'Seasonal rhythms' of a rural Kurdish village: ethnozooarchaeological research in Bestansur, Iraq

People with Animals

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People with Animals

Perspectives & Studies in Ethnozooarchaeology

Edited by Lee G. Broderick

Paperback Edition: ISBN 978-1-78570-247-1
Digital Edition: ISBN 978-1-78570-248-8

Oxford & Philadelphia
www.oxbowbooks.com

Published in the United Kingdom in 2016 by
OXBOW BOOKS
10 Hythe Bridge Street, Oxford OX1 2EW

and in the United States by
OXBOW BOOKS
1950 Lawrence Road, Havertown, PA 19083

Paperback Edition: ISBN 978-1-78570-247-1
Digital Edition: ISBN 978-1-78570-248-8

A CIP record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

Names: Broderick, Lee G.
Title: People with animals : perspectives & studies in ethnozooarchaeology / edited by Lee G. Broderick.
Description: Oxford : Oxbow Books, 2016. | Includes bibliographical references.
Identifiers: LCCN 2015049026 (print) | LCCN 2015050021 (ebook) | ISBN 9781785702471 (softcover) | ISBN 9781785702488 (digital) | ISBN 9781785702488 (epub) | ISBN 9781785702501 (pdf) | ISBN 9781785702495 (mobi)
Subjects: LCSH: Ethnoarchaeology. | Animal remains (Archaeology) | Human-animal relationships--History. | Agriculture, Prehistoric. | Livestock--History.
Classification: LCC CC79.E85 P46 2016 (print) | LCC CC79.E85 (ebook) | DDC 930.1/0285--dc23
LC record available at http://lccn.loc.gov/2015049026

Printed in the United Kingdom by Hobbs the Printers Ltd, Totton, Hampshire

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Front cover: Sheep shearing in Mongolia (Photo © Lee Broderick, 2012).

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‘SEASONAL RHYTHMS’ OF A RURAL KURDISH VILLAGE: ETHNOZOOARCHAEOLOGICAL RESEARCH IN BESTANSUR, IRAQ

Robin Bendrey, Jade Whitlam, Sarah Elliott, Kamal Rauf Aziz, Roger Matthews and Wendy Matthews

This paper presents results from an ethnoarchaeological study of animal husbandry in a modern rural village situated in the foothills of the Zagros Mountains of Iraqi Kurdistan. We discuss how animal management, herding and local land use is affected by environmental and social factors. We explore seasonal variations in practice in respect to agricultural activities, resource availability and local traditions. The aim is to provide the groundwork for archaeological investigations of past animal husbandry practices in the local landscape on the basis that modern behaviours, identifiable ecological constraints and affordances can suggest testable patterns for past practices within the same functional and ecological domains. Semi-structured interviews conducted with villagers from several households provide information on current and recent behaviours illustrating notable shifts in practices and use of the local landscape in living memory.

Introduction

The modern rural village of Bestansur is situated in the foothills of the Zagros Mountains, Iraqi Kurdistan (Fig. 5.1). Repeated visits to the village at different times of the year have allowed first-hand observation of seasonal variations in animal husbandry and the opportunity to engage with local families to determine how and why the farming calendar changes. In this paper we explore these ‘seasonal rhythms’ with the aim of elucidating how animal husbandry is practiced within the local environment of Bestansur, and throughout the year, in respect to agricultural activities, resource availability and local traditions. Understanding the interplay of these factors at a local and regional level, and their influences on animal husbandry and arable farming practices (e.g. Bendrey, 2011; Colledge *et al.*, 2005; Dreslerová *et al.*, 2013; Manning *et al.*, 2013) are recognised as being key to developing more nuanced interpretations of animal management at archaeological sites.

The research presented here is part of a broader ethnoarchaeological study which has been developed in the context of excavations at the Early Neolithic site of Bestansur (Matthews *et al.*, 2014, p. 254), and which aims to contribute to ongoing archaeological analysis by providing a local framework and control data for these investigations. This is based on the premise that modern behaviours can suggest testable patterns for past practices within the same functional and ecological domains. Research has incorporated a programme of modern sampling aimed at exploring archaeologically identifiable signatures of modern animal use in the locale that can potentially be used to interpret archaeological evidence from the Neolithic settlement (Elliott *et al.*, in press). For example, strontium isotope analysis of modern plant material demonstrates that a measurable variation exists between the alluvial floodplain and the lower foothills (Fig. 5.2), which can be used to help constrain studies of past animal mobility in relation to

Figure 5.1. Location of the study area.

underlying geology/hydrology (e.g. Bentley, 2006), while analysis of modern dung samples shows clear variation between sheep (*Ovis aries*)/goat (*Capra hircus*) and cattle (*Bos taurus*) dung, in terms of numbers of faecal spherulites (Elliott *et al.*, in press).

