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Plant commodification in Northern Mesopotamia: evidence from the Early Bronze Age site of Kani Shaie, Iraqi Kurdistan

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One of the milestones in the trajectory of economic and social change that spurred increasing societal complexity, and urbanization was the commodification of natural resources, such as plants, animals, and their derived products. In this paper, I examine new evidence of agricultural surplus in a small-scale Early Bronze Age (dated approximately to 2900 to 2300 BCE) community at Kani Shaie in the Bazyan Valley, Iraqi Kurdistan, situating it within the broader context of early commodification and the redistribution of staple foodstuffs. Excavations at an architectural complex dated to the early phase of the EBA suggest its function as a food storage and redistribution center, supported by the presence of administrative remains (sealings), restricted access to the space, and carefully stored agricultural crops, likely intended as the basis for meals. Considering the strategic location of Kani Shaie at a junction between the mountainous Zagros region and the Mesopotamian lowlands, the site's role as a redistribution center can be analyzed within the context of mobility networks linking lowland plains and highland valleys. This contributes to the broader discussion on the role of small, remote administrative centers in the commodification of plant resources, both preceding and existing outside major centers of urbanization.

KEYWORDS

archaeobotany, storage, commodification, Early Bronze Age, Northern Mesopotamia

1 Introduction

Decades of intensive research on past social and settlement developments have demonstrated that the emergence of centrally administered exchange and trade—well-documented in the urban hubs of the Bronze Age in Southwest Asia—was a consequence of profound transformations in the social and economic organization of Neolithic and Chalcolithic communities (e.g. Childe, 1950; Jacobs, 2000). Crop cultivation was a critical factor in these changes. The establishment of cereal-based economies at the end of the Neolithic influenced landscapes (e.g., arable fields, deforestation, soil erosion, and arable soil formation), ecology (e.g., coevolution of domesticated plants and animals, weeds, and commensals), and society itself (Ellis, 2015; Fuller and Stevens, 2017; Zeder, 2017).

The ability to produce food through farming, as opposed to a reliance on hunting and gathering, enabled a sedentary lifestyle that facilitated food storage. This practice protected food from environmental conditions, allowed for the accumulation of foodstuffs over extended periods, and reduced dependence on seasonal availability (Hastorf and Foxhall, 2017). The gradual development of agricultural technologies, such as extensification

of labor practices,[1] ultimately led to food surpluses—quantities of food exceeding the immediate survival needs of producer communities. These surpluses allowed for culturally and socially conditioned behaviors such as reciprocity and gift-giving (Hastorf and Foxhall, 2017; Joka et al., 2024a). Stable food supplies supported population growth and enabled the emergence of non-agricultural specializations (e.g. ceramic production, textile production but also various food producers aside of farmers, e.g. bakers) (Wengrow, 2008; Hald and Charles, 2008) and the broader distribution of goods, culminating in the commodification of agricultural crops and food resources (Scott, 2017). This process was instrumental in the development of complex societies and urbanization.

One significant driver of these transformations was the increasing importance of delayed-return cultivation practices, which emphasized the long-term benefits of agricultural investment (e.g. Miller, 2000; Boivin et al., 2016; Morris, 2010).

This study examines new evidence of crop surplus production, storage, and exchange in a small, non-urban community. It contextualizes these findings within the broader processes of early commodification and redistribution of staples and explores the long-term consequences for social complexity. As widely recognized (e.g. Sherratt, 1999; Benati, 2015; Wengrow, 2008; Bevan, 2010; McMahon, 2020), the commodification of plants gained momentum during the Early Bronze Age. However, identifying archaeological indicators of this process remains challenging. Archaeobotanical deposits have typically been studied in the context of settlement economies or diets and, more recently, to understand cultivation techniques such as water management or manuring (e.g. Bogaard et al., 2013; Wallace et al., 2015).

Archaeobotanical data can, however, be analyzed through a multidimensional lens to reflect social changes and the economic adaptations of settlements over time. Evidence from Kani Shaie (Bazyan Valley, Iraqi Kurdistan) suggests that plants were transformed into commodities, stored and redistributed from early redistribution centers. In a broader perspective, this evidence contributes to ongoing debates (Graeber and Wengrow, 2021; McMahon, 2020; Morris, 2010, 2005; Algaze, 2008) regarding the role of small administrative centers in shaping the delayed returns of cultivation practices.

