

The Socioecological Transition of an Atlantic European Agriculture: the Case Study of Galician Agriculture, 1752-2000

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Research Project

- SET in Galicia, an example of Atlantic agriculture
- **Social Metabolism:** theory and methods
 - Nutrient Flows
 - Energy Flows
- **2/3 case studies:** Ribadavia, Betanzos, A Baña, Chantada...?
 - Information required for every agroecosystem: land uses, land management and yields
- Pragmatic approach: **sustainability** perspective --> considering agronomic and environmental problems in the past and relating them with the present

Objectives

- To determine the functioning, structure and evolution of the selected agroecosystems under a biophysical standpoint along the studied period
- To establish the **energy and nutrient balances** for every agroecosystem in the different stages of their evolution
 - To describe the different ways in which soil **fertility** is replenished in the studied agroecosystems
- To determine the different **stages** in the evolution of the agroecosystems regarding the type of land management and to compare the results with the chronology established in other case studies
- To determine the degree of **sustainability** of the agroecosystems in every stage of their evolution
- To identify **organic management** techniques susceptible to be used nowadays in order to

Hypothesis

- **Main hypothesis:** the chronology of this transition process shows regional variations within Galicia and differs from the established in the Mediterranean case studies:

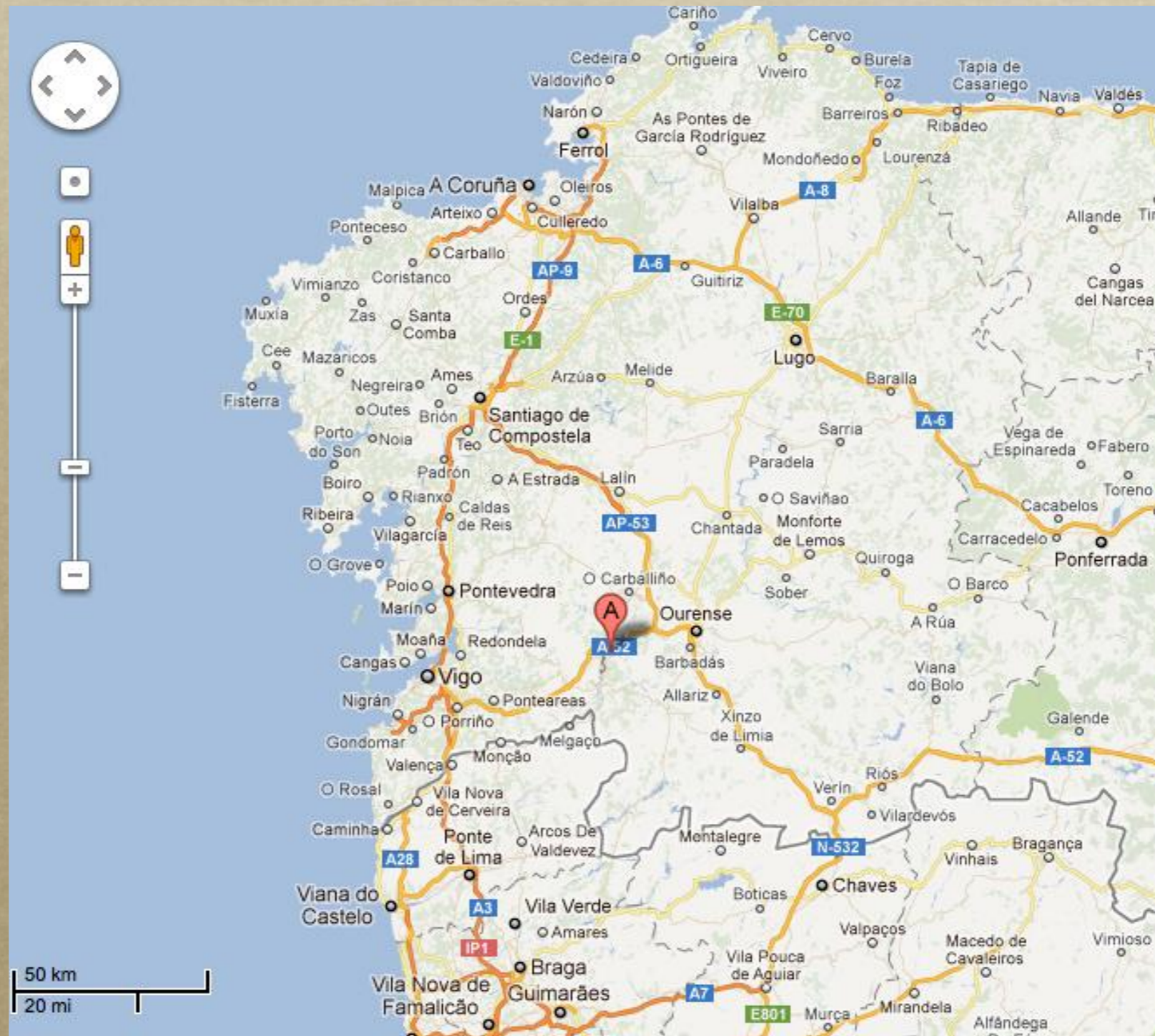
- a) Areas of **mixed farming** (policultivo): SET would start after the Mediterranean one because -despite the intensive farming- innovations in crop rotation led to an increase in yields without compromising soil fertility and thus avoiding to import nutrients or energy from outside the agroecosystem. This would be the case of Galicia, where mixed farming covers most of the territory.

