What we do for food – social strategies for overcoming food scarcity in the Neolithic of the Central Balkans

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ABSTRACT – Food is essential for survival, but how humans obtain and manage it is regulated socially. The life of Neolithic and other non-industrial communities depended on environmental variations – temperature patterns and precipitation. For farming communities, even minor changes in those patterns could have led to periods of food scarcity. In order to overcome and prepare for periods of scarcity, non-industrial communities applied different social buffering strategies. In this paper, the social buffering strategies Early/Middle Neolithic Starčevo and Late Neolithic Vinča culture communities applied in overcoming the environmental variability are tested and the most plausible ones are considered.

KEY WORDS – Neolithic; Balkan Neolithic; subsistence; mobility; farming

Introduction

The Neolithic is traditionally perceived as a time when farmers lived in permanent settlements, but this simplified generalization cannot be universally applied. By introducing the concept of the ‘Neolithic package’, archaeologists tried to unify cultural, economic, social and ideological innovations which occurred in the Near East during the Neolithic. These innovations spread beyond the original territory, leading to the emergence of a new lifestyle in a wider area. The Neolithic package is often described as several factors that differentiate the Neolithic from previous lifestyles and it includes agriculture (plant domestication and cultivation), domestic animal farming (animal domestication), the emergence of sedentism, pottery production, polished stone tools and an ideology compatible with the new lifestyle.

1 This paper is a result of the work on the project ‘Humans and Society in Times of Crisis, Archaeology of Crisis’ (Faculty of Philosophy, University of Belgrade). In the first phase of the project social buffering strategies applied by Early/Middle Neolithic communities at the Central Balkans were studied (Đuričić 2021). This paper is a result of a second phase of the project, where this subject is further elaborated and social buffering strategies applied by Late Neolithic communities are added to the study.
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(e.g., Çilingiroğlu 2005; Cauvin 2000; Durićić 2021), which led to new subsistence strategies and new risks.

At the territory of the Central Balkans, the Neolithic lifestyle arrived already formed together with a new population around 6250 cal BC (Borić, Dimitrijević 2007; Borić 2014; 2016; Cramp et al. 2019; Ivanova 2020; Stojanovski et al. 2020; Durićić 2021). The area these early farming communities of the Early and Middle Neolithic Starčevo culture (6250–5300 cal BC) occupied was predominantly previously non-inhabited, except from the Danube Gorges, where the local Mesolithic population was still thriving (where the local Mesolithic and new Neolithic populations came in contact) (Borić, Dimitrijević 2007; Borić 2014; 2016; Cramp et al. 2019; Durićić 2021). The arrival of the Neolithic population coincided with the 8.2-kiloyear event (Porić et al. 2021), which affected the temperature and precipitation patterns in the Central Balkan region (Bonsall 2007; Kobashi et al. 2007; Gronenborn 2009). The Late Neolithic Vinča culture (5350/5300–4500 cal BC) (Porić 2020), occupied similar territory as the Starčevo culture, but their settlements and material cultures differed significantly (Fig. 1).

Even though the process of cereal and animal domestication was a long-lasting one, fully domesticated plants and animals were documented in numerous settlements in the Near East, dating back to the Pre-Pottery Neolithic (having a dominant role in the subsistence from the Pre-Pottery Neolithic B) (Kuijt, Goering-Morris 2002; Gibbs, Jordan 2016). A sedentary lifestyle forms a base for the intensification of the economy, population growth and increase of social complexity (Neil et al. 2016.1). However, Neolithic innovations were applied differently in different regions, resulting in a non-uniform Neolithic lifestyle with diverse sedentism and mobility patterns (see Neil et al. 2016). Agriculture and husbandry usually form the base of Neolithic subsistence. The amount of food in farming communities depends on predictable seasonal changes and unpredictable weather/climate factors (temperature, amount of precipitation, type of precipitation during certain seasons, droughts, floods, climate change...). Predictable factors (seasonal changes) are something that cannot

![Fig. 1. Distribution of Starčevo–Körös–Criš and Vinča cultures. Sites: 1 Blagotin, 2 Starčevo, 3 Medjureč, 4 Drenovac, 5 Nosa – Biserina Obala, 6 Donja Branjevina, 7 Golokut – Vizić, 8 Gomolava, 9 Opovo, 10 Selevac, 11 Vinča – Belo Brdo, 12 Stubline – Crkvine, 13 Banjica – Usek, 14 Divostin, 15 Grivac, 16 Medvednjak, 17 Valač, 18 Pavlovac – Ćukar, Gumnište, 19 Lepenski Vir, 20 Zadubravlje, 21 Galovo, 22 Zvečka, 23 Vinkovci (map by S. Živanović).]
be avoided, so the communities apply different buffering strategies to obtain a balanced diet throughout the year. But even minor changes in temperature or precipitation patterns can sometimes endanger the existence of farming-based non-industrial communities, due to crop failure and lack of fodder for animals. Bad conditions can last one or multiple years, forcing communities to employ one or several survival strategies, based on the duration of the unfavourable period and their cultural, social, economic and ideological preferences (Halstead, O’Shea 1989; Duričić 2021). The Neolithic lifestyle, being completely different from the previous ones, with the increase in population and reliance on domesticates, resulted in new survival strategies.

Four social buffering strategies for overcoming food scarcity have been proposed by Paul Halstead and John O’Shea (1989): (1) diversification, (2) storage, (3) exchange and (4) mobility (Halstead, O’Shea 1989; Groot, Lentjes 2013). These buffering strategies are not applied only when food shortages occur, but also refer to actions undertaken to prevent the lack of food and prepare for inevitable periods of the year when food is less available in nature (Duričić 2021). In this paper, the social buffering strategies Early/Middle Neolithic Starčevo and Late Neolithic Vinča culture communities applied in order to prepare for, prevent and overcome periods of food scarcity caused by environmental variability are tested and the most plausible ones are considered. The similarities and differences between social buffering strategies practised during the Early/Middle and Late Neolithic of the Central Balkans will also be compared.

**Overcoming the environmental variability**

Food scarcity is not connected solely to natural disasters, and lack of food can occur due to different factors. Solar radiation influences ecosystem dynamics. Temperate climate zones, like the Central Balkan region, have uneven solar radiation, leading to pronounced differences between seasons (Rowley-Conwy, Zvelebil 1989.41; Duričić 2021). During spring vegetation grows suddenly, giving the plants limited time for growth, development and reproduction. Summer is the season of abundance with numerous migratory animal and plant species – cereals, fruits, vegetables and berries. A decrease in resources, both local and migratory, is visible during autumn, whilst winter is the most difficult period, with the least amount of available food (Rowley-Conwy, Zvelebil 1989.41). These are seasonal fluctuations or variations, which are predictable and cannot be avoided, so people apply previously established mechanisms for overcoming periods of food scarcity, to obtain a balanced diet throughout the year (Rowley-Conwy, Zvelebil 1989.41; O’Shea 1989.57; Halstead 1989.71; Duričić 2021). Interannual fluctuations or variations depend upon numerous unpredictable factors. They can depend on climatological factors (droughts, frosts, storms, hail, excessive rain at the wrong time, floods, and so on), animals, insects, plague, plant and animal diseases or human activity. In farming communities, interannual variations like drought can affect crop yields or animal disease can increase domestic animal mortality rates, forcing people to compensate for the losses in alternative ways. Even though these variations are mainly unpredictable people know how to deal with them, using experience gained from previous similar situations. (O’Shea 1989.58; Halstead 1989.72; Duričić 2021). Long-term fluctuations or variations are the results of climate or natural changes and often last for a longer period of time. To survive these, communities have to make considerable adaptations (Rowley-Conwy, Zvelebil 1989.44–45; Duričić 2021). In facing these different types of variations the strategies communities apply can vary and change, but they are always in accordance with their specific natural environment, social, cultural and economic norms (Duričić 2021).

