



Provisional analytical procedures for mapping MFS, their socio-ecological context, and system performance

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December 2022



Conceptual framework

Potential SEC factors?

Where are the MFS?

SEC's typologies driven from SEC factors? Their map?

How many MFS's sub-types (Empirical MFS typology)? Their map?

Not considered in regional assessment/mapping

Productivity trend

Productivity per capita trend?

Risk/Vulnerability status?

2

1

3

Socio-Ecological Context (SEC)

x

Mixed Farming Systems (MFS)

x

Management (M)



MFS Performance

Mapping of MFS (sub-types) in-context ((Map of [MFS x SEC])

Characterization of each [MMS x SEC] (statistics)

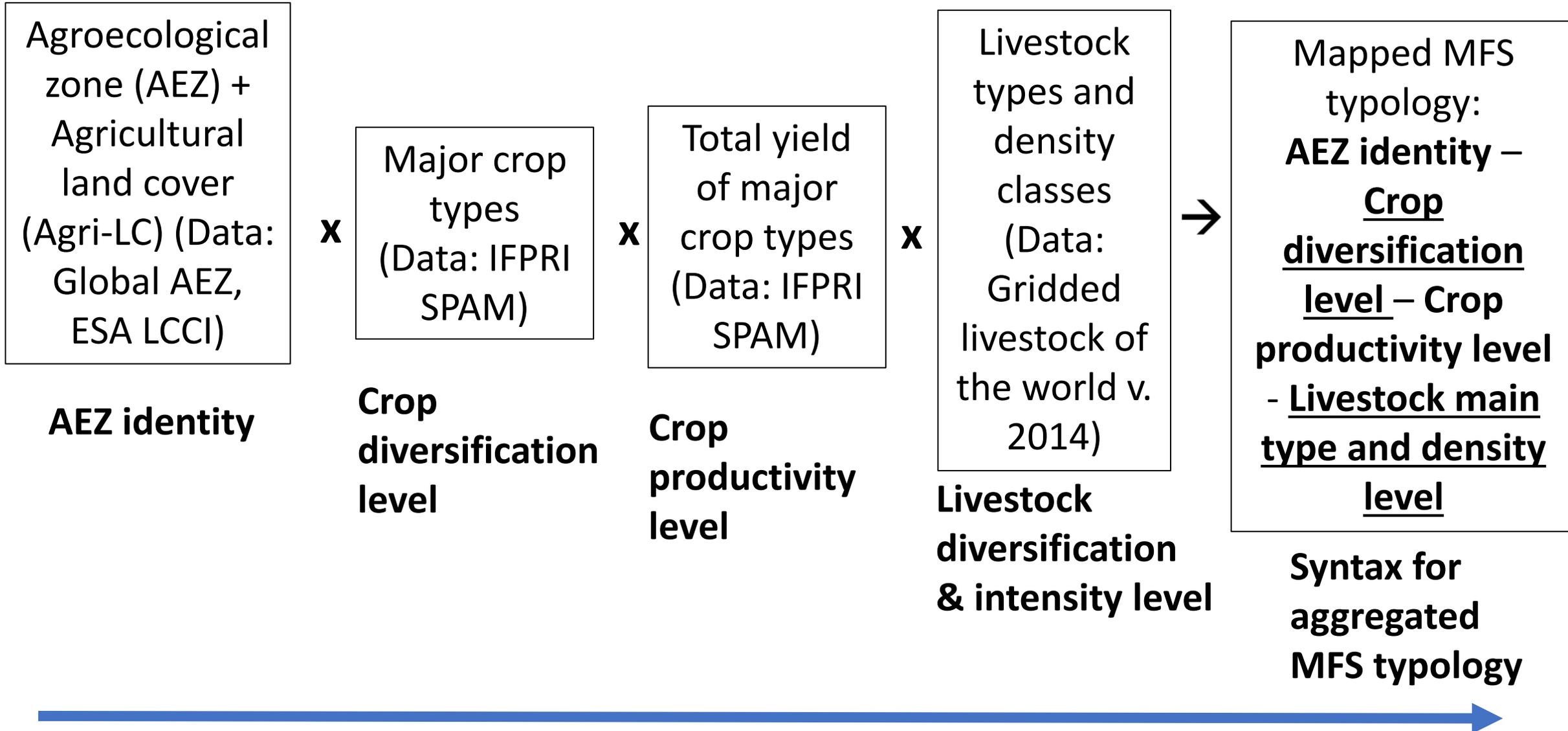
4

Mapping of MFS's prod. trend (incl. degradation hotspots)

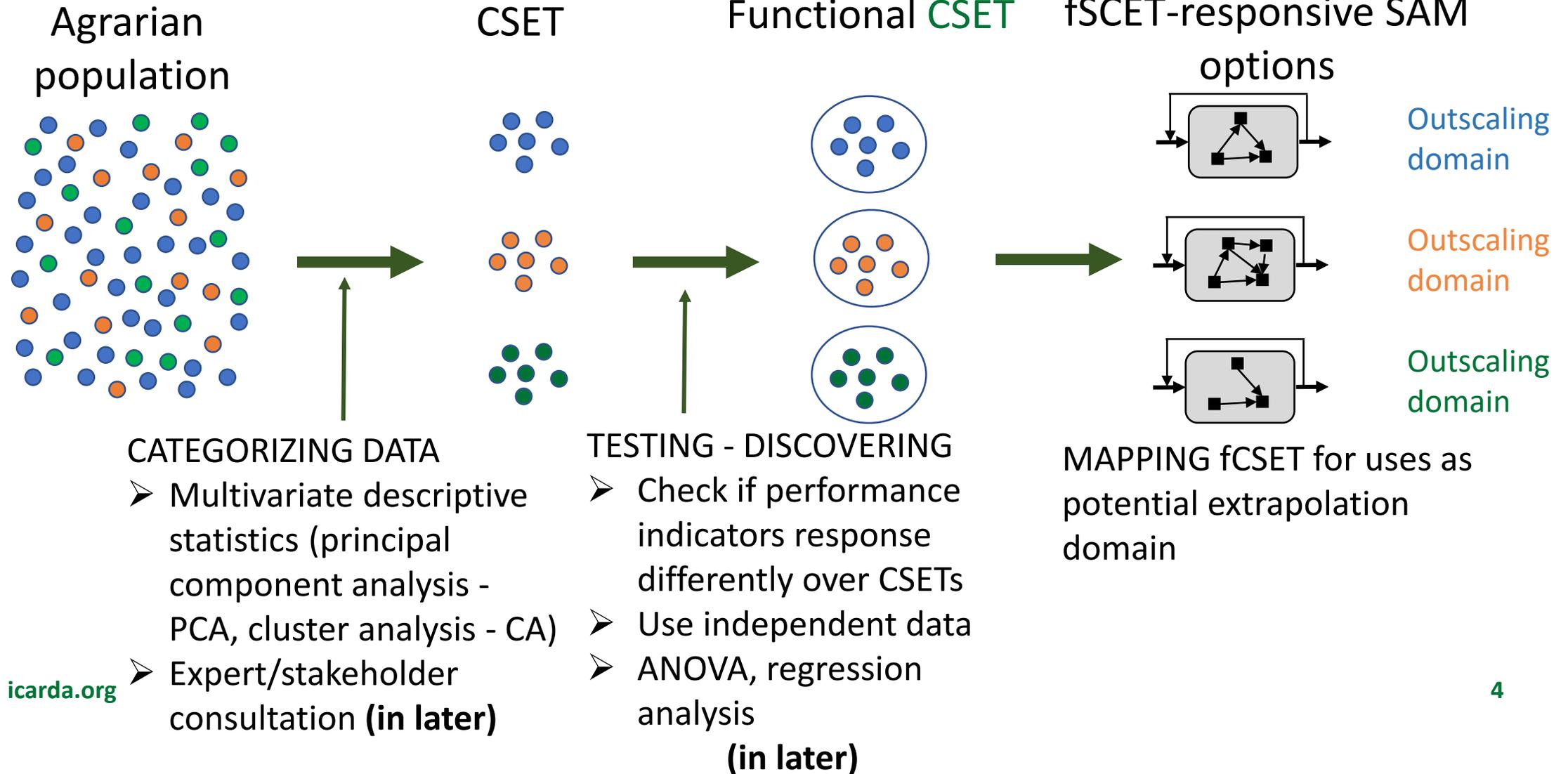
Prod. Trend of each [MFS x SEC] (statistics)