2 Commodification of plants

Hirth (2020) defines the economy as a "socially mediated form of material provisioning and interaction involving the production and allocation of resources among alternative ends." This definition implies that the economy reflects social behaviors related to the material aspects of everyday life. These interactions are shaped by environmental resources and their control by individuals or groups. The entire mechanism is influenced by the dynamically evolving cultural context, where the value of a resource (henceforth also referred to as a product) and the controlling party is often associated with political, religious, or other social activities (Hirth, 2020).

The process of attributing value to such resources—such as agricultural crops processed for storage or exchange, raw materials crafted into artifacts, environmental resources (e.g., water, stone, wood), or real estate (e.g., coastlines, arable fields, buildings)—is called commodification—production of commodities, where the resource is being marked as a commodity, and then exchanged for an equivalent value to a counterpart. Whether an item becomes a commodity depends on social context and can vary between individuals and groups (Kopytoff, 1986). As this process unfolded gradually, understanding the commodification of various goods and resources requires a diachronic perspective. Archaeologists must identify the origins of these processes and define the geographical and cultural circumstances that facilitated them.

Regardless of geographical locales, subsistence items—resources and products essential for survival and safety, such as staple foods and secondary products derived from plants and animals—inevitably became commodities, either locally or through long-distance exchange.[2] A second category of commodities includes prestige goods, which signify the social importance of individuals, groups, or locations and follow different dynamics.[3]

In the paper *Different Types of Egalitarian Societies and the Development of Inequality in Early Mesopotamia* (2007), Marcella Frangipane argues that the commodification of foodstuffs, land, and livestock in Northern Mesopotamia began to emerge during the sixth millennium BCE. This was in the context of a mixed economy that combined agricultural and livestock exploitation. Agricultural development worked alongside transhumance practices, leading to specialized use of landscapes for animal or plant resources. This created complementarity and interdependence within growing populations: one part of the community engaged in sedentary farming while the other practiced seasonal pastoralism. Both groups required access to a full range of products, necessitating an exchange system to ensure subsistence items were available year-round. This dynamic prompted the emergence of storage and redistribution facilities.

Although it is difficult to pinpoint when the commodification of staple crops first occurred, the phenomenon can be traced through changes in material culture, including architecture and artifacts. Evidence from as early as the Neolithic—such as storage facilities at Anatolian Çatalhöyük and Greek Toumba Kremast (Urem-Kotsou, 2017; Bogaard et al., 2009)—indicates that systems of food sharing predated commodification. Collective storage and management of staple goods were key features of seventh-millennium BCE societies in Southwest Asia, as seen in the social organization of Hassuna

1 It is generally agreed that in the area of Northern Mesopotamia the increased crops production was achieved through agricultural extensification: cultivation of larger areas of land, while entailing lower manure inputs per unit area (Styring et al., 2017).

2 For example, cotton and yams in Maya civilization (Chase et al., 2008; Smith, 2011), linen and sandstone in Egypt (Shaw, 2002), and greenstone and spinifex resin in pre-colonial Australia (Pitman and Wallis, 2012; Smith and Burke, 2007) exemplify a global trend of resource commodification.

3 Prestige goods must stand apart from everyday items in material, craftsmanship, function, or all these aspects, moreover, their form and significance are shaped not only by material availability but also by cultural contexts (Frangipane, 2007).

and Umm Dabaghiyah-Tell Sotto cultures in the Jazeera region (Frangipane, 2007).

An advanced redistributive system is exemplified by the "Burnt Village" at Tell Sabi Abyad (Akkermans and Schwartz, 2004), where hundreds of *cretulae* bearing impressions from over 65 different seals were discovered among charred plant remains in large communal storage buildings (Akkermans and Duistermaat, 1996). As Late Neolithic societies, including those in the Northern Mesopotamia, are generally viewed as egalitarian (Frangipane, 2007), the system at Tell Sabi Abyad likely functioned as one of egalitarian redistribution. Goods stored there remained within the community, intended for communal use rather than profit accumulation (Graeber and Wengrow, 2021).

