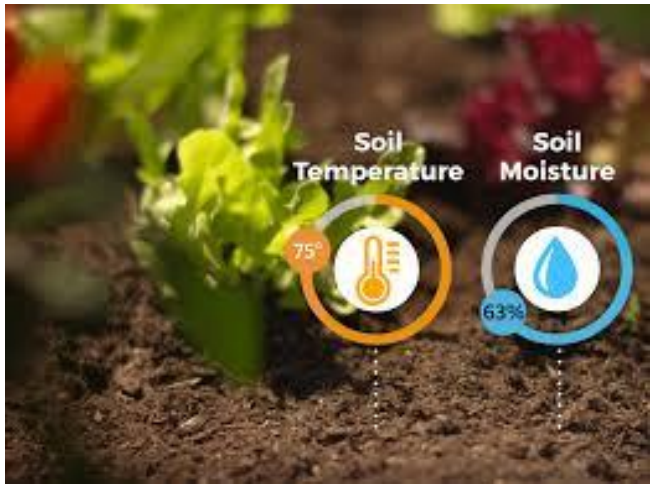
use

for the nutrient and water management

Computer vision

use

for nutritional status of the crop plants

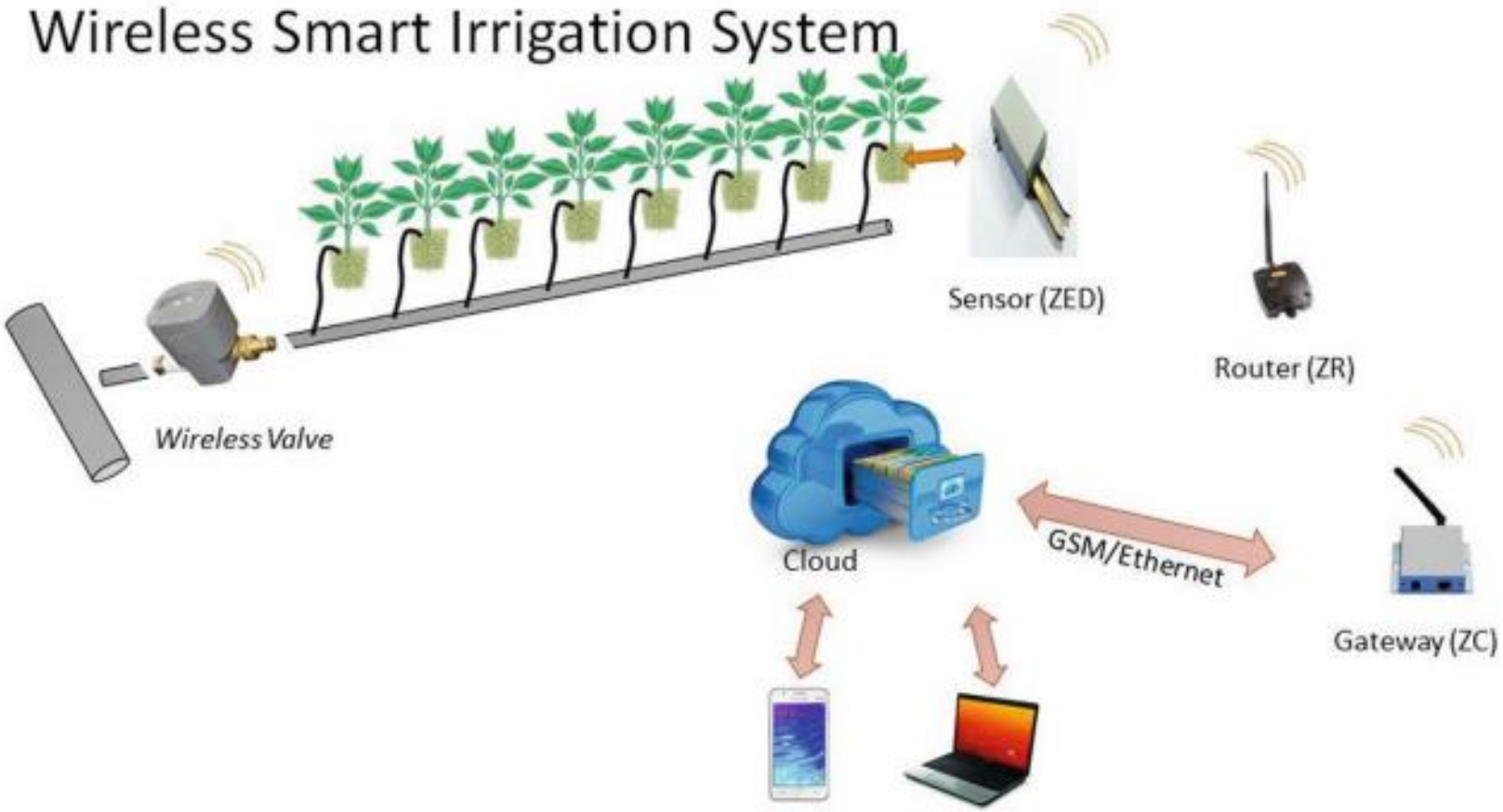



DARK
LIGH
0 200 500 1000 2000
1 2 3 4 5 6 7 8 9 10
DRY
MOIST
WE
8 6 5 4 3.5


22.6

Smart Irrigation: Smart irrigation in Vietnam

A smart irrigation system can help substantially improve water-use efficiency. When the soil moisture level falls below a certain threshold, an alert can be generated through a mobile phone app. The farmer can then decide the optimal time to irrigate the farm and the amount of water to apply.