- b) Areas of **agrarian specialization**: SET would start earlier than in areas of mixed farming and the Mediterranean due to the higher degree of intensification in agriculture, which would make it necessary to import nutrients and energy from outside the agroecosystem a lot before. Our case study of Ribadavia seems to confirm this hypothesis, although it is not representative of the rest of Galicia.

Sources

- Ensenada's Cadastre (1752)
- "Amillaramentos", "cartillas avaliatorias": tax assessments / land registries
- Martín de Garay's Cadastre (1820)
- Junta Consultiva Agronómica (Agrarian Consultative Committee)
- Juntas de Información Agrícola (Agrarian Information Committees)
- Agrarian literature (MARM, Congresses, divulgation, etc.)
- Image

Results: the Case Study of Ribadavia



Source: www.google.maps.com

Ribadavia



Ribadavia



Ribadavia

. Climatological characteristics of the region of Ribeiro

- . Temperate Mediterranean clima
- . Mean Annual Temperatures between 11-15°C, 5-8°C in the coldest month and between 18-22° in the warmest
- . Frost from 3 to 6 months
- . Mean Annual Precipitation: 700-1.000 mm
- . Dry season: 1-3 months
- . Non irrigated crops: cereal, beans and winter crops such as olive trees or vineyard, also favoured by orography