Over the ~4,000 years between these Late Neolithic egalitarian economies and the emergence of the first cities, both cereals (wheat, barley, pulses) and newer perennial crops (olives, figs, grapes) were transformed from subsistence staples into commodities transported from producers to consumers (Sherratt, 1999, 2011; Fuller and Stevens, 2019). Value was added by accumulating surplus crops and through labor-intensive processing, such as producing oil from olives, wine from grapes, or dried fruit from various plants (Joka et al., 2024b; Fuller and Stevens, 2019; Sherratt, 2011, 1999). These activities were geared toward redistribution, but this time with the aim of profit rather than mere subsistence (Sherratt, 1999).

The trajectory of these expansive changes in the perception of agricultural crops remains poorly understood. However, the commodification of crops had profound consequences, arguably serving as a catalyst for urbanization. These include the development of land ownership rights and the emergence of social elites, both linked to increasing stratification (Fuller and Stevens, 2019). Given the far-reaching implications of this process, recognizing the emergence of crop commodification is crucial for advancing scholarship, extending well beyond the specific case study discussed in this paper.

3 The site of Kani Shaie

Kani Shaie is an archaeological site situated in Iraqi Kurdistan, within the rural Bazyan Valley, positioned between the cities of Kirkuk to the south-west and Sulaymaniyah to the north-east. The settlement covers ~3 ha and comprises a primary mound about 70 m in diameter at its base, rising roughly 14 m above the valley floor. Extending northwards is a gently sloping "lower town," where evidence of prolonged occupation has also been identified.

Strategically located, Kani Shaie occupies a pivotal position within the landscape. It lies in the western foothills of the Zagros Mountains, offering facilitated access to the Transtigridian plains to the north-west and routes through mountainous terrain leading north and east toward the Urmieh Basin and Iranian Plateau (Figure 1). Within the Bazyan Valley—a north-west to south-east corridor bounded by the Qaradagh and Baranand hills—Kani Shaie commands a central place. The valley is accessed via the Bazyan Pass to the north and the Bassara Pass to the south, receiving an annual rainfall of 500–750 mm. Springs fed by snowmelt and seasonal precipitation create excellent water drainage, supporting pockets of highly fertile land interspersed with the valley's limestone rock formations. Historical accounts by early European travelers describe the Bazyan Valley as abundant with orchards, vineyards cultivating grapes, barley crops, and cotton plantations (Rich, 1836).

In a broader context, Kani Shaie's location facilitated connectivity and exchange, linking the resource-rich zones of highland and lowland Mesopotamia. Material evidence recovered from five seasons of excavation (2013–2023) reflects its strategic position as a nexus for trade and cultural exchange between the mountainous Zagros region and Mesopotamian urban centers during the early phases of state development (Tomé et al., 2016).

Excavations and stratigraphic investigations at Kani Shaie have uncovered over 4 m of Early Bronze Age (EBA) deposits, dating from ~2900 to 2300 BCE. In recent years, research has focused on an expanded 200 m² excavation area (Area A), aiming to provide extensive horizontal exposure of EBA architectural remains and clearer contextual information. This work has revealed a dynamic settlement during the first half of the third millennium BCE, with at least eight phases of occupation.

These dense EBA deposits accumulated rapidly as thin occupational layers built directly atop one another, occasionally interrupted by periods of abandonment, settlement reorganization, and squatter occupations. The upper 2 m of the mound's EBA levels were heavily damaged by intrusive pits associated with medieval campsites and Ottoman-era graves (Ahmad and Renette, 2023). However, the earlier phases of the EBA, better preserved and supported by radiocarbon dating (Ahmad and Renette, 2023), align closely with contemporary Ninevite 5 type-sites dated to the early third millennium BCE in Northern Mesopotamia.

The architectural features of Kani Shaie are consistent with those found at Ninevite 5 sites in the Tigridian/Eski Mosul Dam region (Roaf, 2011; Lawecka, 2019). Examples include Tell Mohammed Arab (Roaf, 1984) and Tell Karrana 3 (Wilhelm and Zaccagnini, 1993), where mudbrick superstructures were constructed atop stone foundations to define small-scale domestic spaces. At Kani Shaie, evidence for grain storage and administrative activities parallels key Ninevite 5 sites, with the discovery of a large building featuring the distinctive "grill plan" design commonly associated with such functions.

