MODULE: Real Time Geospatial Applications

LESSON: Smart applications

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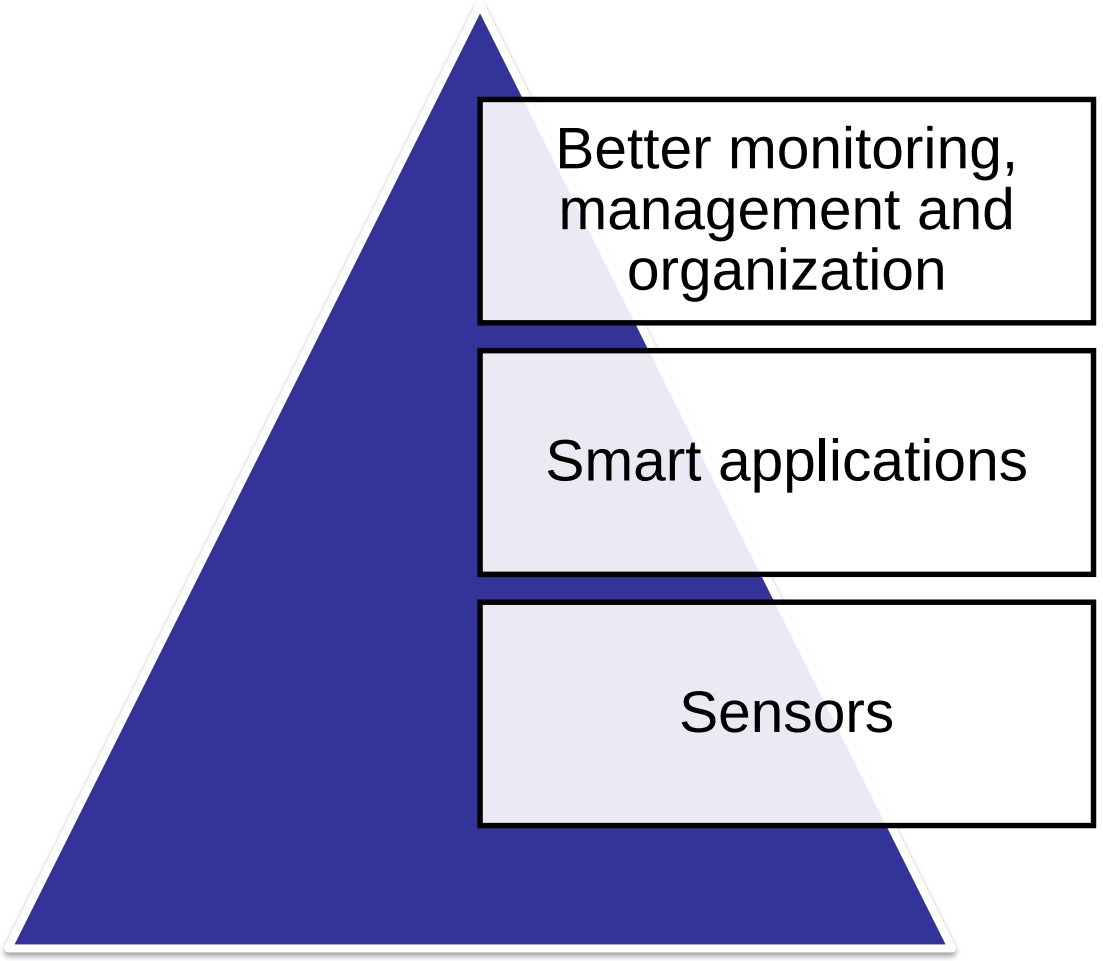
GeoServices-4-Sustainalibity (GeoS4S)
ERASMUS+ Project No. 561716-EPP-1-2015-1-AT-EPPKA2-CBHE-JP Co-funded by the European Commission