Farming communities depend on plant and animal annual reproductive cycles which are controlled by regular seasonal patterns. Even minor shifts in seasonal patterns can influence the amount of food available, whether of plant, or animal origin. To overcome a lack of food, either due to predictable or unpredictable factors, communities apply one of the previously mentioned strategies: diversification, storage, exchange and mobility (Halstead, O’Shea 1989.3; Groot, Lentjes 2013.9; Duričić 2021). The inclusion of a greater variety of food sources is called diversification. This also includes keeping certain types of food exclusively for ‘rainy days’ and the cultivation of different crops on different soils. For farmers, agriculture and herding are forms of diversification, but it also includes hunting, fishing and gathering. Saving food for annual periods of food scarcity is called storage. Exchange includes different social practices – trade, food sharing, obligatory reciprocity and negative reciprocity (theft). Relocation of a group of people or the whole community towards areas with available food sources is called mobility (Halstead, O’Shea 1989.3–4; Groot, Lentjes 2013.9–10; Duričić 2021).
Communities usually mix several buffering strategies. Depending on their preferences, certain strategies can be practised as prevention, while others could be applied as a last resort. Also, different cultures can apply the same strategy differently (Durdić 2021). A typical agricultural/herding community shows some degree of diversification. They cultivate multiple crop types and keep at least two types of livestock, with additional hunting, fishing and gathering that provide a balanced diet and year-round food supply. In situations when a plague or a disease attack crops or animals, diversification provides an effective fall-back strategy, ensuring that at least some food will remain for human consumption. Every society has a tendency to accumulate a surplus. Early agricultural communities accumulate a surplus as a result of seasonality, as a strategy to overcome colder periods of the year. During bad years they may have switched to hunting and gathering, which was also documented in the archaeological record (Groot, Lentjes 2013:9). On the other hand, hunter-gatherers rely on different wild resources, making their diversification strategy dependent on a variety of wild animal species and wild plant taxa that are available during different seasons (Halstead, O'Shea 1989; Durdić 2021). According to Paul Halstead, every community generates a surplus, but they define it differently. A distinction should be made between direct and indirect storage. The accumulation of food for later consumption is direct storage, but food sharing with other members of the community, expecting reciprocity in time of need, is an example of indirect storage – social storage. With indirect storage the risk of food spoilage is reduced, as the food often cannot be stored for a long period of time (Halstead 1989).

Evidence for diversification in the Neolithic of the Central Balkans

Diversification is a survival strategy applied by both farming and hunting-gathering communities. Hunter-gatherers rely on different wild resources, making their diversification strategy dependent on a variety of wild animal species and wild plant taxa that are available during different seasons (Halstead, O'Shea 1989; Durdić 2021), while farming communities rely primarily on agriculture and domestic animal herding with the addition of hunting and gathering, which is often accompanied by a sedentary lifestyle (Çilingiroğlu 2005; Cauvin 2000). Diversification is suitable for overcoming seasonal, interannual and long-term variations. It not only implies the exploitation of alternative resources, but also the cultivation of different types of cereals and pulses of different growing patterns and endurance levels on different soil types. By applying this strategy, a community can potentially reduce the possibility of crop failure (Groot, Lentjes 2013; Durdić 2021). Subsistence based on domesticated plants and animals is also a form of diversification. Domestic animals can convert agricultural waste and plants unsuitable for human consumption into edible food (meat, milk and fat), further reducing the potential for food shortages (O'Shea 1989; Durdić 2021).

Archaeobotanical analyses conducted on various Starčevo culture sites have revealed a broad spectrum of plant food used in the human diet, and these can be divided into cultivated crops and wild plants. However, the results of the archaeobotanical analyses were affected by the lack of systematic sampling, which was conducted only at two sites (Blagotin and Drenovac), while at other sites only contexts marked as interesting or important by archaeologists ('judgement' sampling) were sampled (Filipović, Obradović 2013; Durdić 2021). The greatest plant taxa diversity was recorded at Drenovac, but it was also at this site that the most extensive sampling was conducted. Archaeobotanical remains from the sites of Blagotin, Drenovac, Medjureč, Starčevo and Nosa-Biserna Obala have confirmed the cultivation of five crops2 (for distribution see Filipović, Obradović 2013:41): einkorn (Triticum monococcum), emmer (Triticum dicoccum), hulled barley (Hordeum vulgare, hulled), lentil (Lens culinaris) and pea (Pisum sativum) (Filipović, Obradović 2013; Filipović 2014; Durdić 2021). A total of nine wild taxa has been documented so far (for distribution see Filipović, Obradović 2013:41): cornelian cherry (Cornus mas), apple (Malus pumila), fruit from the malus genus (Malus sp.), fruit from the pear genus (Pyrus sp.), beech nut (Fagus sp.), blackberry (Rubus fruticosus), unidentified berries (Rubus sp.) and dwarf elder (Sambucus ebulus) (Filipović, Obradović 2013; Durdić 2021).

Over 70% of the examined faunal assemblage belonged to domestic animal taxa, indicating a reliance

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2 Even though broomcorn millet (Panicum miliaceum) was found at Neolithic sites in the Central Balkans, recent studies have disputed its cultivation during the Neolithic in Europe, so all millet samples should be treated as an intrusion (Filipović et al. 2020), which is why they were excluded from this paper.
on domesticates at the majority of Starčevo culture sites (for detailed archaeozoological analysis and distribution see Orton 2012) (Greenfield 2008:108; Duričić 2021). Cattle is the most dominant domestic animal taxa, with the exception of Donja Branjevina, where goats/sheep dominate (Orton 2012), while pigs were barely represented in the faunal assemblage (Orton 2012; Ethier et al. 2017; Duričić 2021). Dogs were also present, but were probably not consumed. However, sites in the Danube Gorges, Golkut-Vizić in Southwestern Bačka and Nosa-Biserna Obala in Northern Bačka show different patterns. At these sites, a higher percentage of wild than domestic animal taxa have been documented (Orton 2012; Duričić 2021). Red deer, roe deer, wild boar, fish, birds and smaller mammals, dominated amongst the wild taxa remains (Greenfield 2008; Duričić 2021). The analyses of faunal assemblage from the Early/Middle Neolithic layers from the Danube Gorges sites show the significance of migratory fish for local subsistence (Dimitrijević et al. 2016). Recent pottery lipid analysis has shown that the majority of vessels in the Danube Gorges settlements were used for cooking aquatic resources, contrary to the data from the sites in the rest of the Central Balkans (Cramp et al. 2019), where pottery was used for processing meat, milk/dairy, plant food and storing beeswax (Ethier et al. 2017; Stojanovski et al. 2020; Duričić 2021). Stable isotope analyses have shown almost exclusive reliance on terrestrial resources of the Starčevo culture communities with mixed terrestrial and aquatic diet in the Danube Gorges and in certain settlements located in close proximity to rivers – Vinča – Belo Brdo, Sremski Karlovci, Obrež – Baštine, and Klisa (Jovanović et al. 2019, 2021). Domestic animals were not only used as a meat and fat source, as recent lipid analyses undertaken on Starčevo culture pottery confirmed milk and dairy consumption during the Early/Middle Neolithic (Ethier et al. 2017; Cramp et al. 2019; Stojanovski et al. 2020).

