

What is big data?

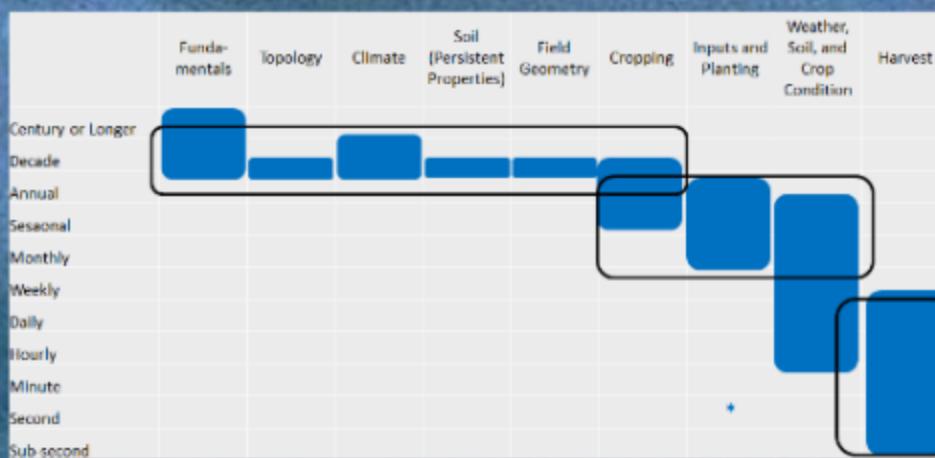
- Big data shall mean the datasets that could not be perceived, acquired, managed and processed by traditional IT and software/hardware tools within a tolerable time. (Chen et al. 2014)
- Big data is where the data volume, acquisition velocity, or data representation [variety] limits the ability to perform effective analysis using traditional relational approaches or requires the use of significant horizontal scaling for efficient processing. (Cooper and Mell, NIST, 2012)
- In business, big data is whatever data is newly recognized by executives or other decision makers as representing a profitable commercial opportunity when put to use, especially if the volume, velocity, or variety of the data *is perceived* as being large based on institutional history or capabilities.
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Production Agriculture

- Production agriculture is a **PROFIT**-maximizing business
 - Not *production* maximizing
 - Not *information* maximizing
- Government programs have an impact.
 - For instance, crop insurance programs can shift crop selection
- Increasingly we see treatment of externalities.
 - FarmSmart
 - Field-to-Market