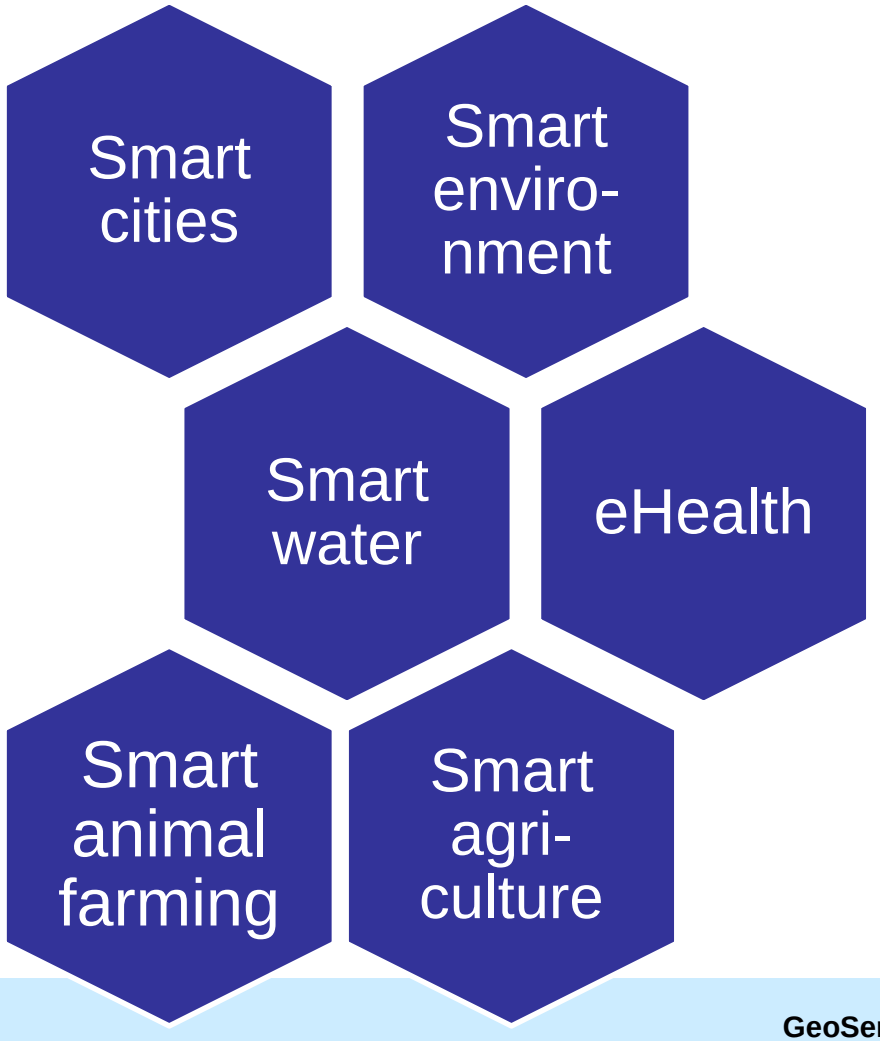
Contents / Learning Objectives

- Smart cities
- Smart house
- Smart grid systems
- Smart healthcare system
- Smart agriculture

IoT technologies and smart objects



Sensor applications



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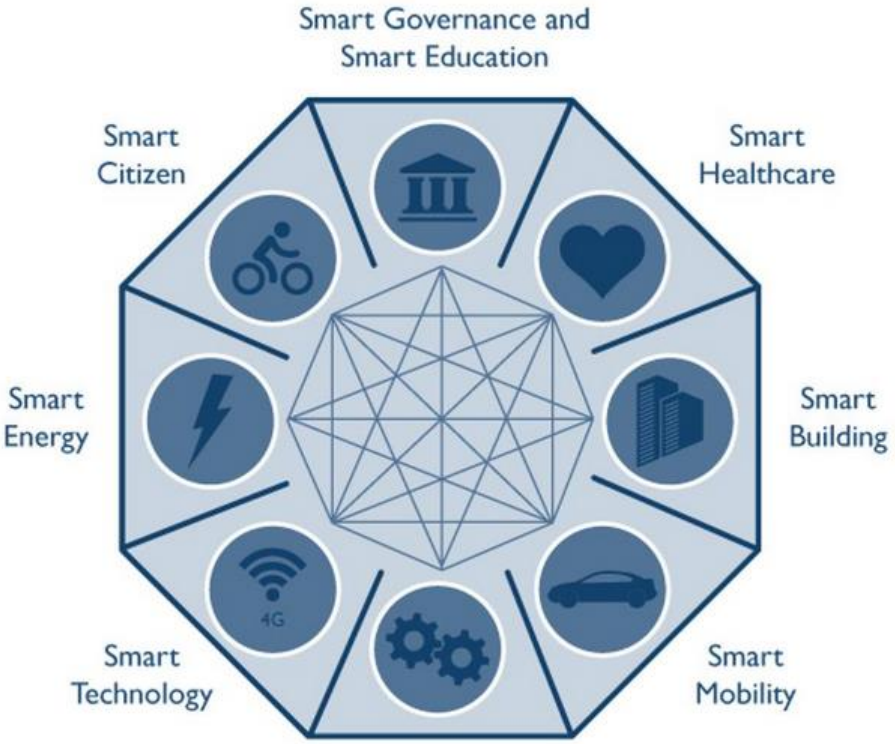
Smart cities - Definition