Wireless Smart Irrigation System for Precision Agriculture

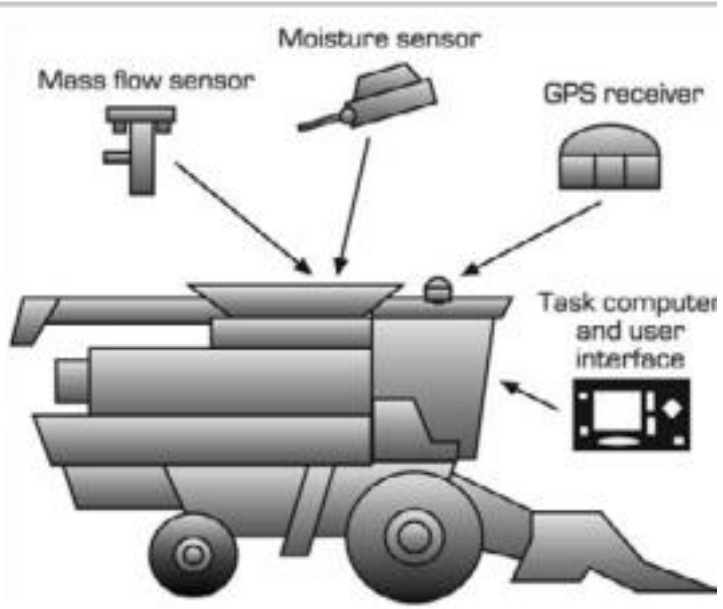
Yield monitoring and mapping

Grain Yield Monitors

Continuously measure & record the flow of grain in the clean-grain elevator of combine

When linked with a GPS receiver

yield monitors can provide data necessary for yield maps



Yield Monitor

Tools of Precision Agriculture

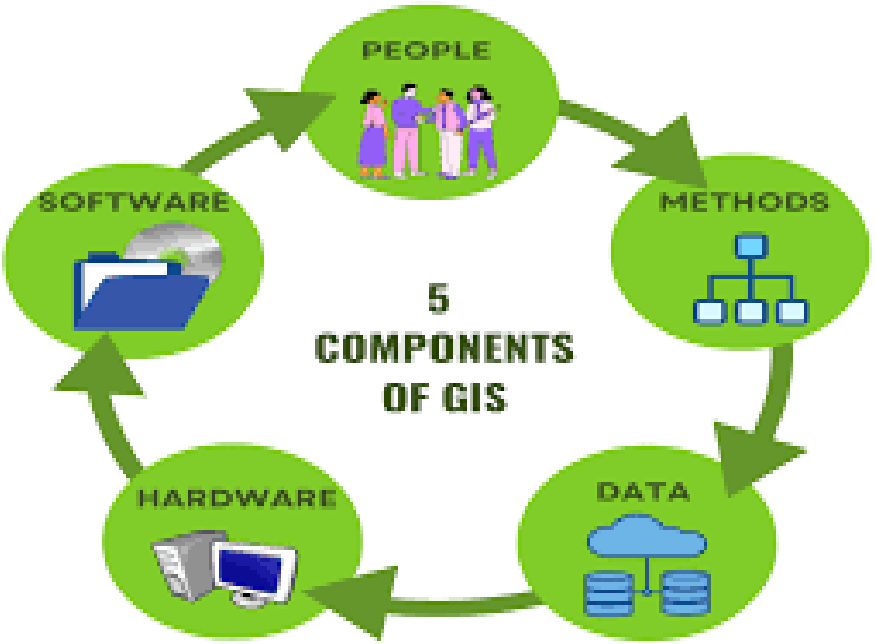
Hardware

Software

Recommended Practices

GIS

Global Positioning System (GPS) receivers



Mobile phones and their use in precision agriculture

Cameras

Cameras are useful for capturing visual data of farm conditions for analysis.

Short Message Service (SMS)

Farmer-focused social networking platforms have also been developed with SMS as the main medium for communication to accommodate users with limited Internet connectivity.

Unstructured Supplementary Service Data (USSD)

USSD is similar to SMS but slightly different in that users can select a customized advisory from a menu.

Use in Precision Agriculture

- Mobile phones enable two-way communication between farmers and experts, real-time monitoring capabilities, and digitization and easy collection of field data. GPS-enabled smartphones can help collect accurate location data and enable delivery of tailored information to farmers.
- Mobile phone-based farming advisory services (also called ‘digital extension’) are the most common precision agriculture solution, currently helping millions of farmers worldwide.

