Land Use Update

12/8/23

Questions to keep in mind:

What can we improve for Phase 7?

What level of detail can the ag sector track?

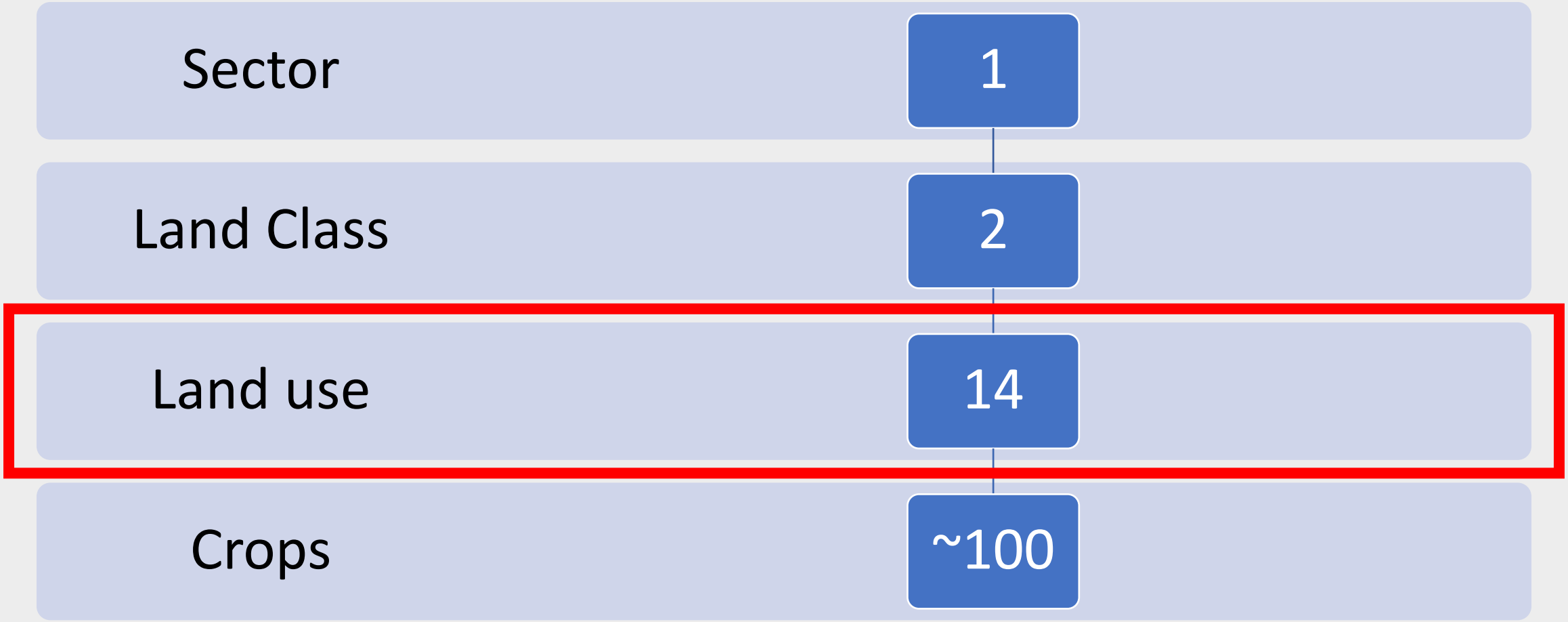
How can we overcome current data limitations (lack of information)?