Our investigations also build upon previous ethnoarchaeological research in the Zagros, which to date has mainly focused on the Iranian side of this region, with studies widely conducted in central western Iran during the 1970s and 1980s (Kramer, 1979, 1982; Hole, 1978; Watson, 1979). Notable among these is Kramer's 'Village Ethnoarchaeology' (1982), which considers animal husbandry within the context of agricultural activities and the constraints of seasonal and cultivation cycles. Crucially, Kramer (1982) emphasises that the utilisation of a specific landscape is limited by the interaction of environmental variables and social factors such as social organisation, territories and traditional patterns of land use

Here we present a synthesis of results from a program of semi-structured interviews undertaken with local participants during the months of August–September 2012 and March–April 2013. As well as providing information about current village dynamics these interviews have also highlighted

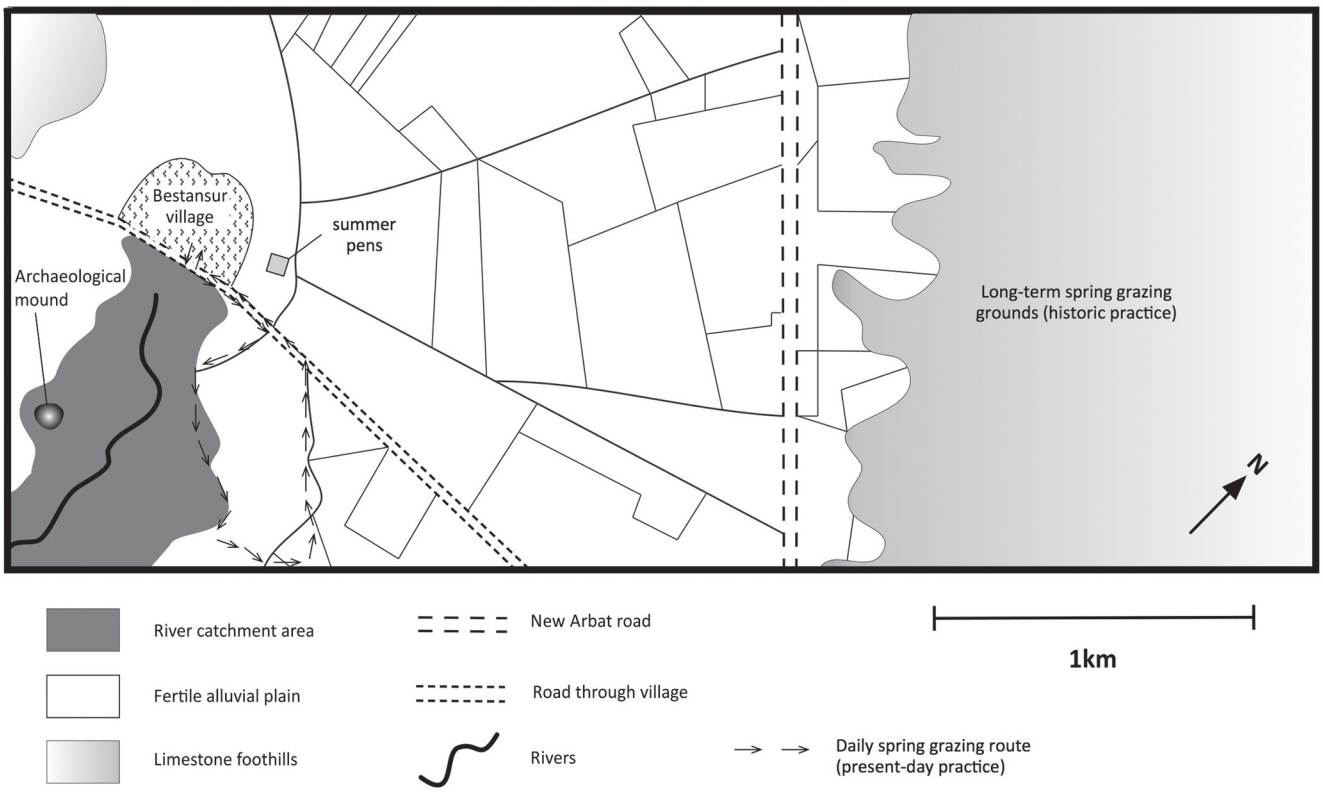

Figure 5.2. A simplified map of the local landscape around the modern village of Bestansur illustrating the three different ecological and functional domains – the river catchment area, the farmed alluvial plain, and the limestone foothills – and showing details of past and present sheep and goat grazing and penning locations.

Figure 5.3. Limestone foothills and edge of farmed alluvial plain, looking north-east from Bestansur village (April 2012).

the ever-widening dichotomy between past and present practices in modern-day Iraqi Kurdistan, and the value of oral histories as related by older-generation villagers who are able to describe traditional practices that occurred in the recent past (*c.* 70 years ago) and during their parent's lifetime, that may since have ceased and for which there is no written record. Where possible information on past practices is reported and evaluated in the context of this research while equally providing a written record for this rapidly disappearing knowledge set.

Study area