Archaeobotanical analyses from Vinča culture sites have shown a greater variety of domestic crops. Archaeobotanical remains from the sites of Drvenovac, Gomolava, Opovo, Selevac and Vinča – Belo Brdo, have confirmed cultivation of 11 crops (for distribution see Filipović, Obradović 2013: 41): einkorn (Triticum monococcum), emmer (Triticum dicoccum), hulled barley (Hordeum vulgare, hulled), naked barley (Hordeum vulgare, nudum), free-threshing wheat (Triticum aestivum/durum), a new type of wheat (Triticum sp., ‘new type’), lentil (Lens culinaris), pea (Pisum sativum), bitter vetch (Vicia ervilia), flax/linseed (Linum usitatissimum), grass pea (Lathyrus sativus/cicera) (Filipović, Obradović 2013; Filipović 2014). A total of 17 wild taxa have been documented so far (for distribution see Filipović, Obradović 2013:41): cornelian cherry (Cornus mas), hazel ( Corylus avellana), wild strawberry (Fragaria vesca), crab apple (Malus sylvestris), common reed (Phragmites communis), Chinese lantern (Physalis alkekengi), fruit from prunus genus (Prunus sp.), fruit from pear genus (Pyrus sp.), acorn (Quercus sp.), beech nut (Fagus sp.), blackberry (Rubus fruticosus), dewberry (Rubus caesius), unidentified berries (Rubus sp.) elderberry (Sambucus nigra), dwarf elder (Sambucus ebulus), water chestnut (Trapa natans), wild grape (Vitis vinifera (ssp. sylvestris)) (Filipović, Tasić 2012; Filipović, Obradović 2013) and sloe berry (Prunus spinosa) (Filipović, Tasić 2012; Borojević et al. 2020).

Archaeozoological analyses have confirmed that domestic animals (cattle, sheep/goats, and pigs) played a dominant role in the subsistence strategies of Vinča culture communities. While the most significant animal was still cattle, the most dramatic shift occurred with pigs, who played an extremely important role in the diet of the Vinča culture communities. The results of organic residue analysis conducted on two Vinča culture sites so far – Drvenovac and Motel-Slatina, confirmed the consumption of different types of meat, milk and dairy products (Kruger et al. 2019). Two different studies have confirmed the presence of beeswax in Vinča culture pottery, confirming the exploitation of honeybees during the Late Neolithic in this region (Raffet-Salque et al. 2015; Kruger et al. 2019). The majority of the wild taxa remains still belonged to red deer, roe deer, wild boar, auroch and smaller mammals (Orton 2012). At the site of Vinča – Belo Brdo, apart from previously mentioned wild taxa, the remains of beaver, rabbit, otter, badger, vole, fox, wolf, brown bear, fallow deer, birds, tortoise, various Mollusca (mostly unio shells) and fish, have been identified (Dimitrijević 2006). Moreover, 14.5% of the dog bones found at this site between the years 1998 and 2003 showed traces of burning, and one vertebra also had butchering traces, indicating the consumption of dog meat, previously not documented in the Vinča culture (Dimitrijević 2006:252).

Plant food can be used in different ways during different times of the year. Cereals could have been sown in autumn, as they need a long period of vernalization to produce seed and legumes could have been sown in spring, due to their shorter growing
season (Filipović, Tasić 2012), securing the crop yields in case of unpredicted interannual variations. At the Late Neolithic site of Opovo, autumn/ winter sowing has been proposed for some of the identified cereals. Analysis of weed flora can help in determining crop sowing time, but those analyses have either not been conducted or the results have been inconclusive (as in the case of the Vinča – Belo Brdo site) (Filipović, Tasić 2012). Information about different soil types in the immediate vicinity of settlements has been provided for several Vinča culture sites. The majority of settlements in the Morava Valley are surrounded by multiple soil types, some more suitable for autumn/winter, and others for spring-sown crops (Milanović 2019). Cereals could have been used in several different ways— they could have been used for bread production or cooked as porridges or gruels. Porridges could have been enriched with legumes, and legumes could have been added to stews and soups. Acorn is also very versatile, and it could have been consumed roasted, dried or ground into flour. Fruit and berries could have been eaten fresh, but also dried or cooked, which prolonged their shelf life (Atalay, Hastorf 2006; Đuričić 2021). The consumption of milk and dairy products and their combination with other food categories further increases the variety of food sources in the Neolithic period.

During the Early/Middle Neolithic in the Central Balkans, diversification as a social buffering strategy was practised through different procurement strategies— agriculture, domestic animal herding, hunting, fishing and gathering. A broad variety of domesticated and wild plant and animal resources were used, which enabled Starčevo culture communities to obtain a year-round balanced diet and reduce the potential for food shortages. One definite model for diversification cannot be provided, however, as food procurement strategies could differ from settlement to settlement (Greenfield 2008; Orton 2012; Filipović, Obradović 2013; Cramp et al. 2019; Đuričić 2021). Each settlement should be approached individually, providing opportunities for further studies on differences and similarities between communities, which surpasses the scope of this paper. Nevertheless, certain tendencies can be distinguished, such as higher dependence on domesticates in the human diet at the majority of the sites, both of plant and animal origin (Orton 2012; Filipović, Obradović 2013; Đuričić 2021). Archaeozoological analyses have helped in determining the seasonality of occupation of certain settlements. By analysing the seasonal availability of the represented taxa, occupation patterns have been determined for several settlements. Archaeozoological analyses of Early Neolithic sites in the Danube Gorges show patterns of seasonal habitation, based on the faunal, specifically migratory fish remains (Đimirtirjević et al. 2016). At the site of Golokut, analyses of faunal remains have indicated that the settlement was occupied seasonally between late autumn to late winter (Živaljević et al. 2017; Đuričić 2021). Similarly, archaeozoological analyses from the site of Blagotin suggest seasonal occupation between late autumn and late spring (Ethier et al. 2017; Đuričić 2021).

Vinča culture communities used even broader spectra of domesticated and wild plants and animals (Đimirtirjević 2006; Orton 2012; Filipović, Obradović 2013). The introduction of new types of domesticated cereals (Hordeum vulgare, nundum, Triticum aestivum/durum and Triticum sp., ‘new type’) and legumes (Vicia ervilia, Linum usitatissimum and Lathyrus sativus/cicera) could further reduce the possibility of crop failure (Filipović, Obradović 2013; Filipović 2014). With regard to domesticated animals, while pigs had negligible significance during the Early/Middle Neolithic, they were important in the diet of the Late Neolithic communities in the Central Balkans (Orton 2012). Furthermore, the extreme diversity of the faunal repertoire at the site of Vinča – Belo Brdo, including previously not registered food sources, specifically in the excavated area of later occupational horizons at this site, raises a question about living conditions at this particular time. It is still not clear whether this broader spectrum of food sources reflects a period of crisis or if this inclusion of more diverse animal species represents the typical diet of Vinča settlement residents. After these occupational horizons, the habitation of the settlement continued, but archaeozoological analyses of faunal remains of the final occupational phase show typical Vinča culture dietary choices (except a smaller representation of pigs) (Đimirtirjević 2006).