Recap

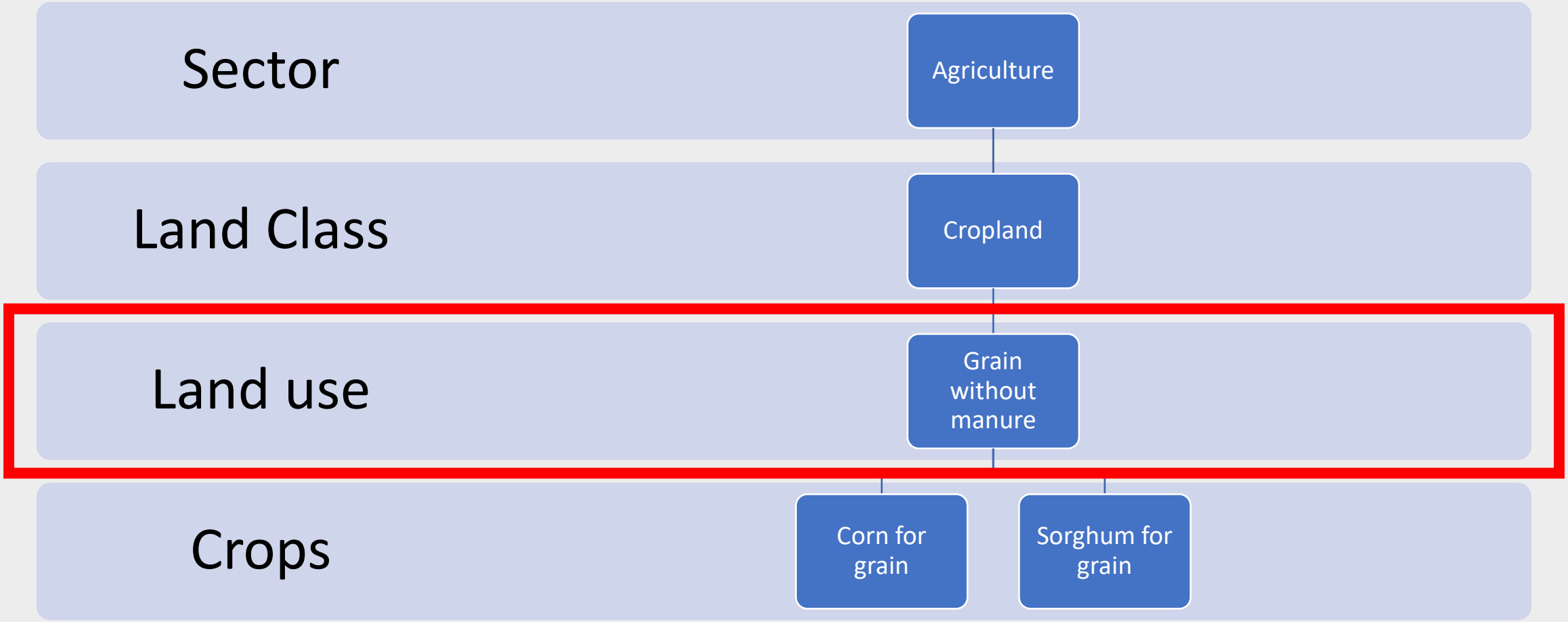
1)Land Uses (Section 2 CAST)

- Aggregation process
  - Crop -> Land Use -> Land Class -> Sector
- Impact loading rates and BMP reporting