- “A city can be defined as 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel **sustainable economic development** and a **high quality of life**, with a wise **management of natural resources**, through **participatory action and engagement**.” (Source: Caragliu et al, 2009)

Smart cities - Characteristics

- **analytics and decision-making systems** will be used to use the derived knowledge effectively by city managers, planners and citizens
- **have detailed, measureable, real-time know**ledge about the city available at every level of management and work
- will also be automated, to enable appropriate city functions without direct human intervention
- have a network of collaborative spaces to **enable dynamic communities**
- continual interaction between the physical and digital worlds enables the **decision making processes to be much more open and inclusive**

Smart cities indicators/aspects



Smart cities example

- Amsterdam
  - Sensors for smart lighting, smart traffic management
- Barcelona:
  - Sensor technology to control de irrigation system in Parc del Centre de Poblenou
- ….

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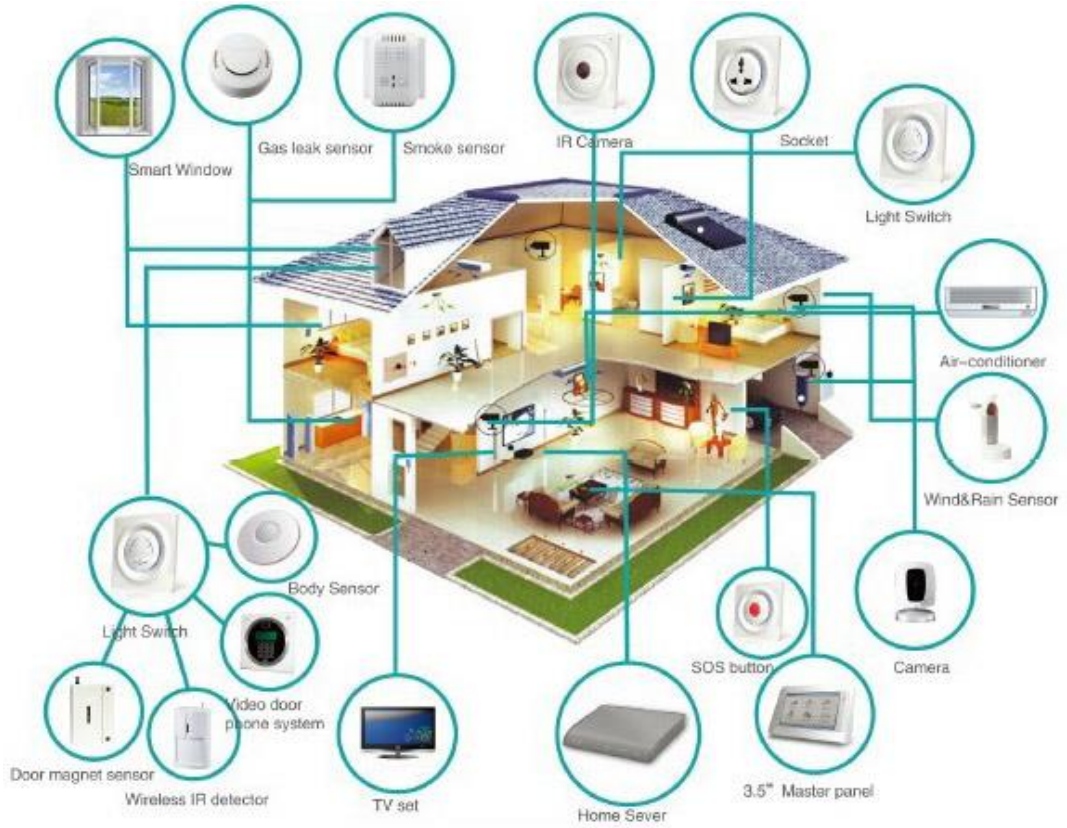
Smart houses