Bestansur lies *c*. 550 m above sea level (asl) on the Shahrazor plain of Iraqi Kurdistan, 27 km south-east of Sulaimaniyah and approximately 30 km from the Iranian border to the east (Fig. 5.1). The modern village is comprised of around 50 households, located near to a perennial spring and *c.* 700 m from the early Neolithic site of Bestansur (Fig. 5.2), this being one of several archaeological sites evidenced in the area today that attest to a long history of occupation in the region (Altaweel *et al.*, 2012; Nieuwenhuyse *et al.*, 2012). The main road running through the village joins up with the 'New Arbat road' in the North that continues onward to the Iranian border and is a major trade route (Fig. 5.2). In the past this area would have also been an important passage for trade into the Iranian highlands.

The Zagros Mountains are a dominant feature of the landscape in this region where the lower folded zone with peaks up to *c.* 1500 m consists of a series of long, narrow valleys composed of soft Upper Triassic well-bedded limestone. Although higher peaks are still some distance from Bestansur the lower foothills (*c.* 720 m asl) are less than 2 km away from the village and currently farmed right up to their limits. The geology here is characterised by cretaceous bedrock overlain by quaternary alluviation that supports modern arable farming (Saed Ali, 2008). For the purposes of this research the environment around the village of Bestansur can be further subdivided into three distinct physical zones (Fig. 5.2):

1 *River catchment area*: the river catchment area is dominated and constrained by the main water source in the village, a large karst aquifer (Saed Ali, 2008) located directly below the village. Impermeable beds around Bestansur prevent groundwater from percolating deeper and make this a substantial water source for the people of Bestansur (Saed Ali, 2008).
2 *Farmed alluvial plains*: the surface of the landscape around Bestansur comprises of slightly undulating thick alluvial sediments that are recharged primarily by the direct infiltration of rainfall, so that the surrounding lands consist of a gently sloping agricultural plain which now makes up the main cultivation land in this area (Saed Ali, 2008).
3 *Limestone foothills*: Limestone ridges mark the start of the lower Zagros in this area and the cessation of profitable alluvial soils for cultivation (Fig. 5.3). Soil cover is thinner with protruding limestone and scree characterising these foothills.

Climate, environment and food production

Iraqi Kurdistan has a semi-arid climate with a strong continental component (Maran and Stevanovic, 2009). Seasonal temperature variation for Erbil, located at 426 m asl and *c.* 173 km to the north-west of Bestansur, is

