

Agricultural land cover change

Agricultural domain (in or out of cropland land cover)

- Change in land cover extent
 - Typically a categorical approach to identifying extent of agricultural lands
 - Coarse-scale quantification of changes in cropland extent at regional/global scales
 - Finer-scale quantification of cropland extent change germane to national scales
 - Methods and products on changes to cropland extent are not common
 - State of the practice is expert photo-interpretation
 - Change, in general, should be targeted directly using digital methods
- Methods
 - Current practices should be improved upon through the use of digital image processing methods that characterize change directly
 - While challenging to implement, formal validation and convergence of evidence approaches to documenting product quality are critical
 - methods must be peer-reviewed and shared
 - repeatability is important, as is transferability

Crop dynamics

- Change monitoring themes
 - Cropping systems
 - Rotations, double cropping
 - Management (till/no till, irrigation, inputs)
 - Crop condition (within season monitoring)
 - Crop quality (for example, protein content in wheat)
 - Trends in yield
 - Long term trends in all of the above
- Data requirements
 - Feasibility of using a given data source is region-specific, largely related to field size and cropping system
 - This has implications for transferability of methods
 - Many change themes require ancillary inputs
- Methods
 - methods must be peer-reviewed and shared
 - repeatability is important, as is transferability
 - no best approach, but validation and convergence of evidence are critical

Field size and sensor class

Task	Key parameter	Satellite data: Optical Adequate (A)- Particularly (P)- Not adequate (N); Coverage (Gl,C,Reg);				
		Low 1 km	Coarser 250 m	Middle 30 m	High 10 m	Very high 1 m
Field size definition	Field size					
	> 400 ha	N / G	N / G	A / G	A / C	A / R
	>100 ha	N / G	N / G	P / G	A / C	A / R
	> 30 ha	N / G	N / G	N / G	A / C	A / R
	>10 ha	N / G	N / G	N / G	P / C	A / R
	>3 ha	N / G	N / G	N / G	N / C	A / R
	>1 ha	N / G	N / G	N / G	N / C	A / R

Agricultural land use and sensor class

Task	Key parameter	Satellite data: Optical				
		Adequate (A)- Particularly (P)- Not adequate (N); Coverage (Gl,C,Reg);				
Field land use type recognition	Number of crop type/ frequency of satellite revisit	Low 1 km	Coarser 250 m	Middle 30 m	High 10 m	Very high 1 m
	monoculture	A / G	A / G	P / G	P / C	P / R
	Crop groups	P / G	P / G	P / G	P / C	P / R
	Different crops	N / G	N / G	N / G	N / C	N / R

Yield forecast and sensor class

Task	Key parameters	Satellite data: Optical				
		Adequate (A)- Particularly (P)- Not adequate (N); Coverage (G,C,Reg);				
Yield Forecast	Field size/ Ground data	Low 1 km	Coarser 250 m	Middle 30 m	High 10 m	Very high 1 m
	> 400 ha	P / G	A / G	A / C	A / C	A / R
	>100 ha	N / G	A / G	A / C	A / C	A / R
	> 30 ha	N / G	P / G	A / C	A / C	A / R
	>10 ha	N / G	N / G	P / C	A / C	A / R
	>3 ha	N / G	N / G	N / C	A / C	A / R
	>1 ha	N / G	N / G	N / C	A / C	A / R

Criteria for developing an agricultural land cover monitoring system (focused on primary annually produced commodities)

- Field size
- Crop types
- Crop calendars/phenology
- Management
- Landscape pattern
- Interannual variability of yield and area
- Cloud cover during cropping season

Argentina – temperate feedstock area change estimation and crop condition example

- Field size
 - Large – MODIS/MERIS/SPOT VEGETATION/AVHRR
- Crop types
 - Corn, soybean – optical
- Crop calendar/phenology
 - January/February key time for corn/soy discrimination – near daily
- Management
 - Commercial agriculture
- Landscape pattern
 - Homogeneous, production centers well established, but there is also a growing frontier
- Interannual variability of yield and area
 - Area is expanding
- Cloud cover during cropping season
 - Summer crops, rainfall frequent, clouds a limiting factor for any weekly or bi-weekly system such as Landsat

Niger – semi-arid subsistence area change estimation and crop condition example

- Field size
 - Small – Landsat and finer with more emphasis on in situ reporting
- Crop types
 - Sorghum, millet – cannot discriminate, use crop group monitoring, not types
- Crop calendar/phenology
 - Short rainy season
- Management
 - Mixed cropping, integrated agriculture (pastoral uses)
- Landscape pattern
 - Heterogeneous, fields mixed with natural vegetation
- Interannual variability of yield and area
 - Yield and harvested area vary
- Cloud cover during cropping season
 - Short cropping season coincides with rainy season, requiring almost daily data (2 to 3 day coverage)
- Long term trend
 - information from MODIS/AVHRR/SPOT VEGETATION type data could be helpful in targeting field data collection

Validation