Rivadavia



Ribadavia

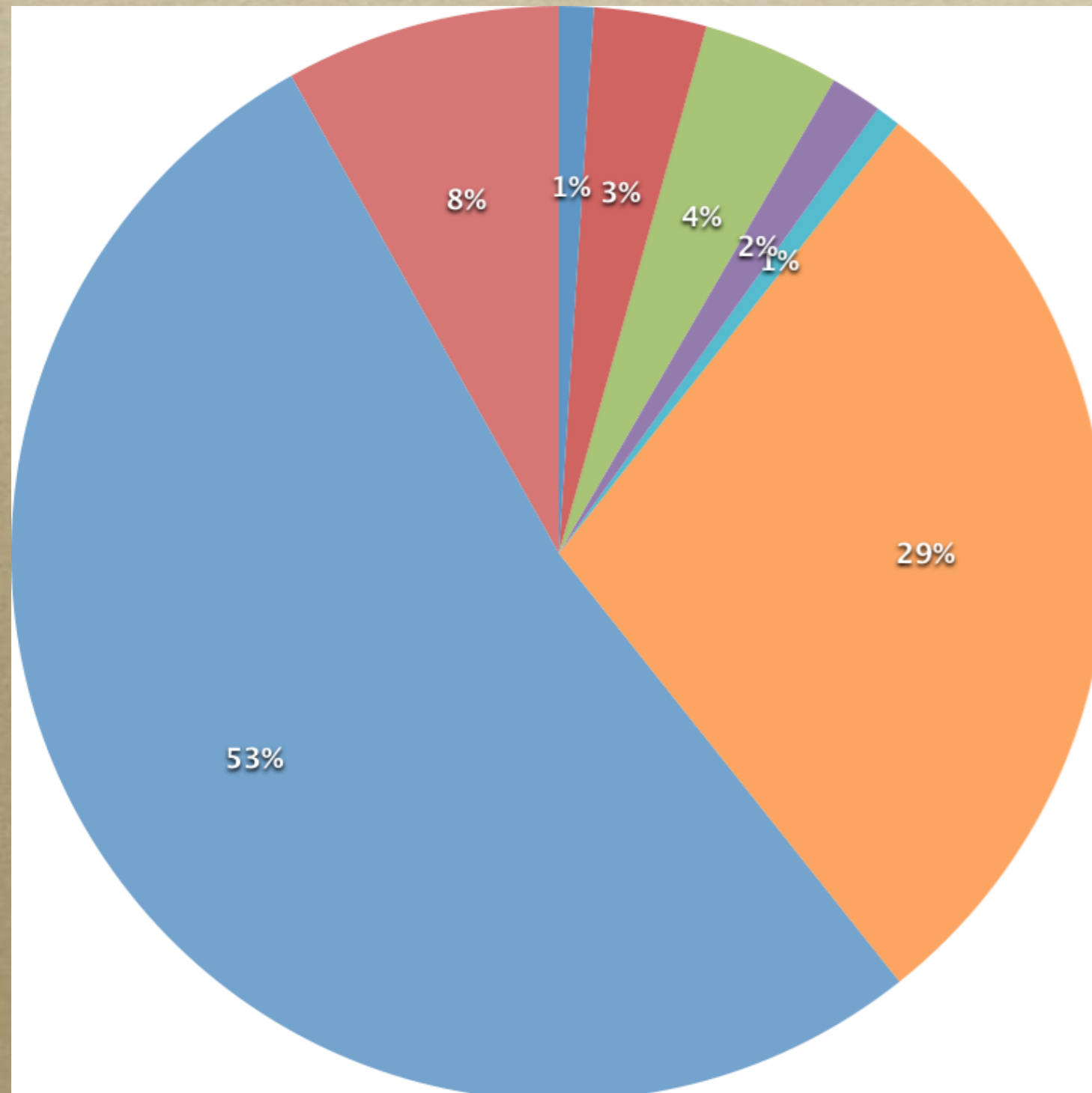
Demography, 1860 Census

	Inhabitants
Population	3619
Surface - km2	22,2
Density	163

Source: Population Census of 1860, Archivo Histórico Provincial de Ourense (AHPOu)