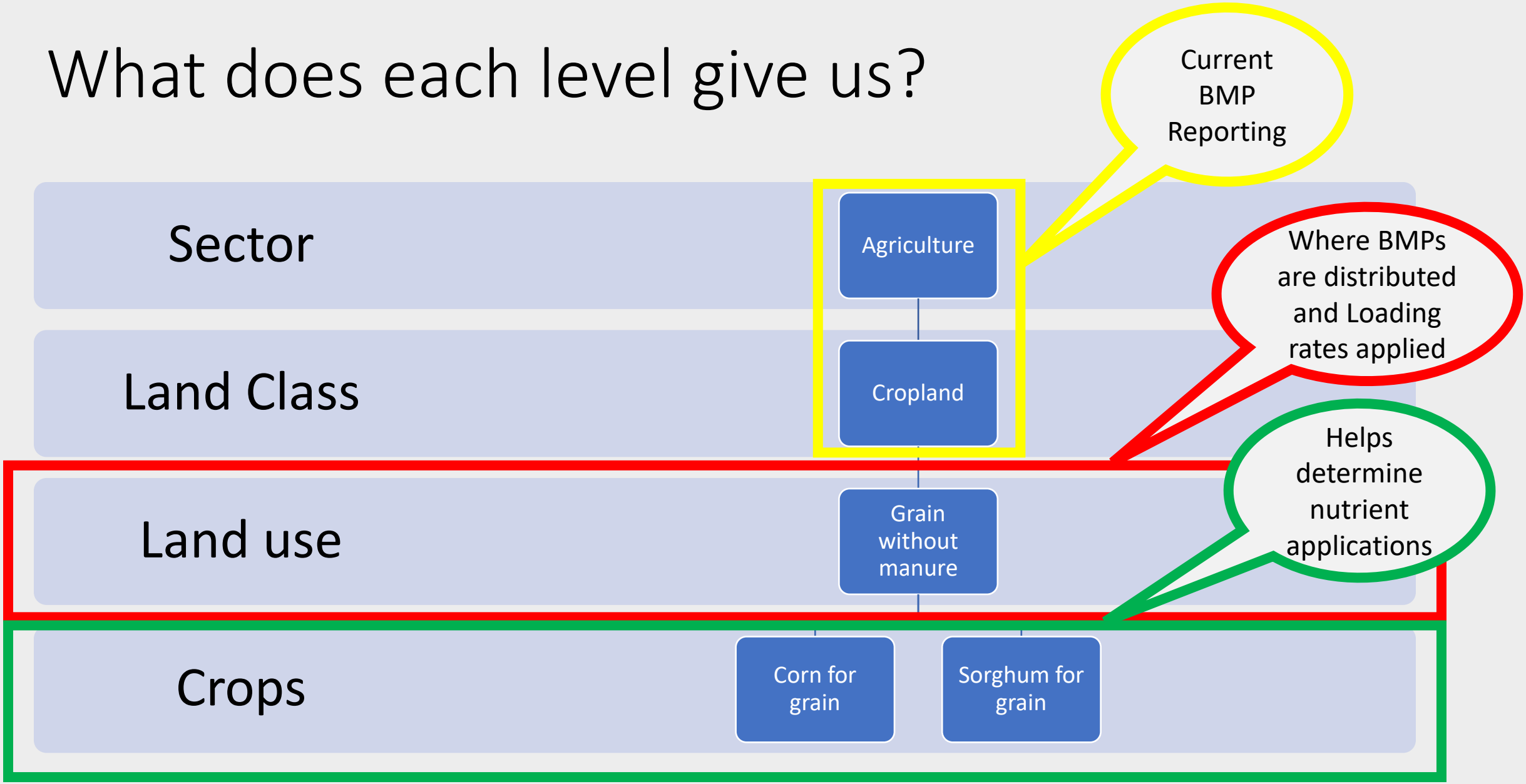
How is the Ag Sector currently represented in CAST?