Kani Shaie's strategic position and material evidence underscore its importance as a focal point for exchange and administration, bridging highland and lowland zones during the transformative Early Bronze Age.

4 Materials and methods

Excavations of the Early Bronze Age (EBA) levels at Kani Shaie were focused on Area A (Figure 2) atop the main mound. These levels are subdivided into eight occupational phases, distinguished by variations in architectural construction, layout, and material culture, particularly ceramic typology. The EBA remains are relatively poorly preserved, with deposits rarely exceeding 10 cm in thickness. These deposits often cut into earlier levels and are themselves cut by later activity. Chronological positioning[4] is established through material culture changes, and architectural

4 A detailed radiocarbon dating programme is in development to determine lengths of occupation and hiatuses.

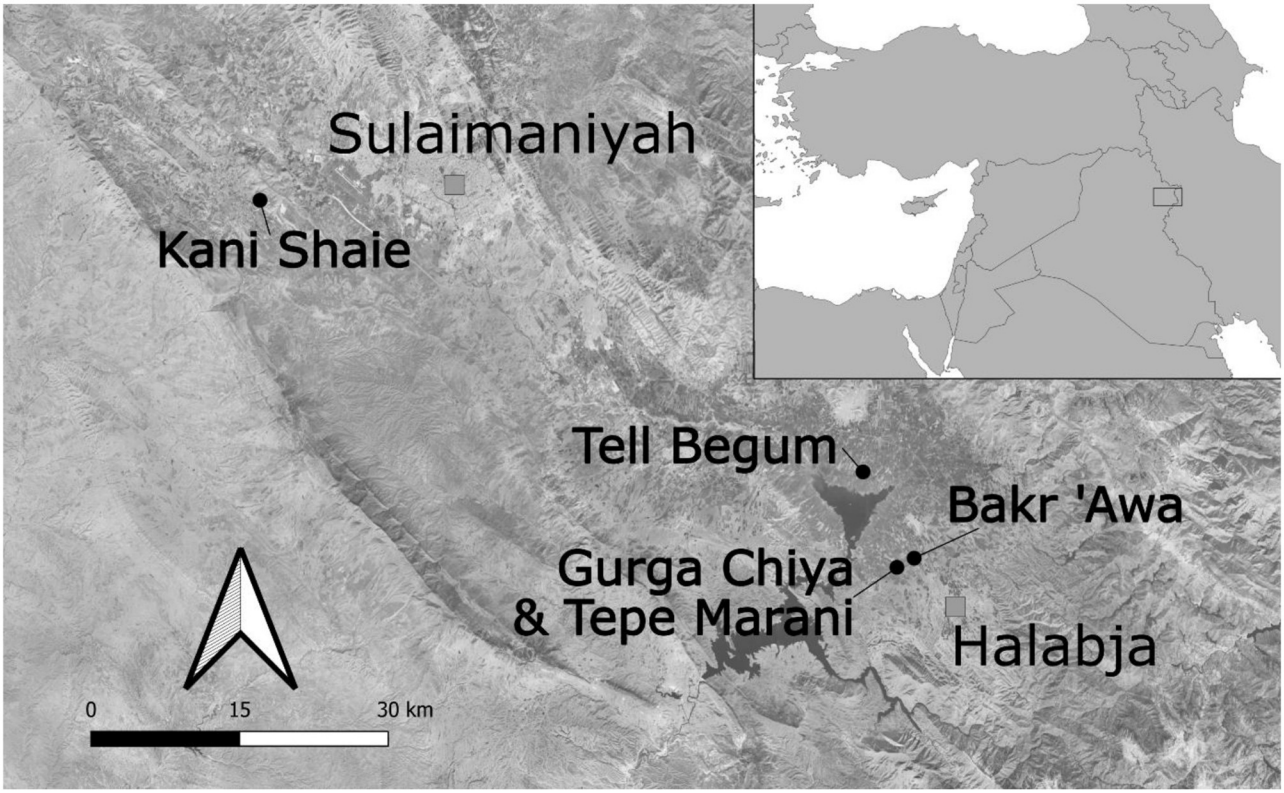

FIGURE 1
Map of the region with the location of Kani Shaie (by J. Hordecki). More detailed map is available in Supplementary Data File.

reconstructions, such as alterations in mudbrick walls. To maintain stratigraphic control, Area A was divided by a central north-south balk, while *ad hoc* sections were retained to examine relationships between contexts. This study focuses on data from a significant context within the area, comprising a grill structure designated as Room A, interpreted as a crop storage facility, and an adjoining rectangular space, Room B, which likely served as a distribution area for stored foodstuffs.