It is possible that this variety of food sources represents evidence of interannual or even long-term variations leading to food scarcity and the application of diversification as a survival strategy, by the introduction of an even broader spectrum of animals. Nevertheless, one universal diversification pattern cannot be applied to every Vinča culture settlement. In some settlements, for example, hunting played a more significant role than in others (Orton 2012), indicating differences in procurement strategies throughout the Vinča culture. Comparison between procurement strategies during the Late Neolithic of the Central Balkans can provide important inform
tion regarding the Vinča culture economy, but these analyses surpass the scope of this paper.

Evidence for storage in the Neolithic of the Central Balkans

Storage is a common practice, not only among farming communities but also among hunter-gatherers. Even though cereals are the most common type of stored food, fruit, meat and fish can also be stored (Madge 1994; Duričić 2021). For seasonal and sometimes interannual variations storage is an extremely effective buffering strategy, but it would not be effective if long-term variations affecting the crop yield occur (O’Shea 1989; Halstead 1989; Duričić 2021). In those situations, meat, fish or wild plants can still be stored.

In the archaeological record, storing features (silos, built-in storage containers, such as storage bins, storage pots or pithoi) or concentrations of carbonized plant remains are good indicators of storage. Other types of food, although stored, are less likely to be preserved in the archaeological record. The properties of the manufacturing material determine the preservation of certain objects or features in the archaeological record, so storage containers from perishable materials – wooden crates, boxes, baskets, sacks or bags made from leather, wood, plant fibres, branches and cork – would be hard or impossible to identify in the archaeological record (Filipović et al. 2018.34; Duričić 2021).

Storage containers in the Starčevo culture are rarely found, so this practice is usually determined via concentrations of carbonized grains. At the site of Nosa – Biserna Obala, more than fifty clay-lined pits, resembling silos (with a pear-shaped cross-section), were found. Inside those pits, small amounts of carbonized grains were detected, together with other fragmented material (Garašanin 1960.229). The fill of the pits corresponds to the fill of the refuse pits, including carbonized remains, which were charred before they were thrown away. If they were silos then those remains either would not have been carbonized or would not have been mixed with other material categories. Still, there is a possibility that those pits were primarily silos, but were secondarily used as refuse pits (Filipović, Obradović 2013; Filipović et al. 2018). Pithoi, large pots that would indicate storage, are scarce at the Starčevo culture sites. A large vessel containing barley was found at the site of Bandovići (Filipović et al. 2018), making it the only reported case so far (Duričić 2021). Grains and other plant-based products could have been stored inside smaller vessels, but their volume does not seem sufficient for extensive storage (Tripković 2011). At the site of Drenovac, in the house destruction layer of burnt daub, a concentration of carbonized seeds was found (Filipović et al. 2018.35; Duričić 2021). It contained predominantly legumes (75% lentil, 20% peas, small amounts of emmer and einkorn, and several fruits remains). This concentration suggests that these different plant foodstuffs were probably stored separately in organic containers – baskets, bags, or wooden containers with several compartments (Filipović et al. 2018.35; Duričić 2021). At the Early Neolithic site of Tsangli in Greece, indications of baskets lined with clay plaster or dung were documented, showing another possible storing option, which would hardly leave any archaeological record (Halstead 1989.71).

At the sites of the Late Neolithic Vinča culture, substantially more evidence for storage has been found. Storage containers were predominantly found inside houses and used for short-term storage. Large storing pots (pithoi) and smaller vessels were found at the majority of the Vinča culture sites, some of which contained remains of carbonized grains, confirming their presumed role based on the pottery typology (Jovanović, Glišić 1961; Tripković 2011; Vuković 2011; Filipović et al. 2018). Pithoi could be found inside separate architectural features – storage bins, made from mud plaster, usually located next to an oven (Fig. 2). The walls of those features were about 50cm high. Storage compartments, together with ovens and querns located in their proximity, form a food processing set (Spasić, Živanović 2015). Storage bins were found in numerous houses: house 01/06 at Vinča – Belo Brdo (Tasić et al. 2007; Vuković 2011; Filipović et al. 2018; Borojević et al. 2020), the house at the depth of Δ 6.73m from 1912 at Vinča – Belo Brdo (Fig. 3) (Vasić 1912.94; Duričić 2019), house II/11 at Vinča – Belo Brdo (Vasić 1912.21), house 1 from the trench XIX at Drenovac (Perić 2017), house 1/2010 at Stubline – Crkvine (Crnobrnja 2012; Spasić, Živanović 2015), house 2/79 at Banjica – Usek (Todorović 1981; Tripković 2013; Spasić, Živanović 2015), house 2 at Opovo (Tringham et al. 1992), and houses 13 and 17 at Divostin (Bogdanović 1988). One of the best examples comes from house 01/06, at the Vinča – Belo Brdo site, where two pithoi filled with carbonized (predominantly) emmer grains were found in one of three storage bins located next to an oven (Vuković 2011; Spasić, Živanović 2015; Filipović et al. 2018; Borojević et al. 2020). Next to them, without a con-
tainer, the remains of emmer, water chestnut and pears were located (Bo-
rojević et al. 2020). Another type of storage bin has been found in Vin-
ča culture houses. Although connected to the house wall, they were smaller and shallower and were not located near ovens or other architectural features. Such containers were found in house 1/2008 at Stubline (Špasić, Živanović 2015), house 21 at Grivac (Bogdanović 2008), house 1 at Jakovo (Jovanović, Glišić 1961), house 15 at Divostin (Bogdanović 1988) and house 1 from the trench XIX at Drenovac (Perić 2017). The number of these fixed storage bins is certainly higher, but the preserva-
tion of these features depends on multiple factors (the most significant being house destruction by fire), as they were built from mud plaster, a material which deteriorates with time (Duričić 2020).

In house 01/06 at Vinča – Belo Brdo, multiple caches of cereals without containers were found, but one of them was in association with carbonized wooden planks, which may imply the existence of a wooden crate. In one emmer deposit, relatively large quanti-
ties of flax/linseed and bitter vetch were document-
ed, probably stored separately in perishable contain-
ers (wooden crates with multiple compartments, baskets or bags). Similar contexts were found at the sites of Medvednjak and Valač, suggesting the usage of containers from perishable mate-
rials throughout the Vinča culture. In house 02/06 at Vinča – Belo Brdo, a cache of well-preserved wild pears was discovered. Those pears could have been stored in bags hung on the house wall, or in pots placed on shelves (Filipović et al. 2018). Pears and berries could have been dried and stored for winter consumption. Herbs, certain grass types and weeds could have been dried, stored and used as medicines or spices (Filipo-
vić, Tasić 2012). Storage practices in the Vinča culture are an important and interesting topic. By following changes in these, broader sets of questions about diachronic changes in social organization, architectural practices and the economy of the Vinča culture communities can be answered (see Tripković 2013), but detailed analyses of these is-
ues surpass the scope of this paper.