Ribadavia

Agrarian Surface Distribution, 1860



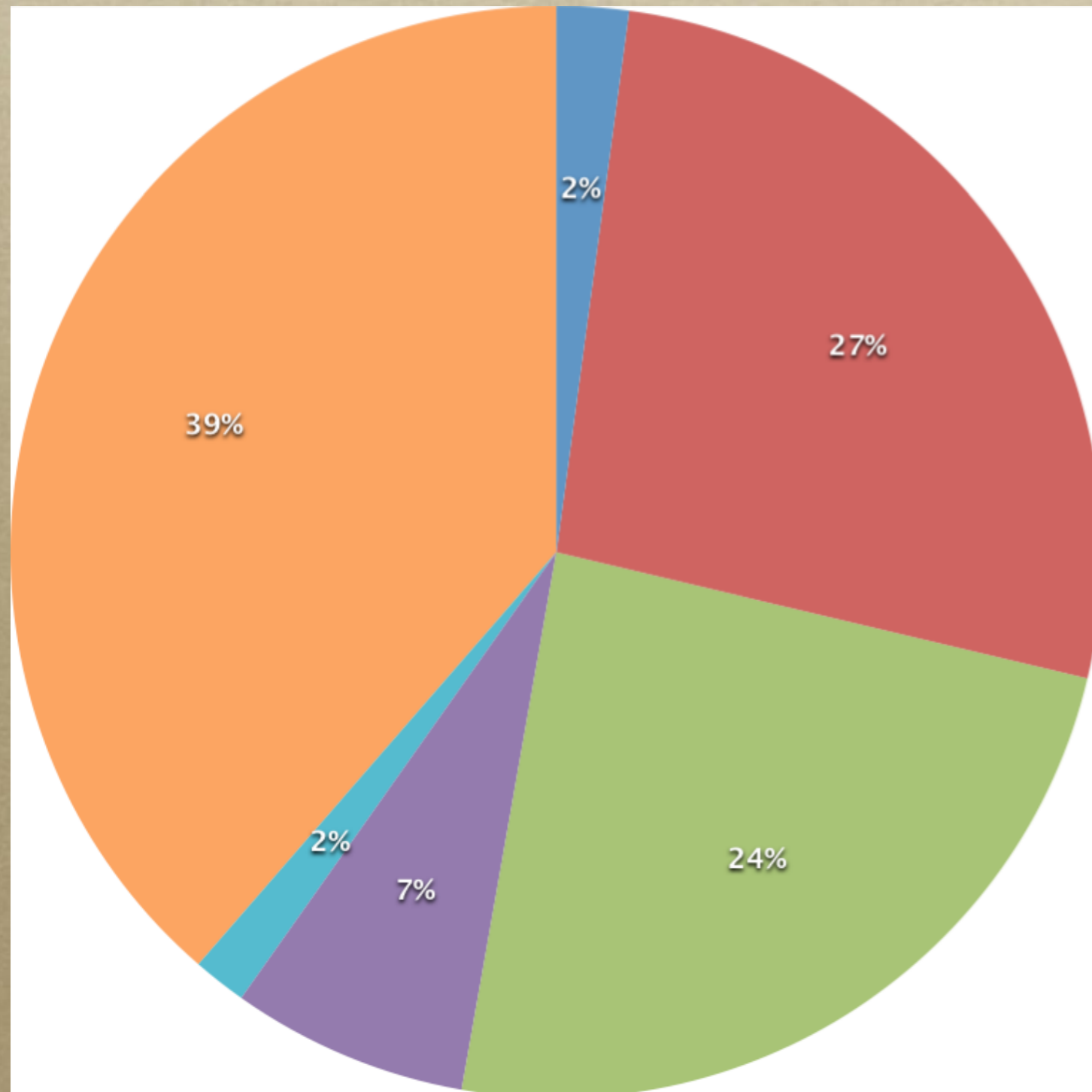
- Irrigated Vegetables
- Irrigated Maize
- Non-irrigated Maize
- Wheat
- Rye
- Vineyard
- Forest*
- Unproductive

*This is a low percentage. The usual in Galician agriculture is around 75% of the agrarian surface.

Source: land assessments and registries, 1860, AHPOu.

Ribadavia

Agrarian Production, 1860



- Vegetables
- Irrigated Maize
- Non-irrigated Maize
- Wheat
- Rye
- Vineyard

Source: land assessments and registries, 1860, AHPOu.

Ribadavia

Agrarian Production, 1860 (tons/ha)

	Fresh Matter	Dry Matter	N	P	K	Energy
Rotations	tons	tons	kg	kg	kg	Gj
Vegetables	9,6	1,9	58,9	31,2	51,3	23,9
Irrigated Maize	18,8	7,4	131,5	65,8	214,1	123,0
Dry Maize	14,0	5,5	97,6	49,1	160,1	91,7
Wheat	5,0	4,3	51,2	20,7	29,4	66,8
Rye	2,3	2,0	22,4	11,0	22,7	31,7
Vineyard	5,8	1,2	10,3	7,0	25,9	33,3
Total	7,7	2,4	32,6	17,5	56,3	47,9

Source: land assessments and registries, 1860, AHPOu.

