

[Supplementary material]

From the earliest farmers to the first urban centres: a socio-economic analysis of underground storage practices in north-eastern Iberia

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Glossary

Dispersed settlement: a model of settlement with a wide scattering of dwellings, little spatial complexity, and an expansive use of the space. It is defined as having a ‘loose’ organisation in which each productive unit has a degree of autonomy (López 2000; Francès 2005).

Farming system: we rely upon Bogaard's (2005) to definition of two main agricultural models: intensive and extensive farming. Intensive farming refers to permanent fields or plots with a high investment of labour per unit of land, applying techniques including crop rotation or fertilisation with animal manure. The manpower invested results in a greater yield from the fields, i.e. a production that generally covers the needs of a domestic unit. It is a small-scale operation that depends on the labour capacity of the domestic unit, and a relatively small number of animals that remain near the settlement. The crop yields forage for the livestock which, in turn, supplies manure for the fields and grazing regulates the growth of crops. Extensive farming, by contrast, involves the cultivation of larger fields with a lower input of labour per unit of land, usually connected to the use of draught animals. This type of agriculture is linked to livestock being managed in large flocks that graze over extensive surfaces and is usually intentionally separated from the agricultural system, in opposition to intensive farming models.

Household and domestic units are units of economic and social cooperation. They refer to a group of people that do not necessarily live under the same roof (dwelling unit), though it often does. The group cooperates and shares a number of activities on a daily basis, including one or more of the following: production, consumption, pooling of resources, distribution, transmission, co-residence, reproduction and shared ownership (Wilk & Rathje 1982;

Ashmore & Wilk 1988). A nuclear type is a group of five to seven economically autonomous individuals; an extensive type is a group whose membership exceeds that of a nuclear unit (Nimkoff & Middleton 1960; Kramer 1982; Alonso & Pérez 2014).

Nucleated settlement: a settlement that is concentrated and consists of true agglomerations comprising several nuclei of stone or earth dwellings. This settlement type implies lasting and permanent occupation (Delibes de Castro & Romero 1992).

Silo fields: a group of underground storage pits in an area separated from other features of the settlement. These types of clusters appear in the Early Iron Age. The available agricultural data indicate that they represent mainly the storage of surplus products since their volume exceeds the needs for immediate consumption. This definition also applies to groups of silos that existed before the Early Iron Age, found in similar large clusters or concentrations (Sanmartí 2015).

Surplus: excess production of a household, beyond its annual immediate needs for subsistence (Testart 1982), which can be due to favourable weather, higher labour capacity, or efficient agricultural technology. This production may be stored as a risk-reducing strategy (Hayden 2009) against bad harvests in the future, for exchange purposes as a kind of ‘social storage’ (Halstead 1989), for immediate sharing in the context of feasts (Hayden 2009), or for trading or speculative purposes.

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Table S1. Frequency of morphological types by period. Bold values indicate the most frequent type per period, italics indicate the maximum value of each type.

Morphology	Chronological period									TOTAL
	Early Neol.	Middle Neol.	Late Neol.-Chalcol.	Early Bronze Age	Late Bronze Age	Early Iron Age	Early Iberian Period	Middle Iberian Period	Late Iberian Period	
Bell-shaped	12	80	33	151	240	<i>269</i>	42	64	97	988
Cylindrical	21	43	48	<i>159</i>	35	67	14	73	95	555
Spherical	4	10	14	48	7	15	7	120	<i>203</i>	428
Ellipsoidal	.	.	.	<i>49</i>	.	1	6	32	35	123
Hemispheric	6	14	5	9	9	9	3	23	38	116
Divergent bell-shaped	3	4	1	11	1	1	2	27	24	74
TOTAL	46	151	101	427	292	362	74	339	492	

Table S2. Relationship between different types of agriculture and types of crops, domestic unit, silo morphology, average and maximum capacity (for references see Alonso 1999; Antolín 2016; Prats 2017).

Type of agriculture	Diversity/type of crops	Type of domestic unit	Dominant morphology	Average capacity (l)	Maximum capacity (l)
Subsistence agriculture (intensive)	Diverse/winter ↑	Small	Cylindrical	<1500	>2000
Surplus agriculture (extensive)	Diverse/winter ↓	Small	Bell-shaped	1500–2500	>4000
Surplus agriculture (extensive)	Diverse/winter + spring ↓	Large	Ellipsoidal	>2500	>20 000