Raw cereals are prone to spoilage and due to their exposure to insects or rodents, they cannot be stor-
ed for a long period of time. Bulgur (cooked and dried cereals) or trahanas (dried fermented cereals) are good options for prolonging their shelf life. Bul-
gur is prepared by first cooking, then drying and fi-
nally grinding cereals. With this process, the grain gets a hard texture, less prone to spoilage and infes-
tation. (Valamonti 2011; Bayram 2000; Duričić 2021). Indications for bulgur production were found
on emmer grains detected next to a quern in house 01/06 at Vinča (Borojević et al. 2020). Trahanas is similar to bulgur, but it involves cooking either bulgur, raw grains or flour in milk or soured milk (Valamonti 2011; Đuričić 2021). After cooling, the mass is formed into balls or rectangles, which are dried in the sun and stored. Trahanas can be stored for up to two or three years (Valamonti 2011). Lactic acid fermentation from milk also preserves food, protecting it from microbes and toxins, making trahanas perfect food for prolonged storage (Daglioğlu 2000; Đuričić 2021).

Long-term storage is possible when a year has been particularly good, creating a considerable surplus. One part of the surplus can then be used as an investment for the future – feeding cattle that will be slaughtered during times of food scarcity. This type of investment for the future – feeding cattle that will be particularly good, creating a considerable surplus. Long-term storage is possible when a year has been particularly good, creating a considerable surplus. One part of the surplus can then be used as an investment for the future – feeding cattle that will be slaughtered during times of food scarcity. This type of storage is intended for feeding the community on an interannual level (Halstead 1989:73).

Evidence for exchange in the Neolithic of the Central Balkans

Exchange is a broad term for social practices of sharing resources between communities, social groups or individuals. It does not have to be literal – goods for goods or goods for services – but also includes an exchange of goods or food between households in social settings: feasts, house hospitality and gifts/treats (Sahlins 1965; Đuričić 2021). These actions consolidate social bonds and obligations, forming a base for reciprocity. Food can be exchanged for labour or for tokens which symbolize the commitment of a household to return the favour, establishing the grounds of social storage. Social storage and these exchange practices are hard to detect in the archaeological record. An exchange between households within one community can be performed only on seasonal and interannual levels. By living in the same settlement, long-term had conditions would deprive every household of food supplies, so they would have to ask for help either from neighbours or allies that live in different territories (Halstead 1989; Đuričić 2021). Possible ways to create alliances with outside communities are marriages or trading partnerships. These partnerships create bonds and can prevent the emergence of hostile relationships (Sahlins 1972; Đuričić 2021). Even though exchange and contact between close settlements is always a possibility, they are difficult to detect in the archaeological record, due to probable similarities in the material culture (Đuričić 2021). Two categories of exotic materials speak of contacts and long-distance trade between the Starčevo/Vinča culture communities and distant populations – Spondylus/Glycymeris shells and obsidian. Objects made from jadeite/nephrite can also imply contacts with distant populations, as sources of these minerals were not documented in the territory of the Central Balkans, but due to the lack of analyses the provenience of raw materials used for the production of these artefacts has never been determined (Balaban 2013). Even though these objects cannot provide insight into communication routes with distant communities at this moment, they should be taken into consideration for further studies, when more data is available.

The presence of thermal structures in the open spaces within a settlement is considered as an indicator of food-sharing practices between households (Byrd 1994). Fire installations found at Starčevo culture sites were located both inside and outside dwellings. So far, only four hearths (Bogdanović 1988; Minich-reiter 2001; Petrović 1984–1985; Đuričić 2019; 2021) and six cooking trenches (Fig. 4) (Đuričić 2019), previously interpreted as tubular ovens (Minichreiter 1992; Bänffy et al. 2010), have been found in open spaces within a settlement (Đuričić 2021). It should be noted that no cooking trenches were present inside the houses (Đuričić 2019). So far, all of the ovens (total of 16) and the majority of hearths (total of 11) that have been found were located inside dwellings (Bogdanović 1988; 2008; Minichreiter 1992; 2001; 2007; Bänffy et al. 2010; Marić 2013; Đuričić 2019; 2021). The location of fire installations in the Starčevo culture settlements implies that at least a portion of cooking activities was conducted in a communal setting. To date, however, it cannot be concluded if these activities were performed on a daily/seasonal basis or on special occasions, nor which part of the community was involved in this process (Đuričić 2019; 2021). Intra-settlement food-sharing was proposed as one of the social buffering strategies practised by the Early Neolithic communities in Thessaly, Greece. Food-sharing activities were practised regularly, not only in times of need, resulting in the consolidation of neighbouring relations. Besides intra-settlement relations, they had contact with other settlements. Those contacts were documented through fine pottery, suggesting some degree of inter-settlement exchange (Halstead 1989; Đuričić 2021). Similar food-sharing practices could have been performed by the Starčevo culture communities (Đuričić 2021).

The presence of artefacts made from materials of non-local provenience suggests contacts with distant
populations. In the Early/Middle Neolithic of the Central Balkans, obsidian finds are scarce and mostly concentrated in the Danube Basin. However, the research on exchange networks has not been extensive enough, so definite distribution patterns are yet to be determined (Tripković 2003–2004). Ornaments from Spondylus/Glycymeris shells have been confirmed at only three Starčevo culture sites with a total of 11 pieces of jewellery. They were probably imported as finished products, as manufacturing debris has not been detected. Additionally, ornaments typologically correspond to the examples from the rest of Europe (Vitezović 2012; 2016; 2019). These sporadic finds of exotic materials in the Early/Middle Neolithic of the Central Balkans, confirm some degree of contact with distant communities, but not the nature of the contact (trade or maybe dowry upon marriage). Stable isotope analyses can offer more information about the relationships between different settlements and communities established by marriage partnerships. Strontium and oxygen stable isotopic analyses conducted on Starčevo culture individuals from several sites in the Hungarian Transdanubia have shown that there was a higher proportion of non-local and regional females than males. If these data do not point to the migration of the Starčevo culture population to the new territory, they could imply patrilocal marriage arrangements with women from different settlements, within and outside the region (Depaermentier et al. 2020).

There are few indications of food-sharing practices in the Vinča culture. Two indicators for individual food preparation are household storage and indoor thermal structures (Byrd 1994), and both have been documented at the Vinča culture sites (Duričić 2019). Contrary to ovens which were always located inside houses, hearths (hearth-pits) were only found at two sites, Pavlovac – Cukar (Duričić 2019) and Pavlovac – Gumište (eight in total) (Perić et al. 2016; Duričić 2019). These types of hearths indicate either communal (Byrd 1994), seasonal (Rollings 1989) or some specialized activity. Due to the scarcity of these finds, further studies should be conducted in order to determine their practical and social role. Still, even though cooking activities were probably conducted on the household level, this does not exclude other food-sharing practices like feasts, household hospitality or gifts. Even though the inter-settlement exchange is hard to determine and identify in the archaeological record, certain products could have been used in negotiations between close settlements. For example, access to pastures in the vicinity of one settlement, by herders and cattle from other settlement, could have been compensated for with products like milk, butter, cheese, meat or some other trade goods (Gillis et al. 2021). Copper can also be used in determining inter-settlement and regional contacts between Vinča culture communities and contemporary non-Vinča culture sites in modern-day Bulgaria. Copper ores used for the production of copper objects found at the Vinča culture sites of Belovode, Pločnik, Vinča – Belo Brdo, Gomolava, Selevac and Gornja Tuzla and Ruse and Dunankulak in the Lower Danube region in modern-day Bulgaria came from deposits located mainly in eastern Serbia. The social dynamics of these inter-settlement and intercultural contacts have not been determined so far (Radivojević et al. 2021).