Ribadavia

Livestock Distribution, 1865

	Livestock Units-500 kg	Number of Cattle Heads	Manure Production, Kg
Bovine	453	527	2.423.402
Equine	8	14	50.711
Mules	14	20	73.662
Donkeys	3	8	15.301
Ovine	20	276	16.552
Goats	4	55	3.284
Porcine	66	410	706.390
Total	569	1309	3.289.302

Source: Livestock Census, 1865.

Ribadavia

Relationship between manure availability and manure needs, 1860 (tons)

LU-500kg	453
Livestock Density (LU/km ²)	20,4
Manure Used	7.176
Manure Produced	3.289
Scrub Collected (esquilmo)	4.148
Manure + Scrub (dry matter)	7.437
% Self-sufficiency Option 1*	103,6
% Self-sufficiency Option 2**	45,8

Livestock Densities in Catalanian and Andalusian cases (Garrabou, González de Molina, 2010):

• Andalucía:

-Montefrío , 1856: 7,73 LU/km²

-Baena, 1858: 7,64 LU/km²

• Cataluña:

-Sentmenat, 1865: 7,25 LU/km²

Source: land assessments and registries, 1860, AHPOu.

*Option 1: apart from manure, scrub is also added to the vineyards directly as green manure.

**Option 2: only manure is applied to the land.

In any case, it is stated in our sources that both methods are combined which means that the degree of self-sufficiency could be around 70%.

Ribadavia

- **Some conclusions:**

- An **early wine specialization** and very **intensive farming** would imply an early SET according to our hypothesis. This means that the need to import nutrients must have appeared towards the end of the XIXth century.
- There must have been **imbalances** in the **fertilisation** replenishment system as well as **exportation of unsustainability** to nearby agroecosystems in early stages.
- Due to its high degree of specialization and to its climatic specificity, Ribadavia represents a **counter-example** of the Galician case as it is not representative of most of the region. It will be used as a counterpoint to the general trend.

Ribadavia

- *“O transporte do toxo ó Ribeiro. Nalgún tempo, nas tres ou catro primeiras décadas do século XX, e quizais antes, había familias que levaban carros de toxo a vender ó Ribeiro (a Leiro, Francelos e Castrelo), a unhas tres leguas. Os compradores enterrábano entre as videiras como abono. Hai unha anécdota curiosa en relación cos chíos musicais e monótonos que emitían estes carros ó paso por Ribadavia. É a seguinte: os veciños da fermosa vila - incapaces de deleitarse con ese son musical e enxebre, como nos ocorre ós que tivémo-la sorte de ser labregos na nosa infancia- denunciaron os ruídos ante a autoridade municipal, alegando que lles trastornaban o seu sosegado descanso habitual da mañá. Escoitábanlle, se cadra, unicamente o segundo significado do son (dos dous que ten), pois o chío do carro, agudo e intenso -ademais de ser un canto de amor ó labrego- era un queixume e un berro contra os contrastes económicos de vilegos e aldeáns, e unha expresión de protesta melancólica, profunda, contra as inxustizas dos gobernantes, que tiñan oprimidos ós fatigados campesiños con contribucións abusivas. [...] A protesta dos vilegos foi seguida de ameaza de sancións, consonte as Ordenanzas do seu Concello, polo que os carreiros víronse obrigados, antes de atravesala vila, a pararse na entrada e engraxárlle-los eixes ós carruaxes. Non protestaron contra o seu paso os veciños de Melón nin os de Quins, porque eles só lle escoitaban o primeiro matiz do canto do carro, sereno, musical e relaxante, o canto de amor”.*



- RODRÍGUEZ TRONCOSO, M., *Historia dunha aldea galega. Coas mans encol do lume*, Vigo, Ir Indo, 2004, pp. 165-166.