5

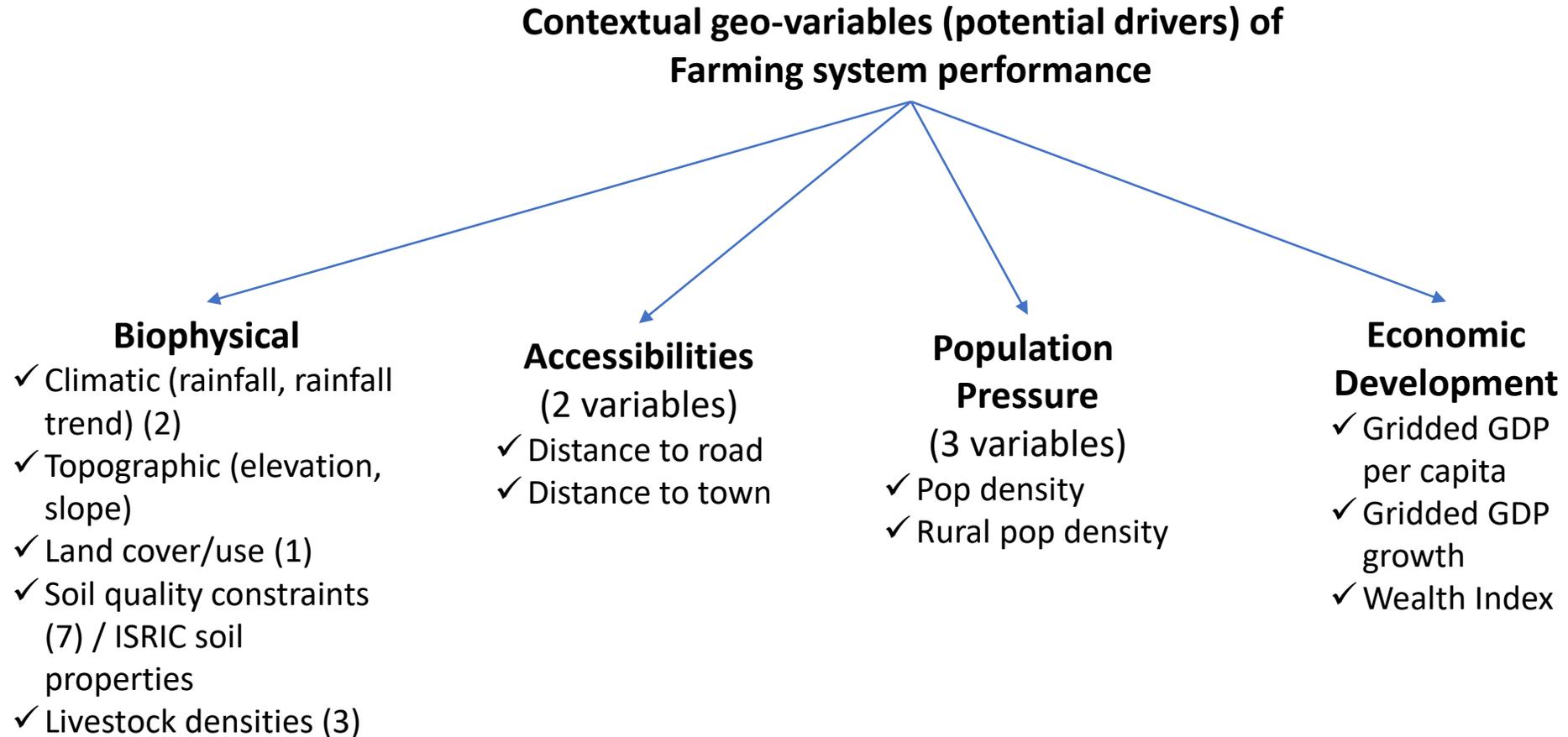
1 Conceptual factors and data for mapping MFS