- Control of lighting, heating, ventilation, appliances



Source: http://smarthomeenergy.co.uk/what-smart-home

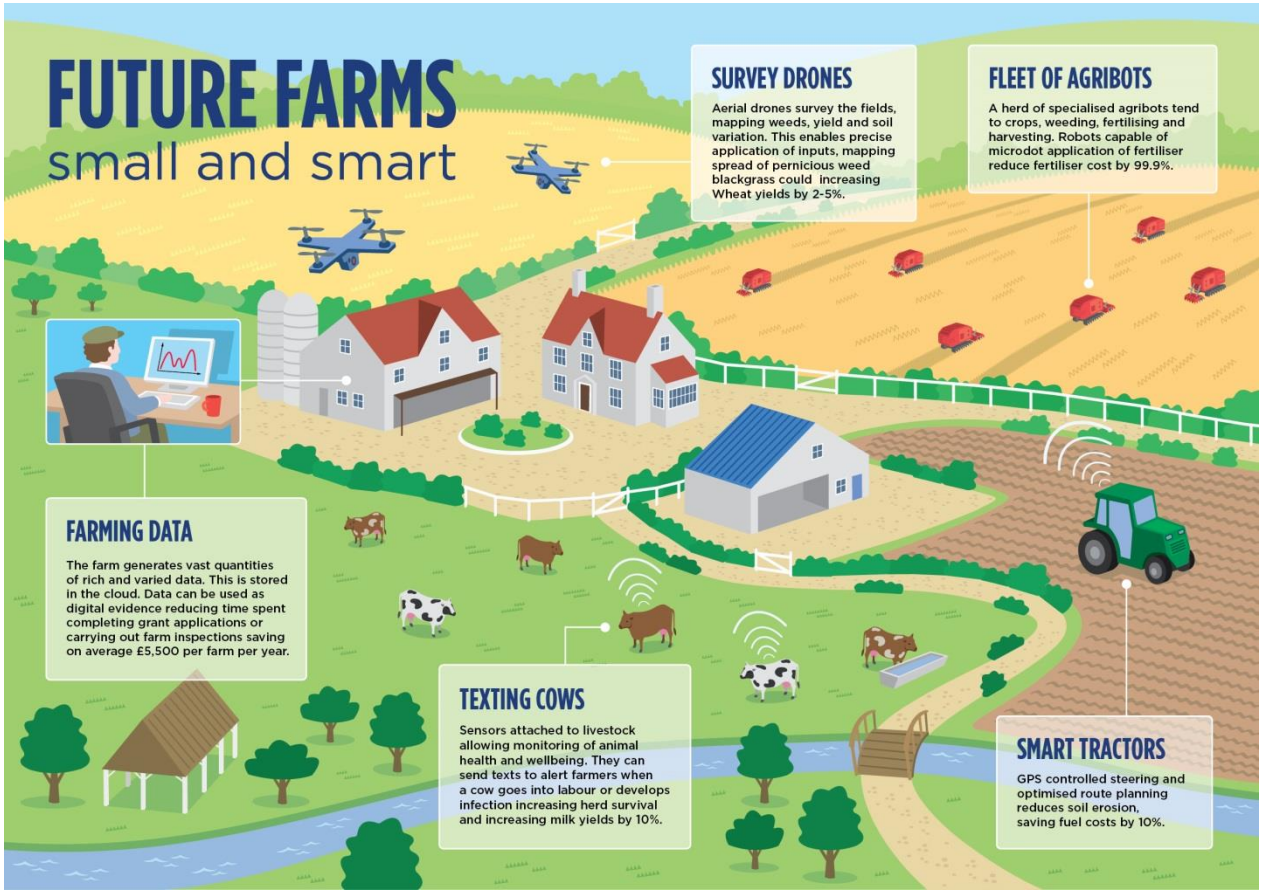
Smart grids

- Electrical grid for energy measures
  - Smart meters
  - Smart appliances
  - Renewable energy resources
  - Energy efficiency resources
- Example:
  - Smart Grid European Technology Platform