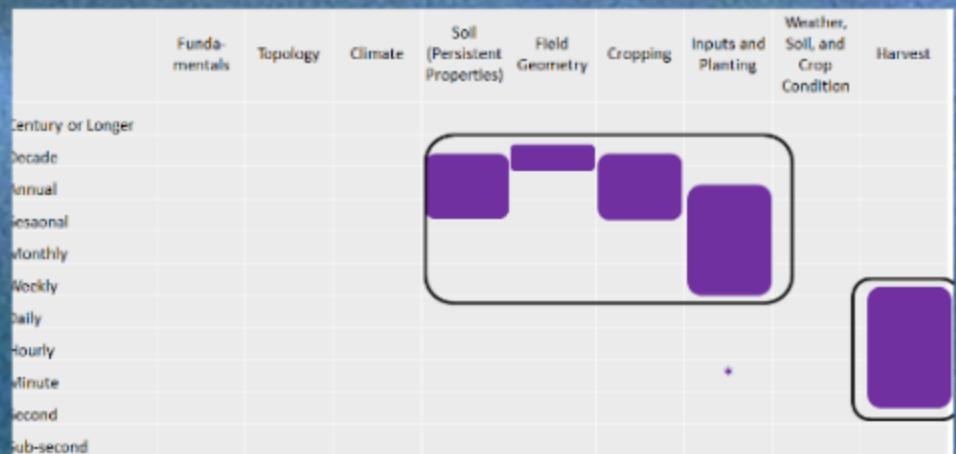
Time Scale of Changes *In information*



Changes

Time Scale of Change

In producer decisions

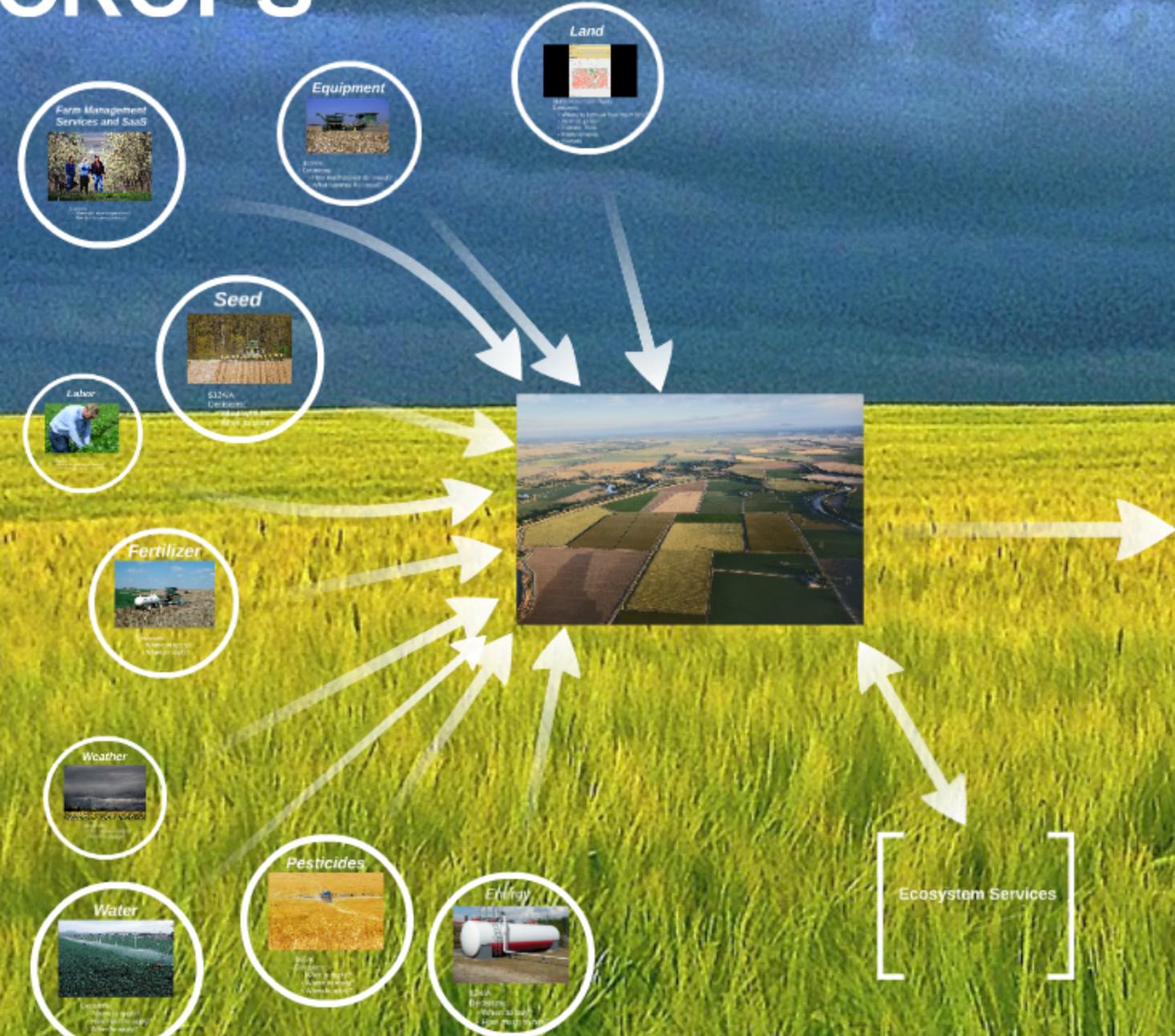


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Big Data Produces Fundamental Changes

- What was consulting/custom can now be X-as-a-Service
- What was considered once-a-year/once-a-quarter can now be daily, hourly, or continuously.
- Where small numbers of scenarios/alternatives were considered, now millions or billions of scenarios/alternatives can be considered.

CROPS



LIVESTOCK

Energy



Land



Decisions
- Where to locate?

Labor



Decisions
- Who many farmers are needed?
- Who needs to do what work?