2. Mapping SEC typologies



2. SEC Potential factors, yet based on geo-data availability



Note: The SEC potential factors should be parameters that reflect the steady states of system drivers, rather changes/trends. The later would be included in block 3 of the Conceptual Framework in Slide 2.

List of Kai's dataset

Data	Year	Resolution	Source
Population (All, Female, Male, by Age group, Youth)	2020	1km, 100m, 10m	Worldpop, Meta
Livestock (Cattle, Sheep, Goats, Chicken, Pigs, Buffalo, Horses)	2010	10km	FAO GLW3
Crops (42 crops)	2017	10km	IFPRI SPAM
Poverty, Global Wealth Index, Relative Wealth Index	2020	2 km	META, Worldbak
Market access (Nearness to small towns, intermediate, large towns)	2020	1 km	Cattaneo et al., 2020
Climate (Rainfall, temp)	1970-2000	1 km	Worldclim
Climate (Humidity, Rainfall, temp up to 2022)	-2022	9 km	ERA 5
Landuse (Landuse classes, croplands, forests, etc.)	2021	10 m	Esa LU
Slopes (Aptitude for mechanization, erosion risk) (To de used)		30 m	STRM, other sources
Terrain rugosity (Aptitude for mechanization, erosion risk) (To de used)		30m , 1km	
Soils (pH, OM, BD, Texture, nutrients) (To de used)		250	ISRIC

Structure of integrated, pixel-based database

Variables of geographic coordinates allow import every variables (input or output) back to GIS program

Each column is data of a GIS variable/layer

Each row is a list of multi-disciplinary data on a pixel

	X	Y	COUNTRY	COVER_LUSE	PREC_MEAN	PREC_TREND	HUMIDITY	ELEVATION	SLOPE_DEG	SQC_
2359865	3.1100	36.1439	4	3000	491	-2	.51	834	5.73	
2359866	3.1600	36.1439	4	3000	491	-1	.46	689	2.75	
2359867	3.1683	36.1439	4	3000	491	-1	.45	676	1.21	
2359868	3.1933	36.1439	4	3000	491	-1	.48	828	1.40	
2359869	3.2183	36.1439	4	3000	491	-1	.49	842	2.67	
2359870	3.2267	36.1439	4	3000	491	-1	.49	849	2.75	
2359871	3.2350	36.1439	4	3000	491	-1	.49	878	1.48	
2359872	3.2850	36.1439	4	3000	491	-1	.47	820	1.25	
2359873	3.3350	36.1439	4	3000	491	-1	.44	707	.37	
2359874	4.5850	36.1439	4	3000	519	0	.57	1413	11.71	

3. MFS Performance indicators, yet based on geo-data availability

Proxies of Farming land-use system's performance

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graph TD; A[Proxies of Farming land-use system's performance] --> B[Productivity]; A --> C[Productivity Gap];
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Productivity

Trend and pressure on human pop and livestock

- ✓ Periodic trend of NPP (continuous data)
- ✓ Trends.Earth productivity trend (3-level data)
- ✓ Reduction NPP/pop density
- ✓ Reduction NPP/livestock density
- ✓ Human appropriation of NPP = used NPP/natural NPP (old data: 2000)
- ✓ Crop yield trend? (Data?)

Productivity Gap

- ✓ NPP gap = actual NPP/potential NPP (old data: 2000)
- ✓ Yield gap (data?)