Smart Healthcare

Source: https://goo.gl/fqNLy0

Smart agriculture

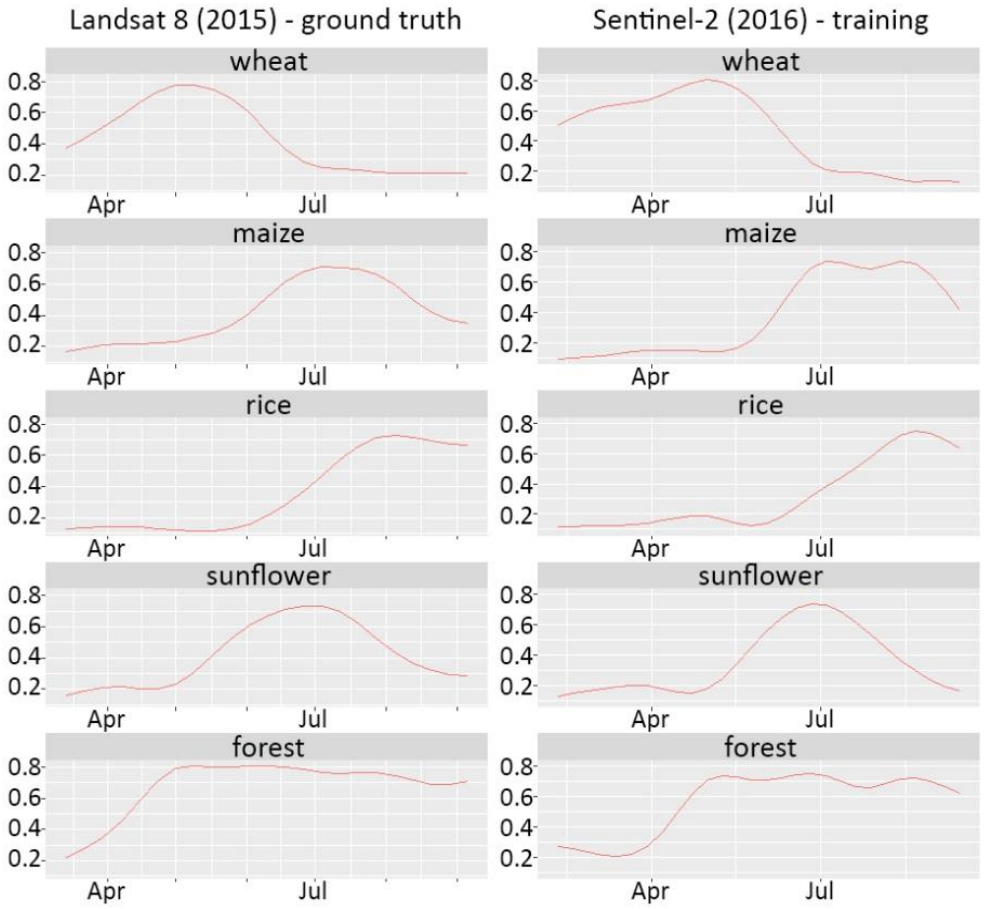


Source: http://www.nesta.org.uk/blog/precision-agriculture-almost-20-increase-income-possible-smart-farming

Crops monitoring

- Improving agricultural productivity through crops monitoring
- Spaceborne:
  - MODIS data (250 m spatial resolution)
  - Landsat-8 (30 m spatial resolution and 16 days revisiting time)
  - Sentinel-1 data (no cloud problems)
  - Sentinel-2 data (10 m spatial resolution for visible spectral bands and 5-days revisiting time)
- In-situ sensors