presented in Figure 5.4. These are average temperatures; summer peaks can, for example, approach 50°C. Normally, there is no rainfall from June until September, with the main period of precipitation lasting from December through to April (Fig. 5.4b). Variation in the topography of Iraqi Kurdistan significantly influences rainfall distribution, with precipitation rates decreasing from the mountains of the north-east to the desert-steppe of the south-west (Maran and Stevanovic, 2009, pp. 21–22). Seasons are unequally distributed through the year, with the long, hot summer dominating the year, and autumn, winter and spring relatively short (Fig. 5.4a–c). Following winter, air temperatures begin to rise in February and by late April summer conditions are setting in: the rainfall reduces and maximum day time temperatures increase to around 30°C. The transition from wintery to summery conditions can feel particularly abrupt. During the field season of spring 2012 we witnessed the transition from wintery conditions, with snow on the ground and freezing nights, through to early summery conditions with daytime temperature peaks of *c*. 30°C and warm nights. This transition occurred within approximately 5 weeks, between late March and late April. Rain is entirely absent from June through to September, with the first rains falling in October, but significant levels not falling until November. The summer is long, hot and dry. Autumn is short and begins late in the year and the winter is characterised by cold and snowy conditions.

Maran and Stevanovic (2009, pp. 103–104) provide an excellent overview of land use and food production in northern Iraq, which is summarised here. Arable agriculture is a key economic activity in Iraqi Kurdistan. Some 35% of Iraqi Kurdistan is currently used as arable land, covering substantial areas in the broad valleys and plains. The main crops include wheat (*Triticum* spp.) and barley (*Hordeum vulgare)*, sunflower (*Helianthus annuus)* and sesame (*Sesamum indicum*), chickpea (*Cicer arietinum*), lentil (*Lens culinaris*), broad beans (*Vicia faba)*, and sugar beet (*Beta vulgaris)*. Winter crops are normally grown between October and May, and summer season crops are grown from March to September (Fig. 5.4d). Wheat is grown as a food crop for human consumption, whereas barley is grown for foddering sheep and goats. Barley is predominantly sown in the drier areas where it is grown continuously or in rotation with fallow periods. Vegetable crops such as tomato (*Solanum lycopersicum)*, cucumber (*Cucumis sativus)*, onions (*Allium cepa)*, eggplant (*Solanum melongena)*, and okra (*Abelmoschus esculentu*) are grown under irrigated or locally favourable conditions, typically near water courses. Crops grown under rotation in the summer growing season (Figure 4d) include rice (*Oryza sativa)*, maize (*Zea mays)*, sunflower and cotton (*Gossypium hirsutum*). Maize is a relatively new introduction to the region, grown as poultry feed. The average size of a single family landholding is less than ten hectares.