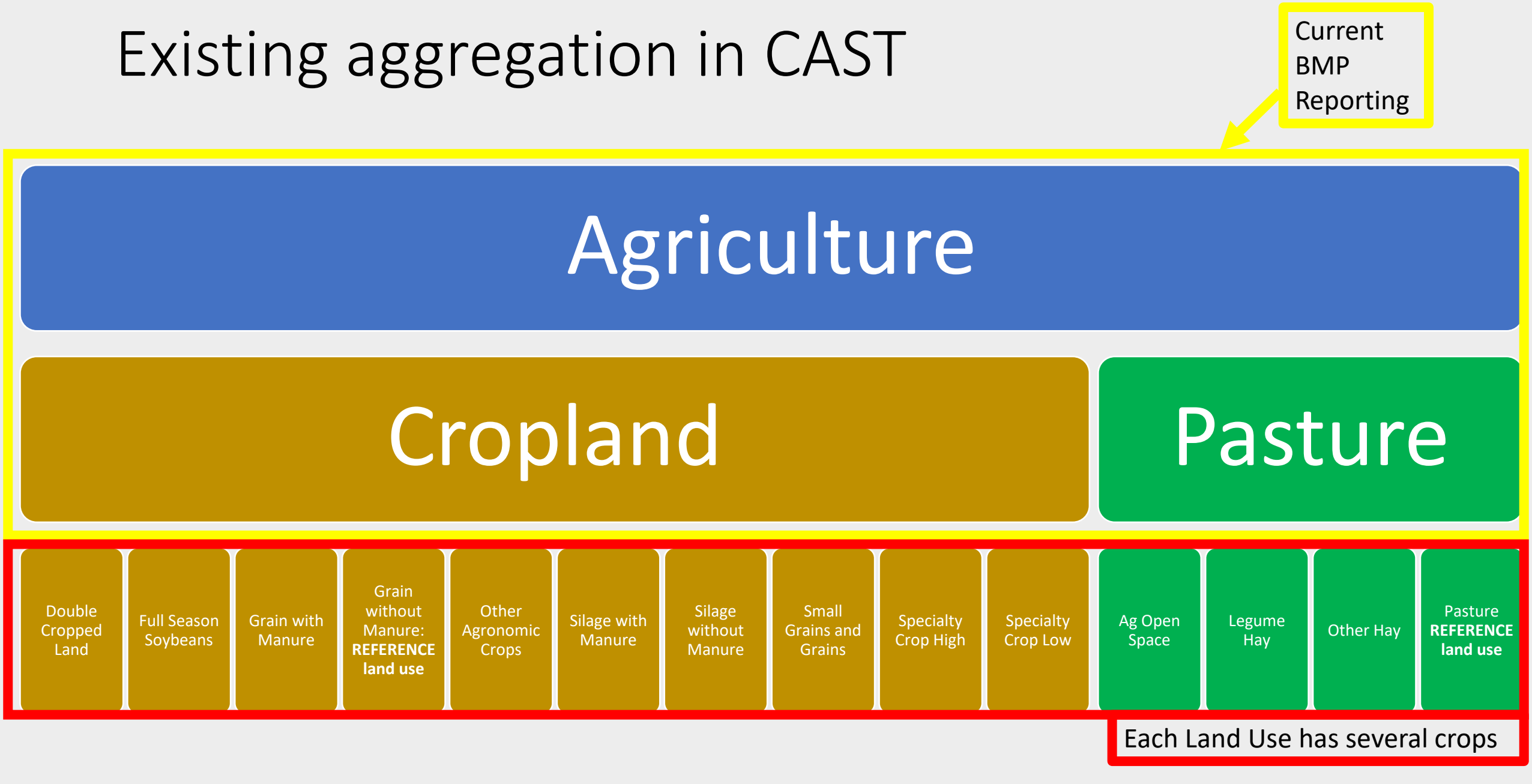
Example of a single Land use:



What does each level give us?



Existing aggregation in CAST



How are Land Class Loads Calculated?

G = Total Landscape Loads (pounds per year)

C = Land Class Average Loading Rate for Crop (pounds per acre per year)

Ri = Land Class Average Loading Rate relative to Crop Land Class (dimensionless)

Ai = Area in Land Class (acres)

$$G = \sum_{i=1}^{4} C * R_i * A_i$$

What is a Loading Rate?

- Expressed in pounds per acre per year.
- Average loads are developed at the Chesapeake Watershed scale with the assumption of no management practices (pre BMP)
- Independent of:
  - local nutrient application rates
  - location within the watershed
  - physical characteristics

Chesapeake Bay Average			
Land class	Land Use	Loading Rate Ratio	Loading Rate (pounds per acre per year)
Cropland	Double Cropped Land	0.79	30.9
	Full Season Soybeans	0.71	27.7
	Grain with Manure	1.4	54.7
	Grain without Manure: **Reference land use**	1	39.1
	Other Agronomic Crops	0.45	17.6
	Silage with Manure	1.62	63.3
	Silage without Manure	1.16	45.3
	Small Grains and Grains	0.84	32.8
	Specialty Crop High	1.34	52.4
	Specialty Crop Low	0.31	12.1
Pasture	Ag Open Space	0.43	5.1
	Legume Hay	0.74	8.7
	Other Hay	1.04	12.3
	Pasture: **Reference Land Use**	1	11.8

What is a Loading Rate Ratio?