The storage facility (Room A) consisted of a grill structure constructed with reeds and mud plaster atop a foundation of parallel rows of single mudbricks. Similar grill structures have been documented at other EBA sites in Northern Mesopotamia, such as Tell al Raqa'i and Tell 'Atij, (Schwartz, 2015; Paulette, 2015; Mardas, 2019). Artifacts retrieved from the storage area included a large number of pottery sherds—many from medium-sized storage jars—alongside burnt clay sealings and significant quantities of archaeobotanical material, predominantly emmer wheat seeds (Farahani, 2018).

A total of 28 clay sealings were recovered from the collapsed remains of the storage facility. The location of clay sealings close to the entrance of the storage facility and sealings imprints suggests that access to the area was restricted (sealed). Access to Room A was likely controlled through the adjoining Room B, which appears to have functioned as a distribution area for the stored goods. Sealings from the storage room entrance were discarded in a narrow corridor (Corridor 1) (Figure 2) connecting the two spaces. This distribution of sealings may indicate that the storage facility was periodically accessed, with seals broken and discarded each time entry was granted. However to determine the purpose of these sealings more precisely, the spatial analysis must be supplemented with a functional analysis of sealings imprints.

In the adjoining Room B, 34 clay sealings were recovered from the burnt collapse of the space and its immediate vicinity. A cluster of 19 sealings—or 26 when including more dispersed examples—was located in the northern quadrant of the room. This concentration was associated with dense deposits of charred botanical remains and numerous painted pottery vessels, most of which were small cups likely used for individual consumption of food or beverages.

At least 17 of these sealings had been attached to mobile containers such as bags and jars. Nearly all were broken, suggesting that these containers were opened within the room itself. A smaller concentration of charred botanical remains was identified near the southern doorway, alongside a group of three or four sealings and a collection of broken jars with painted decoration.

Preliminary analysis of the sealings, including their functions, material imprints (mainly textile and leather), and seal impression imagery, is ongoing, however clear patterns are emerging. The evidence suggests that foodstuffs, mainly botanical, could be brought into Room B—likely from the northern storage facility (Room A)—possibly for further distribution. The architectural layout and associated artifacts indicate that these spaces were not used for domestic purposes but were instead restricted areas dedicated to the storage and distribution of food.