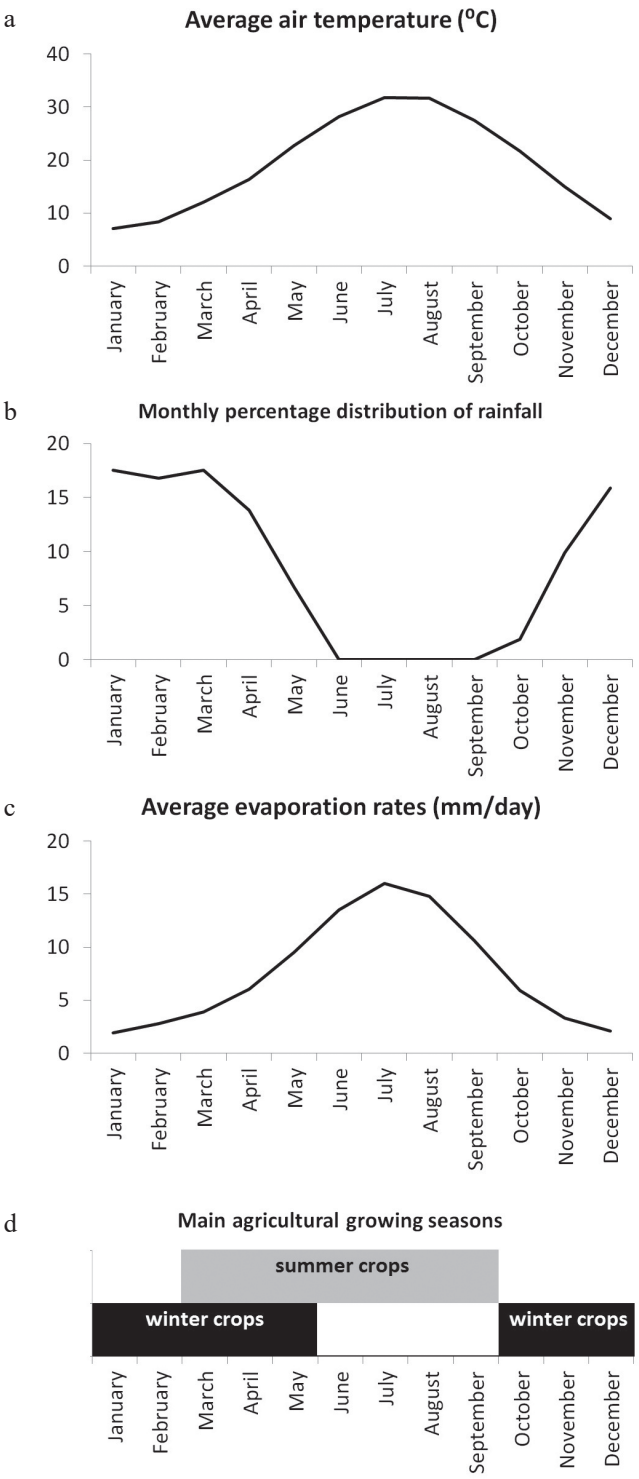

Figure 5.4. Seasonal variation in the climate of Iraqi Kurdistan: a) average air temperature (°C) for Erbil (1959–1972; Haddad et al., 1975 cited in Maran and Stevanovic, 2009); b) annual monthly percentage distribution of rainfall (1941–1975), typical data for the annual distribution of rainfall in Iraqi Kurdistan, no location given (Maran and Stevanovic, 2009, p. 24); c) average evaporation rates (mm/day) for Erbil (1966–1973; Haddad et al., 1975 cited in Maran and Stevanovic, 2009); d) the main agricultural growing seasons.

Table 5.1. Households interviewed

		Present practices	*Past practices*	*Date of interview*
Household 1	Younger adult generation	X		August–September 2012
Household 2	Younger adult generation	X		August–September 2012
Household 3	Older adult generation		X	August–September 2012
Household 4	Older adult generation	X	X	March–April 2013

Forest and rangeland currently account for 40% of the land use of Iraqi Kurdistan. The latter comprises forests, shrubs, perennial and annual herbs. Altitudes higher than *c*. 1500 m asl are predominantly used for the grazing of sheep and goats in the summer. In the upland pastoral system, family-centred economies are based on the sale of meat, milk and wool products. Small-scale poultry production is practiced in most villages. Fruit production is widespread, due to favourable climatic conditions and most villages in Iraqi Kurdistan have orchards, which are typically irrigated during the summer. Fruit trees such as apple (*Malus domestica*), pear (*Pyrus communis)*, cherry (*Prunus* spp.) and walnut (*Juglans regia)* may be found in mountainous areas, probably due to their ability to tolerate the colder winters and the general scarcity of oak (*Quercus* spp.) trees in upland areas may be linked to the fact that oak branches are commonly exploited for animal feed. At lower elevations, Mediterranean fruit trees may also be present although they need irrigation during the summer, with figs (*Ficus carica)*, apricots (*Prunus armeniaca)*, pomegranates (*Punica granatum)*, peaches (*Prunus persica*) and almonds (*Prunus amygdalus*) increasingly being planted. Poplar (*Populus* spp.) and willow (*Salix* spp.) plantations can also be found in many valleys and alluvial plains.

Spatial and seasonal variation in climate and environment clearly influence food production, both from pastoral and arable farming. Regionally, key interrelated factors include variations in temperature, precipitation and topography; with factors such as surface water courses and agricultural land quality operating at a more local level. The significance of water availability to pastoral and arable farming is not just a question of the quantity of precipitation, but also evaporation rates, amongst other variables (Fig. 5.4c; Lioubimtseva and Henebry, 2009). Although tensions exist between the land use needs of plant and animal husbandry, the two are intimately interrelated, and have been for millennia.

Data collection

Semi-structured interviews conducted with local participants from several village households provided the principal method of data collection for this study. In addition, living in the village for periods of six weeks for archaeological excavation allowed us to observe at close quarters active animal management throughout the year, which corroborated information provided during interviews and prompted further lines of questioning. Observations were possible within the project's excavation seasons, each of around six weeks (in spring 2012, 2013 and 2014; summer 2012 and 2013), and shorter week-long visits to the area (winter 2012 and 2013). Interview dates are given in Table 5.1.