Exotic materials are found more frequently at Vinča culture sites. A number of settlements, especially those located in the Tisa Valley, the South Banat and the Morava Valley, show a considerable amount of obsidian objects. The most abundant collection of obsidian finds comes from the site of Vinča – Belo Brdo, where this material makes up 69.5% of the chipped stone industry (Tripković 2003–2004; Tripković, Milić 2009). Analyses shows that the obsidian

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3 Although there is no evidence of places for gathering and communal feasting in the Vinča culture settlements, one interesting context found at the Late Neolithic site of Kleitos 1 in Northern Greece can offer some insight how this practice was conducted (Kalogiropoulou, Ziota 2021).
came from the source in the Carpathian Basin, implying strong and long-lasting connections with Tisza culture communities (Tripković, Milić 2009). Connections with these communities are further documented by unique finds from the site of Vinča – Belo Brdo, with pottery and other ceramic objects of Tisza provenience (including the famous Mayres pithos) (Ignjatović 2008). Spondylus/Glycymeris shell ornaments were more common and present in more varying forms than in the previous period. Their finds were especially abundant at the site of Vinča – Belo Brdo (Dimitrijević, Tripković 2002; Vitezović, Antonović 2020). Spondylus/Glycymeris trading routes have not been determined yet, and several options are plausible. Even though it was commonly assumed that these shells came from the Aegean Sea, the lack of Spondylus/Glycymeris finds along the presumed trading route via the Vardar and Morava River valleys opens the door for new options. The trading network between the communities in the Central Balkans with the communities living on the coast of the Adriatic Sea was established either directly or via intermediaries in what is today central Bosnia. Spondylus/Glycymeris objects and raw material were found at the sites along this route, suggesting that Vinča culture communities could have been a part of this exchange network (Dimitrijević, Tripković 2006). The number of exotic finds at the site of Vinča – Belo Brdo distinguishes it from the rest of the Vinča culture settlements, indicating a prominent role of this community in trade and exchange, with long-lasting and well-developed connections throughout south-eastern and central Europe (Vitezović, Antonović 2020).

Evidence for mobility in the Neolithic of the Central Balkans

Mobility is considered the ‘easiest’ survival strategy, and it is undertaken when a community encounters a lack of resources. This strategy is typical for hunting-gathering and pastoral communities. Certain archaeologists consider mobility as an unfavourable option for agricultural communities, as storage (characteristic of agricultural communities) and mobility are mutually exclusive (Halstead, O’Shea 1989, 3–4; Durićić 2021). It is thought that forced mobility in agricultural communities occurs when long-term variations make arable land unsuitable for farming for a prolonged period of time, and thus these communities would perceive mobility as a last resort (Rowley-Conwy, Zvelebil 1989, 46; Durićić 2021). But mobility is not rigid and not all mobile communities have the tendency to become sedentary. Equally it does not mean that sedentary communities cannot become mobile in certain situations. Even in fully sedentary communities, there are certain social groups with a higher level of mobility (Leary, Kadør 2016). Mobility is thus an extremely complex term that cannot be defined just as relocation but also through movement (a certain period of time, season), motion (mobility pattern), motivation (resources, cultural identity, social or economic circumstances) or segment (parts of the population) (Wendrich, Barnard 2008, 8). Nevertheless, as a social buffering strategy practised by communities to overcome environmental variability, mobility mostly refers to group or settlement relocation towards areas with available food resources (Halstead, O’Shea 1989; Groot, Lentjes 2013; Durićić 2021).

It is considered that the level of sedentism of a certain community is most accurately determined through architecture. The model for determining mobility/sedentism came from cross-cultural studies conducted on modern non-industrial communities. Those studies have suggested that mobility is implied by settlements with pit-dwelling house types and sedentism by above-ground houses (Greenfield, Jongsma 2006, 67; Nicholas 2002, 75; Durićić 2021). Ethnographic studies show that pit-dwellings are a preferable choice for communities with increased mobility during the colder months (Nicholas 2002, 75). The development of agriculture is followed by the reduction of mobility. Sedentism forms a base for economic intensification, population growth and an increase in social complexity (Neil et al. 2016, 1). This approach, even though suitable for some Neolithic communities, cannot be applied universally, as a number of Neolithic agricultural communities display a certain degree of mobility (Neil et al. 2016; Depaermentier et al. 2020; Durićić 2021). Although architecture can be a good indicator of mobility, stable isotopic analyses offer the most accurate data. Stable isotopic analyses performed on the material from the Early Neolithic sites in this region have been primarily focused on dietary practices, not mobility patterns (Jovanović et al. 2019, 2021; Stojanovski et al. 2020), so future studies can offer more clarification on this subject.

The most prominent Starčevo culture architectural features are pits, and due to the fact that above-ground structures are rare it is considered that these Early Neolithic populations lived predominantly in pit-dwellings. Although pits at Starčevo culture sites can be very large with large quantities of material, a pit cannot be determined as a dwelling purely on its...
What we do for food – social strategies for overcoming food scarcity in the Neolithic of the Central Balkans

size. In order to be interpreted as a pit-dwelling, a pit should have thermal structure remains (Garašanin 1949.52–54). Unfortunately, Early Neolithic Central Balkans sites have not been excavated extensively, so the data we have is still fragmentary, especially when architecture is concerned. Pits that meet the criteria for being interpreted as dwellings have been identified at several sites: Divostin (Bogdanović 1988), Lepenski Vir (Srejović 1969), Donja Branjevina (Karmanski 2005), Drenovac (Perić 2008), Grivac (Bogdanović 2008), Zadubravlje (Minichreiter 1992; 2001) and Galovo (Minichreiter 2001; 2007). Their interiors are divided by platforms, niches or differences in floor levels (Petrović 2001; Duričić 2021) and the presence of a superstructure is indicated by postholes or daub remains (Bogdanović 2008; Duričić 2021). The roofs were thatched, made from straw or reed (Bogdanović 1988.37–39; Petrović 2001). Architectural features made from mud plaster, indicating fixed house furnishing, are not present in these dwellings (Duričić 2021). Additionally, almost all of the ovens were underground, not built or modelled from mud plaster, and they were easy to make by digging niches (Fig. 5) or chimney-like features (Fig. 6) into the sides of the pit-dwelling. The walls of these ovens were made from burnt soil, due to exposure to fire. The only examples of ovens modelled from mud plaster, similar to the ones found at the Late Neolithic sites, were found at the site of Lepenski Vir, but they were also located inside pit-dwellings (Duričić 2019). These types of houses and ovens, with all of their characteristics, show less investment in the living spaces, suitable for a community with increased mobility (Duričić 2019; 2021).