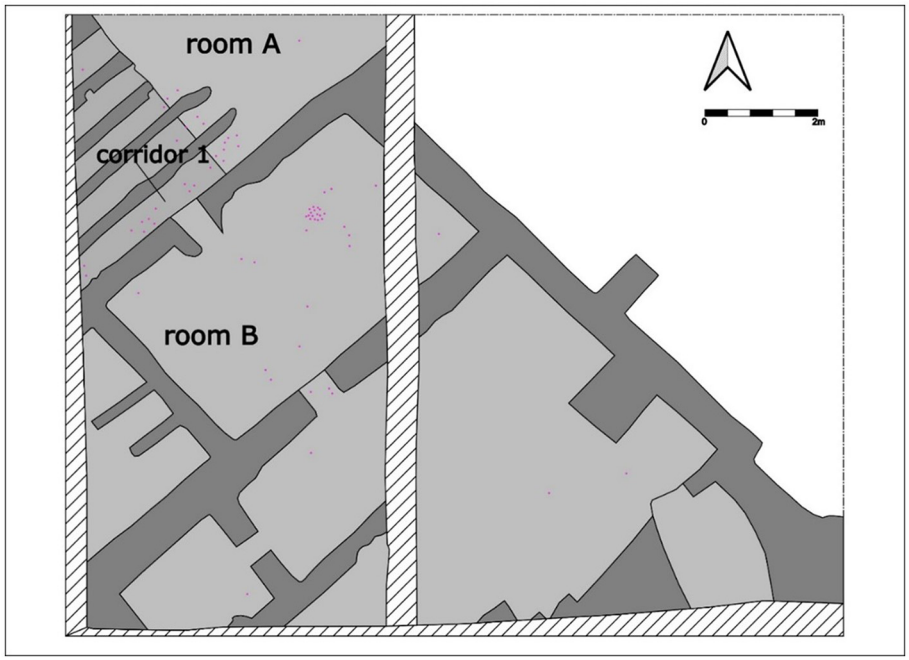

FIGURE 2
A plan of Area A, with the facilities addressed in the text body: room A: grill structure (storage), room B: adjoined rectangular room (redistribution facility), corridor 1: narrow corridor between the rooms. Pink dots: sealings (orthophoto for plan provided Kani Shaie Archaeological Project).

4.1 Environmental sampling strategy

The sampling strategy involved collecting a 2.5-L core soil sample from each excavated context, for contexts with substantial accumulations of archaeobotanical remains, such as those discussed here, a combined method of handpicking and soil sampling was employed. All samples were processed using a flotation machine, with the system adapted to recycle water. Light residues (flots) were collected using a mesh with an aperture of ~250 μm, while heavy residues were retained in a mesh with a 1 mm aperture. The collected material was air-dried in the shade prior to sorting. Heavy residue samples were manually sorted to recover both organic and inorganic archaeological material. For each light fraction, the total volume (mL) was recorded and then the material was sieved through 2 mm, 1 mm and 500 μm sieves to facilitate the sorting and identification process. The flot volume (ml) and weight (g) were recorded. Macrobotanical remains from the flots were examined using a low-powered binocular microscope (×10–60 magnification). Identification followed standard archaeobotanical procedures, relying on modern seed reference collections housed at the UCL Institute of Archaeology. Differentiation criteria for botanical families, genera, and species were informed by seed atlases (e.g. Anderberg, 1994; Cappers and Bekker, 2006; Cappers et al., 2012), archaeobotanical publications (e.g. Jacomet and Greig, 2006; Jones, 2005; Nesbitt, 2006), open-access online repositories such as the Digital Plant Atlas (https://www.plantatlas.eu/), and personal observations. Plant nomenclature generally adhered to the *Flora of Iraq* (Guest et al., 1966).

The archaeobotanical material analyzed for this research originates from contexts interpreted as part of a foodstuff redistribution area adjacent to the grilled structure,[5] which also featured administrative instruments such as seals. Fourteen samples were collected from this area via flotation, supplemented by hand-picked plant remains recovered during excavation. These samples yielded a total of 1.204 seeds and seed fragments, including wild taxa (the dataset is provided in Supplementary Data File).

5 Results

The samples from rooms A and B at Kani Shaie contained approximately equal proportions of identifiable seeds and indeterminate/fragmentary material, with a ratio of 49% to 51%. In total, five cultivated species—barley, emmer wheat, lentil, chickpea, and pea—were identified, alongside one edible arable weed (Galium sp.; Table 1). The assemblage demonstrates high homogeneity, dominated by staple crops, with barley (*Hordeum vulgare sensu lato*) being the most frequently identified taxon. Indeterminate cereal fragments were the most ubiquitous finds, while crop-processing waste, such as chaff, was almost entirely absent except for a single wheat glume base (*Triticum cf. dicoccum*). Arable weeds were also notably rare.

The archaeobotanical data reflect a regional pattern of agricultural production centered on domestic crops, particularly

5 Archaeobotanical material from grill storage structure reported in detail by Alan Farahani (Farahani in prep.) also has been presented in the ICAANE conference (Farahani, 2018). The archaeobotanical material from this storage structure was not a subject to archaeobotanical analysis conducted for the purpose of this paper, as it will be published as a separate volume.

TABLE 1 Summary of the frequency and abundance of major plant categories across the analyzed assemblage.

Presence	Ubiquity	Sum*
Barley	15.3	180
Emmer	0.9	11
Cereal indeterminate	47.5	560
*Total cereal**	63.6	751
Chickpea	4.9	58
Pea	4.0	47
Lentil	12.9	152
Legumes indeterminate	14.6	172
*Total legumes**	36.4	429

*Including indeterminate categories.