The great majority of the villagers are Kurdish and Muslim. Today vehicle ownership appears to be common, with most households having a vehicle. A small number of tractors were observed in the village. These were clearly used to plough arable fields, but when observed sowing was done by hand. The inhabitants of Bestansur consist of family households living within close proximity to their extended kin. From our observations, these households comprise nuclear families within single dwellings, generally consisting of a house, enclosed yard and one or more out-buildings. The local participants included in this study, referred to as households or families, represent the immediate family residing in one dwelling within the village. The results of each semi-structured interview relate to the individuals and animals that belonged to the immediate members of the family residing within one individual dwelling within the village and not the extended family unit.

Local participants were happy to demonstrate many of the techniques and practices discussed during the interview process, providing further insight into these and in some cases the necessary materials for further research e.g. the manufacture of dung cakes for experimental burning (Elliott *et al.*, 2013). During the spring 2013 field season we also spent a day with a local sheep/goat herd, observing their behaviour, the behaviour of the shepherd and the interplay between them. In addition we had the opportunity to interact and question the village cowherd who regularly herded a similar route and observe the interaction between these different herds and herders. Accompanying the herd also meant it was possible for us to engage with the shepherd to determine routine practice and the context in which herding decisions are made. Locations of all modern samples collected for scientific analysis (reported in Elliott *et al.*, in press) were recorded with a Garmin eTrex H, high sensitivity handheld GPS.

Semi-structured interviews

Dialogue with local families in the form of 'semi-structured' interviews provided the primary method of data collection, gathering information about both current and past practices. Interviews took the form of a questionnaire designed to

Table 5.2. Questionnaire results from three families in relation to present animal and plant management.

		Household 1	*Household 2*	*Household 4*
ANIMALS				
Number		1/3/24	100/50/9/60	7
Type		S/C/Ch*	S/G/C/Ch	C
Milk		yes	yes	yes
Meat/eggs		eggs	sold for meat	sold for meat
Breeding		no	yes	yes
Wool/hair		no	yes	yes
Dung (fuel/fertiliser)		fertiliser	fertiliser (summer only)	no
Other uses		n/a	n/a	n/a
Grazing	Spring	low hills close to village (C)	fields/ river (S/G/C)	non-cultivated fields
	Summer	fields around the mound (C)	fallow fields (S/G/C)	
	Autumn	no		
	Winter		limited-river (S/G/C)	
Grazing duration		n/a	summer 6am-6pm (S/G)	n/a
Supplementary Feed		straw, barley, flour	straw, barley, Alef, wheat, bad flour	barley farmed/bought, bad flour/rice, Alef
Penning	Summer Winter	S/C separately	S/G/C separately	pen for adults and pen for calves
Pen location	Summer	house	fields (S/G), house (C)	house
	Winter		house (S/G/C)	
Hunting?		no	no	no
GARDEN				
Primary function		decorative	n/a	food
Fodder grown		yes - and weeds fed to livestock		no - but weeds fed to livestock
Approximate size		Small		large
Main gardener		mother		father
Source of plants		shop bought		friends and family
Watering		Hand		hand and sprinkler system
Tillage		ploughed and sown by hand		ploughed by tractor and hand
Manured (dung fertiliser)		yes - dung from own cow		yes - dung not derived from own livestock
Weed killer/pesticide use		never		never
Food plants		onions, herbs, vines, celery, pulses		fig, grape, almond, pomegranate, mulberry, black-eyed bean, okra, celery, leek, radish, spinach
Collection/use of plants from outside the garden/areas of cultivation		food and fodder, not transplanted into garden		food and fodder, not transplanted into garden

Key: sheep (S), goat (G) cattle (C), chickens (Ch), *and doves

investigate year-round modern husbandry practices within the local landscape and environment (see Tables 5.2 and 5.3). A supplementary plant-based questionnaire explored the role and function of informants' 'Kitchen Gardens', collecting information on how animal and plant management are integrated and function sustainably at the level of individual households within the village's structure and economy (e.g. foddering, manuring). 'Kitchen Gardens' is used here to describe those gardens in which some, or all, of the plants being cultivated are for household consumption

(also commonly referred to as 'homegardens' (Vogl *et al.*, 2004)). Whilst questionnaires provided a structure to these interviews participants were encouraged to elaborate on and deviate from topic to describe other related or non-related practices, traditions, etc. This was particularly constructive when considering animal husbandry in the past. Interviews were conducted with the aid of translators and information was written down during interviews. Verification of details were made during interviews, but detailed cross-checking of the information has not been carried out at this stage and responses have been accepted at 'face value', as such this data-set should be treated as preliminary. With the permission of participants, photographs were also taken on occasion.