Besides pit-dwellings, above-ground houses were also found at Starčevo culture sites, but in a significantly smaller number. They were found at Divostin (Bogdanović 1988), Nosa – Biserna Obala (Brukner 1979), Grivac (Bogdanović 2008), Zvečka (Todorović 1966), Zadubravlje (Minichreiter 2001), Vinkovci (Đizdar, Krznaric Škrtvanko 2000) and Galovo (Minichreiter 2007). These houses are poorly preserved and are only detected based on the postholes, trenches and poorly preserved daub fragments (Bogdanović 1988,34; Duričić 2021). Regarding fire installations, a total of four hearths and no ovens were registered inside these houses. Postholes, trenches and daub fragments indicate that they were made using the wattle and daub technique and the roof was probably thatched and made from straw or reed (Bogdanović 1988; Duričić 2021). Spatial organization is unknown, and the determination of potential separate rooms has not been possible (Duričić 2021), which is in complete opposition to the later Vinča culture house organization and furnishings.

Both strontium and oxygen stable isotope analyses have been conducted on several Starčevo culture sites in Transdanubia in modern-day Hungary. The
majority of analysed individuals found at these sites were either mobile or of non-local origin (21 out of 37). However, the non-local individuals may have belonged to the first generation of settlers (12 out of 37) or could point to marriages with partners from different regions. Nonetheless, the number of individuals who led a mobile lifestyle should not be neglected (nine out of 37) (Depaermentier et al. 2020). Studies like these performed on the material from other Starčevo culture sites can enable the reconstruction of mobility patterns of these Early Neolithic communities.

Vinča culture houses were rectangular in plan, with one or multiple rooms, made using the wattle and daub technique with a thatched roof (Jovanović, Glišić 1961; Todorović 1981; Tripković 2007; 2013; Črnobrnja 2011). Each house had at least one, but usually multiple domed ovens (Fig. 7), with rebuilt floors (up to six at the oven from house 01/2010 at Stubline) (Črnobrnja 2012). Sometimes an oven was inside each room (Tripković 2013; Tasić et al. 2007), and on occasion, two ovens could have been located in the same room (Vasić 1932) (Fig. 8). Next to ovens, clay bins and composite grinding stones have have been found (Todorović 1981; Bošdanović 1988; Tasić et al. 2007; Tripković 2013; Spasić, Živanović 2015; Perić 2017; Borojević et al. 2020; Đuričić 2019). Symbolic elements, such as bucrania, when present, were fixed to a post next to an oven (Spasić 2012). Some furnishing regulations are observed inside Vinča culture houses, especially in the food processing area, where fixed architectural features (ovens, clay bins, composite querns and bucrania) were located. All of the fixed architectural features were built from mud plaster, implying time-consuming activities with intentional placement of furnishings (Đuričić 2019). Contrary to the Starčevo culture settlements, Vinča culture ones are multi-layered, with houses built one on top of the other, during multiple settlement phases (Vasić 1932; Kraiser, Voytek 1983; Perić 2008). Settlement duration, architecture, subsistence and extensive storage, all indicate increased sedentism of the Vinča culture communities. Nevertheless, certain social groups could have been more mobile (Leary, Kador 2016). Even some settlements show different occupation patterns. A good example for this is the site of Opovo. This settlement was occupied for a shorter period of time, which is implied by its stratigraphy, architecture, scarcity of storage features, pottery, tools and a lower percentage of domesticated plants and animals (Tringham et al. 1992). Archaeozoological analysis has shown that 65–70% of faunal material be-

Fig. 7. Oven from the northern room of the house at the depth of Δ 3.20m from 1911 at Vinča – Belo Brdo (photo: Archive of the Archaeological Collection, Department of Archaeology, Faculty of Philosophy, University of Belgrade).

Fig. 8. 3 ovens from house at the depth of Δ 3.20m from 1911 at Vinča – Belo Brdo (one in the northern room and two in the southern room) (photo: Archive of the Archaeological Collection, Department of Archaeology, Faculty of Philosophy, University of Belgrade).
longed to wild animal taxa (Orton 2012), indicating that hunting was the dominant procurement strategy (Tringham et al. 1992). Furthermore, cattle remains represent 22.6% of the archaeozoological assemblage, while pigs were not detected at this site (Orton 2012). All of these data have led archaeologists to propose an interpretation that the site had a short-term or seasonal occupation. Opopovo could have been formed as a specialized settlement oriented toward the exchange and procurement of raw materials like venison or antler (Tringham et al. 1992, 384). So even within fully sedentary communities, there are examples of partial, maybe seasonal mobility of certain groups due to some specialized activity they were conducting. Recent stable carbon and oxygen isotopic analyses conducted on cattle, sheep/goats and pigs from the Vinča – Belo Brdo and Stubline settlements have revealed new herding patterns. During warmer months domestic animals spent some time away from the settlement in different natural environments (Gillis et al. 2021). It is still unknown whether they were kept in the vicinity of the settlements or if Vinča culture herding strategies required seasonal mobility of animals and herders. Strontium stable isotopic analyses conducted on cattle from the Neolithic site of Arbon Bleiche 3 in Switzerland suggest three different herding styles – local herding, the seasonal movement of cattle and non-local herding (Gerling et al. 2017). Similar studies could help in reconstructing the mobility patterns of one specialized social group within the Late Neolithic communities of the Central Balkans. Nevertheless, these social groups with different mobility patterns point also to diversification and exchange. With their lifestyle, they obtained and managed different resources and enabled contacts between settlements and communities.

Discussion

Each community applied one or several social buffering strategies in order to overcome environmental variability, whether it is caused by seasonal, interannual or long-term fluctuations. Most of the proposed buffering mechanisms (diversification, storage, exchange and mobility) are complementary, but the ways in which they were implemented was community specific. The difference is how dependent each community was on each of these strategies and which were applied as the last resort. By presenting the Early/Middle and Late Neolithic examples which point to each of the four social buffering strategies, we were able to examine which strategies were predominantly used during these periods in the Central Balkans. Members of both Starčevo and Vinča culture communities practised agriculture and animal herding, but it seems that they used differing buffering strategies in order to prepare for, avoid and overcome periods of food scarcity.

Early/Middle Neolithic communities of the Central Balkans practised agriculture and herding, but the evidence for storage is scarce, with caches of plant food indicating storage inside perishable containers (Filipović et al. 2018; Đuričić 2021). The current data does not allow the determination of the amount of surplus they produced or the extensive-ness of their storage, so it is difficult to assess how reliant they were on this buffering strategy (Đuričić 2021). They cultivated crops with diverse growing patterns, that could have been sown during different seasons (Atalay, Hastorf 2006), which could provide a balanced food supply on the seasonal level and diminish the risk of crop failure in case of unpredictable interannual variations. In addition to the cultivation of multiple crops, domestic animal herding, hunting and wild plant gathering form part of their diversification strategy. By applying these mutually complementary procurement strategies, the community can obtain a balanced diet on the seasonal and interannual levels. Even though evidence of long-distance exchange is scarce, there are elements which would point to certain food sharing practices within settlements. While exchange between neighbouring settlements is a possibility, the available data still does not allow determination and reconstruction of inter-settlement relations (Đuričić 2021).