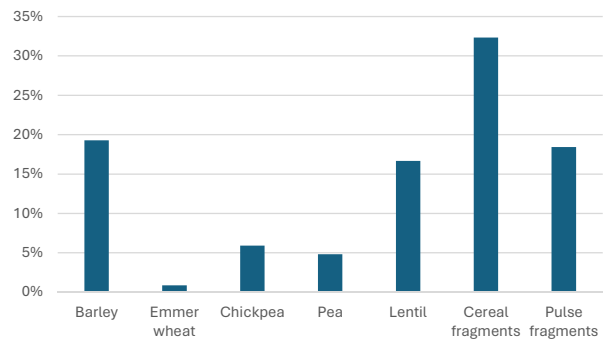

FIGURE 3
Presence of food crops recorded on site by type.

barley (*Hordeum vulgare sensu lato*), emmer wheat (*Triticum dicoccum*), and legumes such as lentils (*Lens culinaris*), peas (*Pisum sativum*), and chickpeas (*Cicer arietinum*) (Figures 3, 4). This pattern is consistent with findings from contemporaneous sites in Iraqi Kurdistan and more broadly across Southwest Asia (e.g., Late Chalcolithic Gurga Chiya and Tel Sureza; Early Bronze Age Tell Brak, Chagar Bazar, and Tell Mozan) (Proctor et al., 2022; Carter and Wengrow, 2020; Diffey et al., 2024; Riehl, 2010). The absence of fruits, nuts, and other edible plants suggests the storage facility was intended to house specific staple crops. Notably, archaeobotanical evidence indicates a division of function between the grill-structured storage (containing predominantly emmer wheat) and the adjoining redistribution facility (dominated by barley, with minimal emmer wheat). This distinction could reflect seasonality in the harvest, or—as commonly suggested—because barley was a major crop grown in Northern Mesopotamia from the fourth millennium onwards[6] (Charles et al., 2010; Schwartz, 2015). The minimal presence of chaff (e.g., barley rachis) and arable weed seeds suggests that threshing and winnowing were conducted off-site, prior to storage. This points to a systematic cleaning process for plant materials before they were stored, distributed, or prepared for consumption (Stevens, 2003). Pulses, which are processed similarly to free-threshing cereals, would have been de-shelled prior to storage (Fuller and Harvey, 2006; Jones, 1987).

The high proportions of fragmentary legumes and cereals appear to result from post-depositional processes, including burning during the collapse of the rooms, rather than evidence of food preparation or crop processing activities conducted on-site.

6 Discussion

The focus on agricultural production and surplus storage identified at the North Mesopotamian Kani Shaie settlement correspond with similar developments reported from the Ninevite 5/Early Bronze Age rural settlements (e.g. Telul eth-Thalathat, Tell Arbid, Tell al-Raqā'I) (Mardas, 2019; Schwartz, 2015; Fukai et al., 1974; Smogorzewska, 2014). The presence of a variety and size[7] of the buildings, such as grill – structured granary racks and *siloi* to store the crops (Tell Karrana 3, Tell al-Raqa'i, Telule el Thalathat) (Mardas, 2019; Schwartz, 2015), in addition to facilities for crop processing, storage and food preparation (e.g rooms with ovens and storage jars, also with the post-processing botanical and food waste; Tell Arbid, Tell Hamoukar, Tell Brak) (Szelag, 2009; Smogorzewska, 2014; Hald and Charles, 2008) seems to confirm that by the beginning of the third millennium BCE the turn toward larger scale storage and post-harvesting processing before storage of agricultural crops already took off in the Northern Mesopotamia. The storage was organized on a large-scale, at a super-household level, and implies that crop-processing was carried out after harvest and before storage. This implies the presence and pertinence of the centralization processes.

Similar practices in other regions of Northern Mesopotamia, including earlier examples from Tell Sabi Abyad, highlight the emergence of administrative systems prior to urbanization (Akkermans and Schwartz, 2004; Wengrow, 2008), however the sealed storage spaces and restricted access at Kani Shaie reflect early centralization efforts, likely intended to regulate surplus and ensure redistribution.