Four families from Bestansur village were interviewed; three families (Households 1, 2 and 4) provided information on present-day activities, one (Household 4) on past and present activities and the fourth (Household 3) gave information about activities *c.*70 years ago in the past (Table 5.1). Households 1 and 2 are both nuclear families, comprising a 'younger adult' couple (around 30–40 years of age), with a number of children (ranging in age up to 16 years old). Households 3 and 4 each consisted of a married couple belonging to the current 'older adult' generation (being >60 years of age). Households 1 and 3 are related, with the male head of household 1 being the son of the couple in household 3. Both husband and wife from households 1, 3 and 4 took part in the questionnaire, whereas only the adult male in household 2 answered our questions for this family.

It was apparent from our repeated visits to the village that animal ownership was relatively dynamic through time by households, with a certain amount of turn-over as animals were bought or sold. The data presented here represent snap-shots of the time and season at which the interviews were undertaken (Table 5.1). We did not collect detailed information on when animals are killed locally (i.e. beyond the market) but from observation we can anecdotally comment that local slaughter would appear to be relatively rare and mainly linked with a feast or celebration.

Present-day animal husbandry practices at Bestansur

Present-day practices in the village, as inferred by interview results and observations, identify two broad levels of involvement in animal husbandry by households. The first applies to households who keep small numbers of animals to supply food for home consumption and small-scale local trade. This is the situation for the majority of households in the village and is represented by Households 1 and 4 in this study (Table 5.2). A small number of cows are kept by many households in the village to provide milk for yoghurt production. At the time of our interview, Household 1 had three cattle (two cows and one calf) and one sheep (a young male who was sold on later that year). The cow's milk was regularly collected and made into yoghurt for family use and for sale or exchange locally. Household 1 also kept chickens, primarily for their eggs but occasionally for meat (the males) with the use of both products limited to family consumption. Household 4 owned seven cattle (three cows; one bull; four calves). These animals were kept for their milk and they generally keep the females and sell the males after 1–2 years. However, they sometimes sell the calves, especially the males when they need money.

The second level of involvement in animal husbandry applies to households who keep larger herds of animals to supply products to regional markets. This is the pattern for a minority of households in the village and is represented here by Household 2. Household 2 focussed production on their herds of sheep (100 individuals including three adult males) and goats (50 individuals including one adult male), with smaller numbers of cattle (seven cows; two bulls; two calves) (Table 5.2). Sheep and goats were largely sold for meat in the Sulaimaniyah bazaar or to the butcher, and not consumed/used by the family themselves. Milk is collected from both sheep and goat herds in the spring for sale, and wool is also collected from the sheep to be sold. We were told that cows were kept for milk, for breeding and selling calves; that milk becomes available one month before birth, and that some cows produce milk for 11 months, while others dry up after four or five months. Household 2 also kept chickens, primarily for personal consumption of eggs, and occasionally meat; although sometimes eggs were sold.

Spring activity

In spring the landscape is a blanket of green vegetation (Fig. 5.5). The birthing period of many animals within the village coincides with the combination of increasing temperatures and lush vegetation. Broods of both geese (*Anser anser*) and chickens (*Gallus gallus*) hatch in late March and early April. Bestansur is locally famous for its geese and one local informant explained that these used to be even more common – recounting that when she was a girl (*c.* 30 years ago) the water table was much higher, apparently only about 5 m below the ground surface locally, and there were many more geese. The informant stated that now, as much of the spring water is pumped to nearby towns, the water table is lower at about 30 metres below the ground surface and there are fewer geese. Lambing begins in early January. During a January field trip to the area around Zarzi village (*c.* 60 km to the north-west of Bestansur), we observed local sheep herds lambing (Fig. 5.6). We also witnessed that nomadic family groups from further south or west had recently arrived in the area to benefit from the high quality pasturage and their lambs were noticeably older than the lambs of the local settled Kurdish families.