Data Acquisition

Electronic data from various sources like satellites, drones, on-site sensors, weather stations and mobile phones is gathered for analysis.

- Satellites
- Weather stations
- On-site sensors
- Mobile phones
- Drones

Analysis

Data from various sources is integrated on a platform and analysed to generate actionable information and insights for relevant stakeholders.

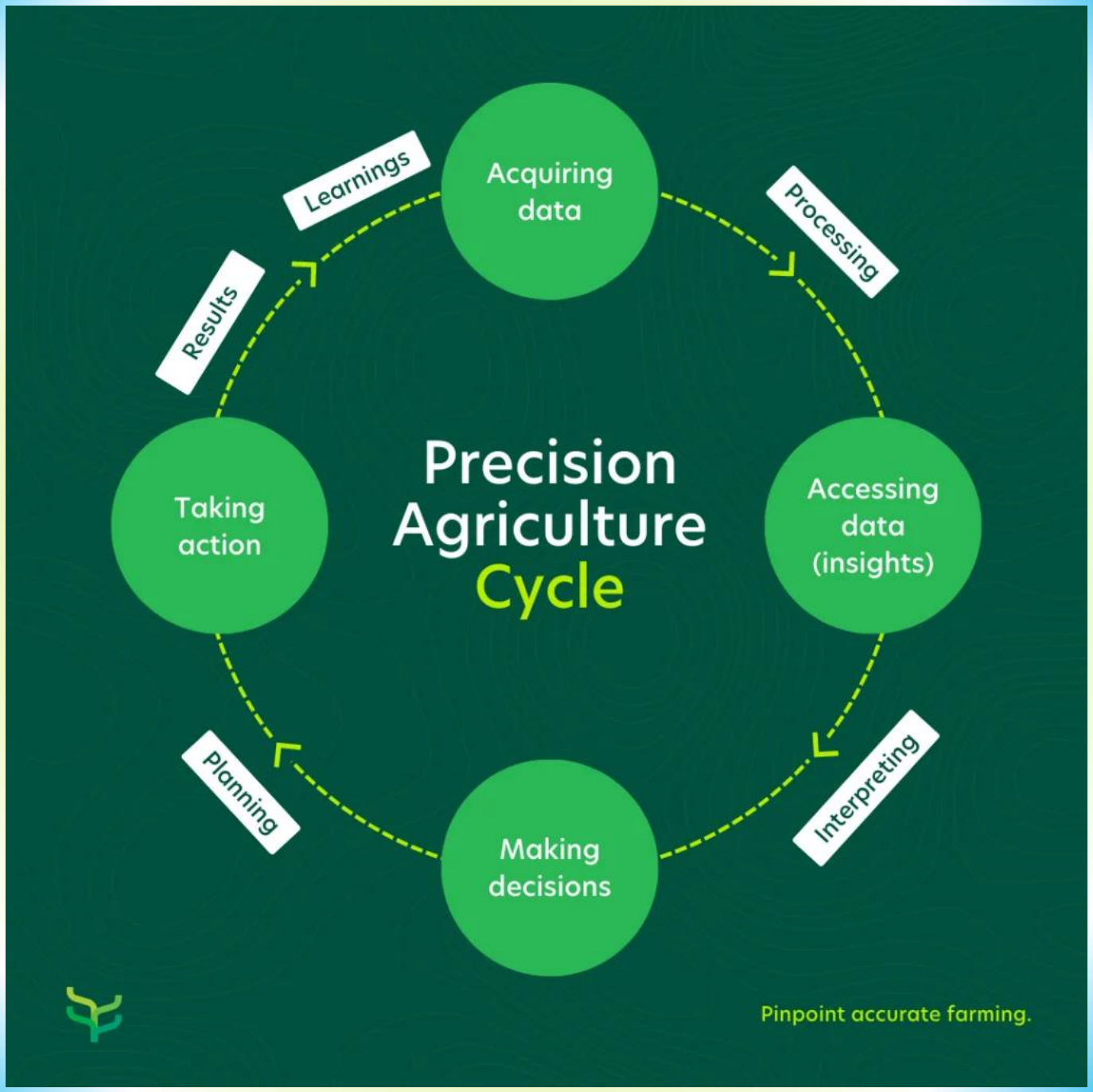
- On-site computers
- Mobile phones
- Cloud platforms
- Satellites

Dissemination/Application

Information and insights are disseminated among relevant stakeholders for necessary action.

- Mobile phones
- Drones
- Farm robots
- Smartphones
- Irrigation controllers

Three stages of a precision agriculture solutions and the technologies involved


Precision Agriculture Cycle
Acquiring data
Processing
Accessing data (insights)
Interpreting
Making decisions
Planning
Taking action
Results
Learnings
Pinpoint accurate farming.

Q & A

Thank You Kind Attention!