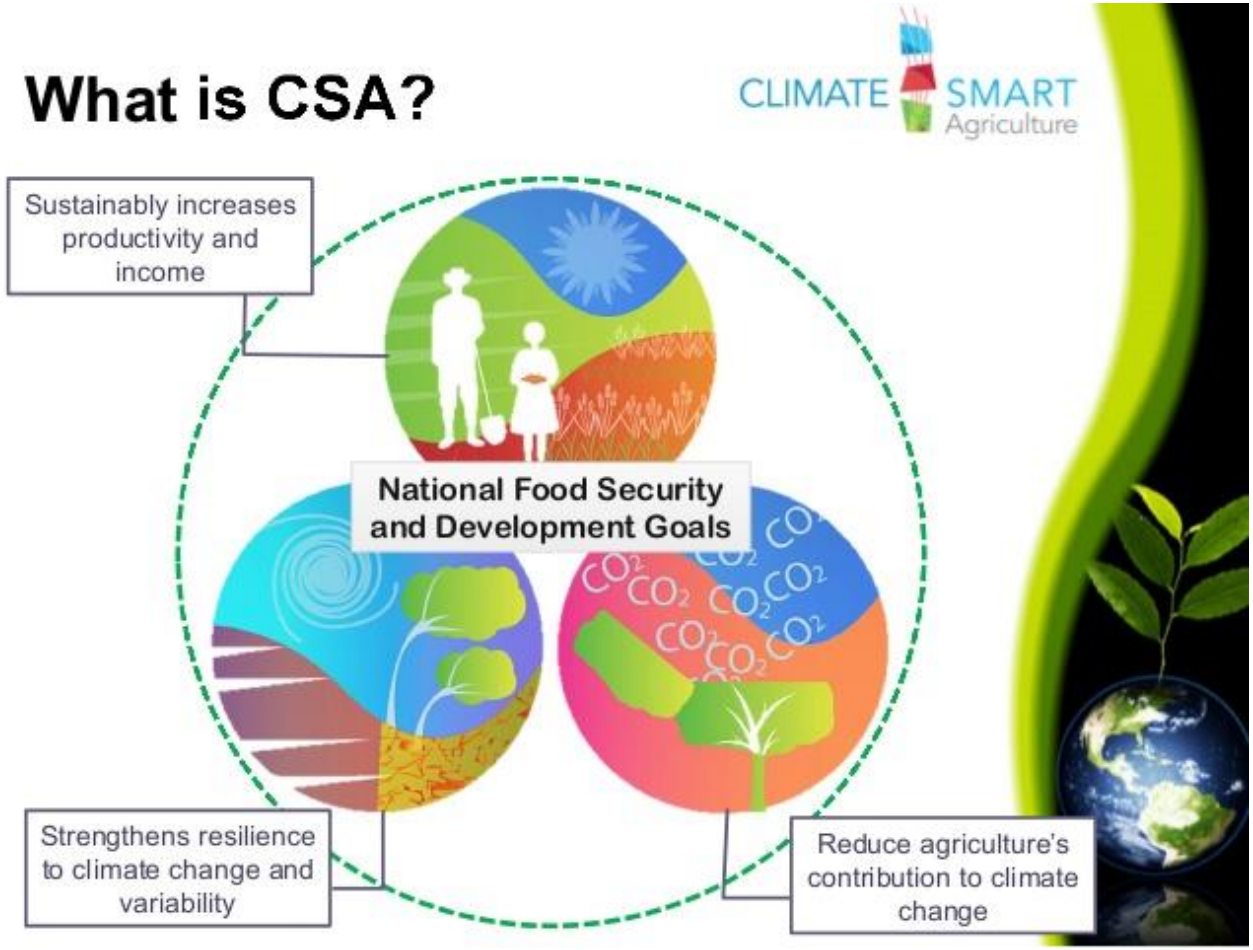
Space-borne crop monitoring



Precise agriculture

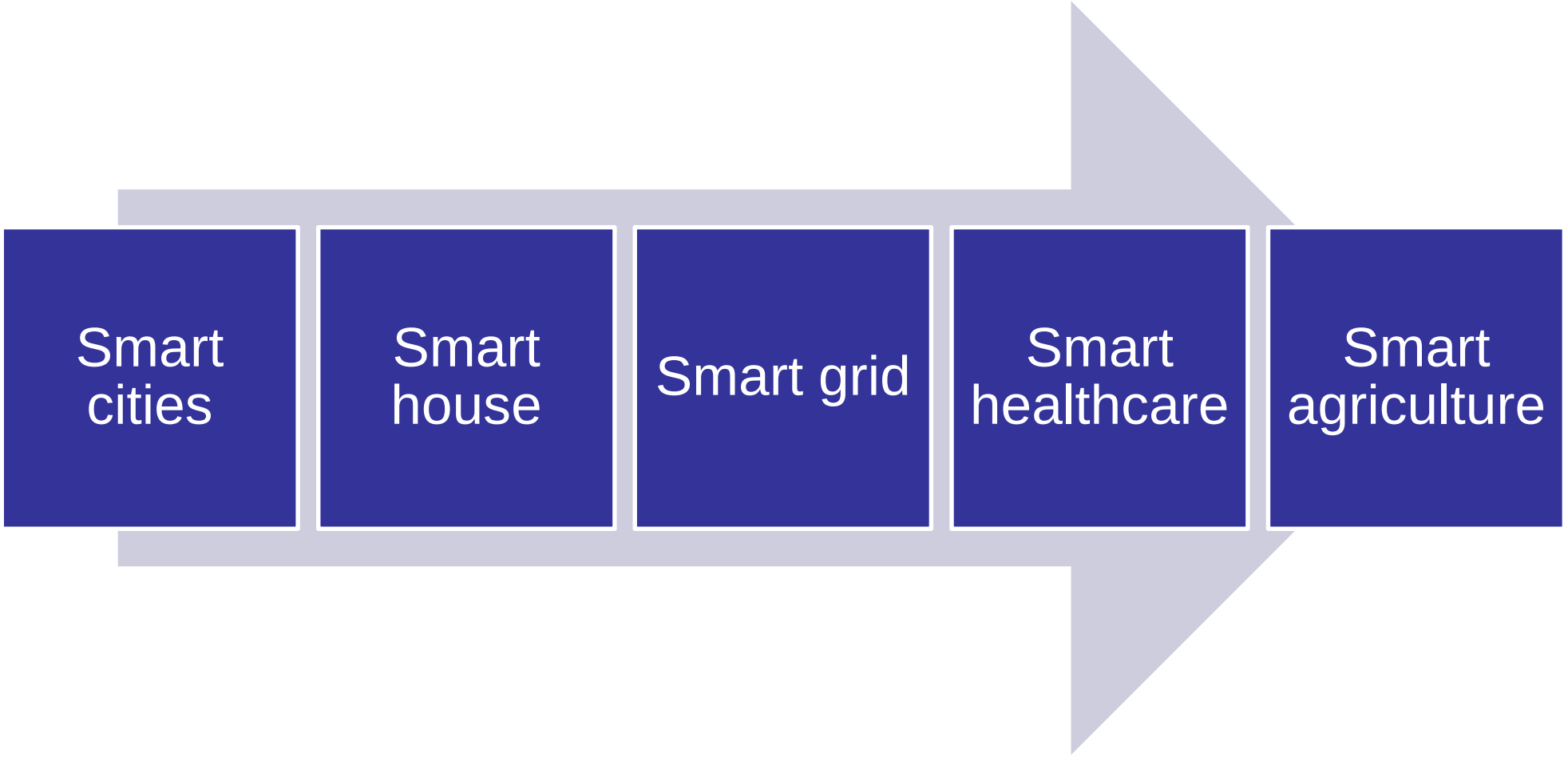
- Precise agriculture = Precision agriculture
- Observing, measuring and responding to crops‘ variability
- Benefits:
  - Increased production and profitability
  - Better working conditions
  - Sustainability of the agricultural production

Climate Smart Agriculture (CSA)



Source: https://csa.guide/csa/what-is-climate-smart-agriculture

Summary


Smart cities
Smart house
Smart grid
Smart healthcare
Smart agriculture

Summary questions

- What is a smart city?
- What are the main indicators/aspects used to evaluate a smart city?
- Explain the concepts of smart building and smart grids and their interdependence.
- What are the advantages of smart agriculture over traditional agriculture?
- What are the main pillars of the climate smart agriculture?

References

- Partners in ERASMUS+ Project ‘GeoServices-4-Sustainability‘

- Please see full list of references in the notes section