Veterinary Care
and Medicine



Feed



Ecosystem Services

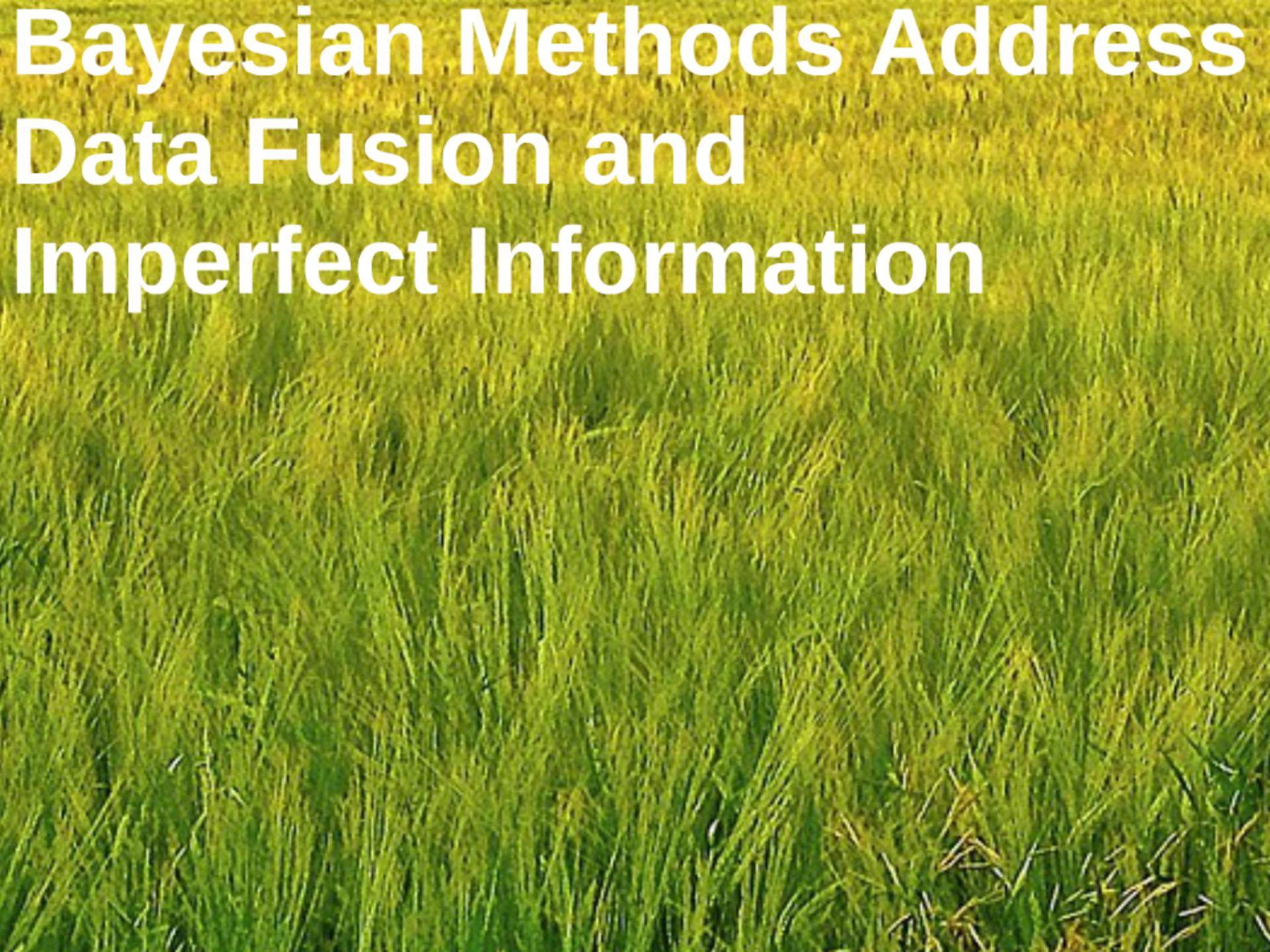
The background of the slide features a photograph of a vast field of tall, green grass swaying in the wind. The sky above is a clear, pale blue.

Small Data Enables Big Data

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Data Fusion is Crucial

- Production agriculture is a **PROFIT**-maximizing business.
 - Not *production* maximizing
 - Not *information* maximizing
- Federal programs have an impact.
- There is increasing treatment of externalities.



**Bayesian Methods Address
Data Fusion and
Imperfect Information**