The archaeological and botanical data from Kani Shaie offer valuable insight into the commodification of crops. Commodification, as conceptualized by Kopytoff (1986), involves the transformation of goods into items of value, marked physically or metaphorically as distinct from ordinary goods. At Kani Shaie, the restricted-access granary, sealed storage units, and careful portioning of crops may be interpreted in a category of commodification, suggesting ongoing early commodification processes. These practices added value to the stored crops, both as physical commodities and as part of a redistribution system. However, while these features align with commodification, there is no direct evidence of trade or market-based transactions akin to those seen in urbanized regions

6 The widespread cultivation of barley is likely attributed to its lower demands for water and soil quality. Being more drought- and salinity-tolerant than wheat, barley can achieve high yields even in regions with significant variability in annual rainfall (Charles et al., 2010; Schwartz, 2015, p. 564) which is also recently confirmed by the results of isotopic studies (e.g. Fraser et al., 2011).

7 The size of the buildings and the amount of grain found indicate that supplies kept exceeding the needs of one household in most of the cases.

FIGURE 4
Most ubiquitous plant species recovered from Kani Shaie **(A)**. Barley **(B)**. Lentil **(C)**. Chickpea, scale bar: 1 mm.

of Mesopotamia. Instead, Kani Shaie appears to demonstrate a form of centralized redistribution, where agricultural surplus was collected, stored, and distributed within the community or possibly to external groups.

The geographical position of Kani Shaie, situated between the Zagros Mountains and Mesopotamian lowlands, underscores its potential role as a node in regional exchange networks. Evidence from as early as the fifth millennium BCE suggests the site served as a central hub in the Bazyan Valley, possibly functioning as a stopover for travelers or nomadic pastoralists traversing the highlands and lowlands (Tomé et al., 2016). This strategic location likely facilitated its role in supporting mobile groups and managing surplus crops for broader distribution.[8] The increasing scale of agricultural production at Kani Shaie supports hypotheses that centralized distribution systems developed in response to surplus accumulation. The presence of seals, sealings, and restricted-access storage suggests efforts to manage and track inputs and outputs, possibly as part of a redistribution system. This system may have supported not only the local community but also mobile or specialized groups, such as craftsmen or traders, highlighting the diverse roles played by rural settlements in broader economic networks (Schwartz, 2015; Frangipane, 2007). Similar hypothesis was proposed for rural site of Tell Raqa'i indicating that agricultural surplus produced was perhaps not only consumed locally, but this rural site was integrated into an agricultural network dedicated to grain production for

8 Zagros is a region where the nomadic pastoralism activities, predominantly based on animal husbandry, took place since the Neolithic times (Abdi, 2003). One potential theory is that the produced grain has been collected and designated to feed people and animals involved in a mobile lifestyle focused on pastoralism, in exchange for animal-derived products (Schwartz, 2015).

supplying urban centers, or nomadic societies (Schwartz, 2015, p. 564; 573).

Kani Shaie demonstrates that processes such as centralization and commodification were not confined to urban centers. The evidence for surplus management, redistribution, and administrative systems at this small rural settlement challenges traditional views that associate these features exclusively with urbanization (Graeber and Wengrow, 2021). The presented site then highlights the diversity of pathways to social complexity in Early Bronze Age Mesopotamia. The findings from Kani Shaie contribute to a growing understanding of how agricultural production and resource management laid the groundwork for social complexity. Through better understanding how these processes took place across a range of sites and site sizes, we will be better placed to understand the origins of urbanization and the emergence of various elements often associated with social complexity.

7 Concluding remarks

The Early Bronze Age rural site of Kani Shaie offers critical insights into processes typically associated with urban contexts, such as resource management, centralization, and plant commodification. Evidence from the site, including sealed storage facilities and carefully portioned crops, indicates early forms of surplus management and redistribution. These findings suggest that plant commodification was a gradual process, beginning in rural settlements and laying the foundation for broader economic systems.

Further research in the Bazyan Valley and other parts of Northern Mesopotamia is needed to fully understand the scale and implications of these processes. Investigating rural sites from both the Early Bronze Age and earlier periods will help clarify how agricultural production and crop commodification contributed to the emergence of social complexity. At Kani Shaie, the transition to centralized storage and redistribution highlights the interplay between local agricultural practices and broader economic and social transformations, providing a valuable case study for understanding the roots of urbanization in Mesopotamia.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

KJ: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fearc.2024.1529459/full#supplementary-material

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