- Ag Loading Rate Review Steering Committee
- Data poor Land Uses
- Relationship between the reference and data poor Land Uses provided stable information

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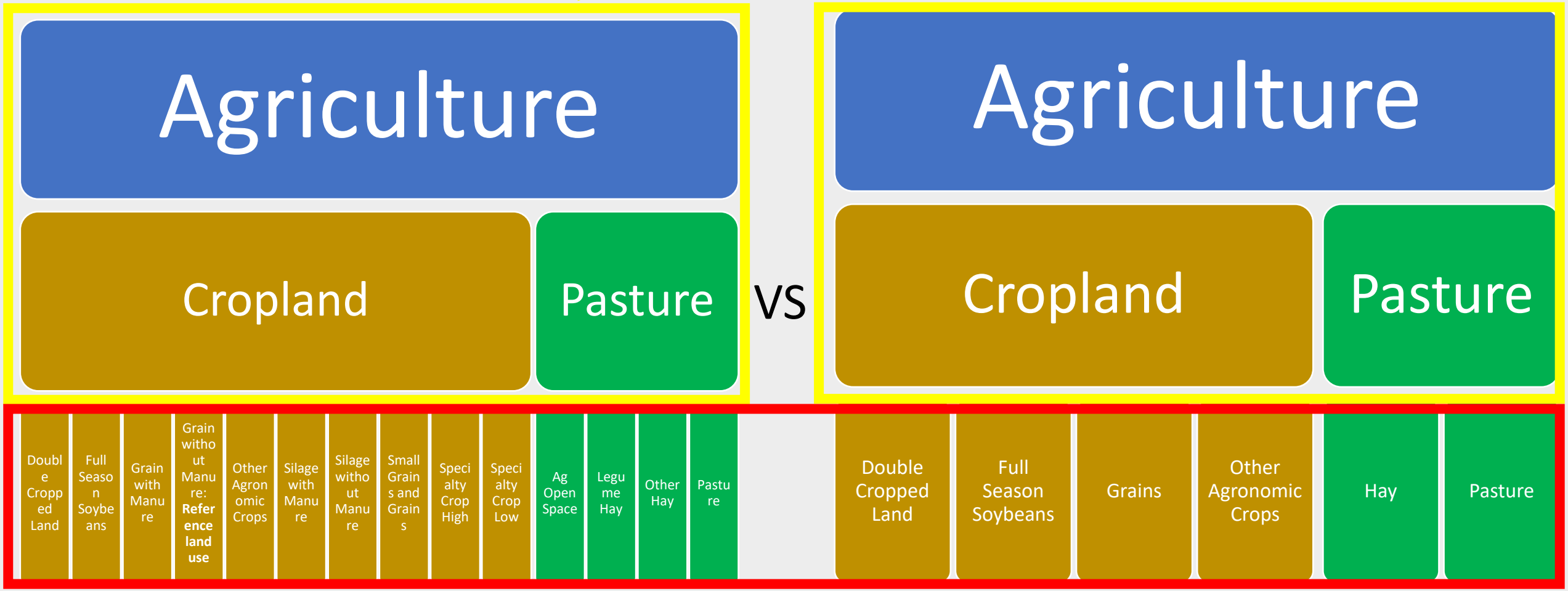
What can we improve on for Phase 7?

Existing aggregation in CAST

Current BMP Reporting

Example of possible new land uses



NOTE REGARDLESS of the aggregation we still keep all the underlying crop data

Things to think about: Nutrient source

- Can we improve on the simulation of inorganic vs organic Nitrogen?

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What might happen if we combine categories?

Large crops dominate several categories

Organic and inorganic N are currently split for two groups

Potential to improve how CAST deals with inorganic vs organic Nitrogen

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How might we combine categories?

- Create a single class for manure and fertilizer Land Uses
- Use land use weighted average?
  - Total acres for each category across the watershed weighted
- Range between existing values?
- Modify sensitivity to adjust based on source

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Proposed Land Use aggregation in CAST

Current BMP Reporting

Agriculture

Cropland

- Double Cropped Land
- Full Season Soybeans
- Grain **REFERENCE land use**
- Other Agronomic Crops
- Silage
- Small Grains and Grains
- Specialty Crop High
- Specialty Crop Low

Pasture

- Ag Open Space
- Legume Hay
- Other Hay
- Pasture **REFERENCE land use**

Each Land Use has several crops

Land Use questions

What load sources do we need for BMP reporting in Phase 7?

- More specific then the existing 14?

What level of detail can the ag sector track?

- Can we get data that is more detailed?
- Is there a benefit to reporting at a finer scale?

What can the data reporters report?

- In the future will there be increased detail about different crops?

Questions?