Nonetheless, the majority of settlements of these farming communities imply increased mobility (Kraiser, Voytek 1983; Greenfield, Jongma 2006.66–67; Whittle 1996.52; Đuričić 2021). The architecture of Starčevo culture communities with pit-dwellings and above-ground houses, which a lack of thermal structures and fixed architectural features, indicate less investment in house construction and furnishing (Đuričić 2021). Recent studies offer some insight into potential reasons for this increased mobility of Starčevo culture communities (Ethier et al. 2017; Stojanovski et al. 2020; Ivanova 2020; Đuričić 2021). Domesticated plants and animals were brought to the Central Balkans by the new population of Early Neolithic Near Eastern migrants. These plant and animal taxa did not have wild relatives in this region, so their relocation to the temperate climate of the Balkan inland may have created problems for these Mediterranean crops and animals, accustomed to warmer and dryer climate. The climate in the Bal-
kan inland was harsher, with winter frosts and a more precipitation. Acclimatization to new conditions was certainly a long-lasting process, so communities who previously primarily relied on agriculture had to create new subsistence patterns (Ethier et al. 2017; Stojanowska et al. 2020; Ivanova 2020; Đuričić 2021). The arrival of the Neolithic population to the territory of the Central Balkans around 6250 cal BC coincided with the 8.2-kiloyear cold event (Bonsall 2007; Kobashi et al. 2007; Gronenborn 2009; Đorić et al. 2021). This event lasted for roughly 200 years (approx. 6250–6050 BC) (Porčić et al. 2021), resulting in 2–3°C lower temperatures in the northern hemisphere in comparison to the previous period. In the territory of the Central Balkans this also resulted in an increase in precipitation, both in winter and summer months (Bonsall 2007). These conditions could have been unfavourable for the newly arrived Mediterranean plant and animal taxa, but further studies are necessary for the determination of the effects this event had on the environment. In order to compensate for losses in agriculture due to this acclimatization process, Early/Middle Neolithic communities may have relied more on cattle meat, and dairy products (Stojanowska et al. 2020; Đuričić 2021). Furthermore, goats/sheep also did not have wild relatives in the Central Balkans, so they may have had problems adjusting to the new climate, resulting in changes in their reproductive patterns, which may have led to the increased role of cattle (Ethier et al. 2017; Ivanova 2020; Đuričić 2021). In contrast to goats and sheep, pigs had wild relatives in the Central Balkans, and this territory is favourable for them, but their significance in the diet of the Starčevo culture population was negligible. Pigs, being less prone to transhumance, are usually a good indicator of sedentary settlements (Ethier et al. 2017; Đuričić 2021). Archaeozoological analyses conducted on the material from the sites of Golokut and Blagotin provided information about the seasonality of these settlements (Živajlević et al. 2017; Ethier et al. 2017; Đuričić 2021). These analyses are crucial for the determination of the seasonal occupation of the settlements and understanding of the mobility patterns of the Starčevo culture communities. By comparing the data, it is evident that Starčevo culture communities had an increased level of mobility, but the character of their mobility is still unknown. Sites with both types of dwellings are often interpreted as multi-seasonal settlements (Nicholas 2002:75). Milutin Garašanin argued that Early Neolithic mobility was cyclic (Garašanin 1979:138), while Dragoslav Srejović noted that Starčevo culture communities inhabited a location while the soil was fertile, abandoning it afterward (Srejović 1988:15).

In contrast to Starčevo culture communities, Vinča culture ones show less reliance on mobility as a buffering strategy but are more dependent on storage. They cultivated an even wider range of crops with diverse growing patterns, possibly sown during different seasons (Filipović, Tasić 2012; Filipović, Obradović 2013). They could rely more on cereals, which enabled storage as a buffering strategy. Storage was well documented on the Vinča culture sites, with numerous pithoi, food caches and clay bins found inside houses (Vuković 2011; Tripković 2013; Spasić, Živanović 2015; Filipović et al. 2018; Borujević et al. 2020; Đuričić 2019). Even though Vinča and Starčevo culture communities based their diet on the same domestic animals, cattle and pigs had a more prominent role during the Late Neolithic (Orton 2012). Hunting and gathering were also practised as a form of a diversification strategy. Interestingly, a wide variety of previously undocumented animals (wild animals and dogs) was consumed during later phases of the Vinča settlement. Archaeozoological analysis conducted on the faunal material from the final occupational horizon at this site shows the typical Vinča culture diet, indicating that the inclusion of new animal species in previous phases could have represented application of diversification as a buffering strategy during periods of food scarcity. Nevertheless, final conclusion cannot be made before the material from other excavated areas is analysed (Dimitrijević 2006:252). The longevity of Vinča culture settlements, with numerous occupational horizons and houses built on top of the other, rectangular buildings with fixed mud plaster architectural features and regulations in house furnishings, attest to the sedentary lifestyle of these Late Neolithic communities (Vasić 1932; Perić 2008). Pigs, which were well represented in the archaeozoological assemblage (Orton 2012), are a good indicator of a sedentary lifestyle, as well (Ethier et al. 2017). Even within sedentary communities, certain social groups could have been more mobile (Leary, Kador 2016). Residents of Opovo, a settlement with short-term occupation, could have conducted some specialized activities – the procurement of certain raw materials or exchange (Tringham et al. 1992). The mobility of these social groups could have further pointed to diversification and exchange, as they performed specialized activities and came in contact with members of different communities. For sedentary communities, storage and diversification are suitable buffering strategies, especially on the seaso-
nal and interannual level. For them relocation would be applied when no other options were available. The evidence for food sharing within a settlement is limited, but this practice should not be excluded as it is hard to confirm this in the archaeological record. Further studies could point to contacts between settlements and exchange networks within the region. Nevertheless, Vinča culture communities had established connections with communities of other contemporary cultures (Tripković, Milić 2009), so in times of need they could have contacted their distant ‘allies’. Even though this strategy could have provided some level of security, the exchange would not be a long-time solution.

Conclusion

In order to avoid periods of food scarcity, Starčevo culture communities relied primarily on diversification and mobility. Based on the current archaeological evidence, storage seems to have been limited. Even though exchange was practised, as we have indications for food sharing activities within settlements and confirmations of contacts between communities, it is hard to assess how dependent they were on this strategy. The increased mobility of these farming communities could have been caused by long-term variations. Whether the 8.2-kiloyear event had an effect on the adaptation of the Mediterranean crops and animals (sheep/goats) in the Central Balkan region has not been established, but current data suggests that these new plant and animal taxa, accustomed to a warmer and dryer climate, had problems acclimating to the harsher conditions of the Balkan inland. Starčevo culture farmers were prevented from being fully reliant on agriculture, resulting in their increased mobility (Đurić 2021). On the other hand, Vinča culture communities relied primarily on diversification and storage. Exchange within the settlement and between different Vinča culture communities was probable, but we still need more studies to determine these social practices. They had established relations with communities form other cultures, so in times of need they could have contacted ‘allies’ from distant territories. Vinča culture communities lived in permanent settlements, so mobility during the Late Neolithic was different from the Early/Middle Neolithic one. Specialized short-term settlements, like Opovo, could point more to the mobility of certain social groups, diversification or exchange than to settlement relocation as a buffering strategy. Vinča culture communities did not rely on mobility as a buffering strategy on a seasonal or interannual level, but they applied it as a last resort, when no other options were available.

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What we do for food – social strategies for overcoming food scarcity in the Neolithic of the Central Balkans


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