At Bestansur, households involved in small-scale cattle husbandry take their animals out for daily grazing during

Figure 5.5. The landscape around Bestansur during the spring, rich in vegetation (April 2012).

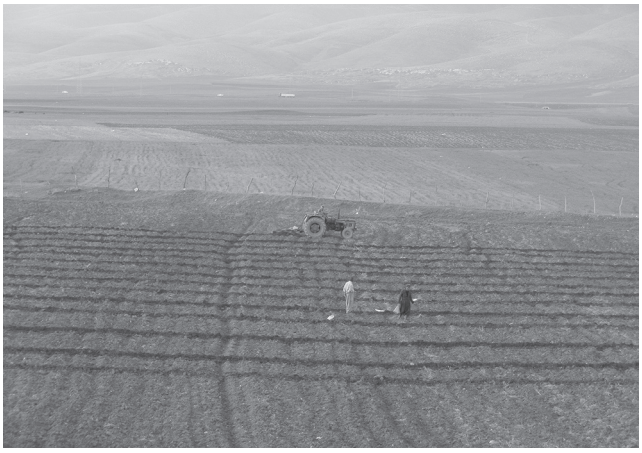

Figure 5.7. Barley field being sown in spring to raise crop for animal feed (Household 4); with the limestone foothills of the Zagros in the background (April 2012).

Figure 5.6. Newborn lamb suckling from its mother (Zarzi, Sulaimaniyah Province; January 2013).

Figure 5.8. Goats browsing on trees and bushes in the river catchment area (April 2012).

the spring (Table 5.2). The eldest son (*c.* 14 years of age) of Household 1 regularly took one of their cows to graze in the low foothills near the village, whereas the other cow remained at the house with its calf. In the spring, Household 4 take their small herd of cattle out to graze locally anywhere they can that is not under crop. Household 4 owned a field next to their house that they planted with barley during the spring in order to provide supplementary food for their cattle (Fig. 5.7); this is not enough supplementary food to feed the animals on throughout the year, so they also buy additional feed such as barley, 'bad flour', rice, and alef (purchased animal feed comprised of straw and barley).

The larger caprine herds are taken out for daily grazing from the village in spring, including herds belonging to Household 2 (Table 5.2), which are grazed on wild grasses growing in fields around the mound within the river catchment area where there are no crops. Goats also browse on the trees and bushes in the fields (Fig. 5.8), and both sheep and goats were observed grazing on reeds by the river, however informants explicitly stated that reeds are never collected for fodder.

Direct Observations of Spring Herding Practice

On 16 April during the spring 2013 field season, we spent approximately 5 hours in the morning with a local farmer out herding his flock of sheep and goats, which included animals owned by two other families. The route taken by the herder is shown on Figure 5.2. During the course of herding attempts were made to keep the animals out of the growing crops, although goats especially would stray into the edges of the fields and were observed feeding on the wheat crop growing here and on crop weeds. The herder returned to

Figure 5.9. A local herder milking one of his goats back at the pen after the morning's grazing (April 2013).

Figure 5.10. Sheep/goat herd being grazed in the fallow fields during the summer (September 2012).

the house at lunchtime to milk the goats and have his own lunch. The same route was followed in the afternoon but on alternate days the herder would take another route out from the other side of the village for grazing (this precise route is currently unknown to us). The kid goats remained back in the pen during the morning grazing time so that the lactating females could be milked during lunchtime when they returned to the pen before the herd went out again in the afternoon (Fig. 5.9). Lambs went out with the herd and could drink milk through the day as sheep were not being kept for their milk; just meat and wool.

During the course of the morning's grazing we met up with the village cowherd who was following a similar route down along the river (see Fig. 5.2) and who took out cattle for other villagers whose children did not undertake this task. The cowherd stated that he had 50 animals from the village with him (although we counted only 30 individuals at most) and that cattle are born at different times of the year; with one calf per year. The herd were almost exclusively adult females, except for a single bull. The cowherd also told us that cattle-grazing is better by the river than in the hills, and that they drink more than sheep and goats, as would be expected from these animals' physiological requirements (Nardone *et al.*, 2006; Silanikove, 2000; Temple, 1984). In the spring they leave at 7am and come back at 11.30am and in the afternoon they leave at 1pm and are back at 6pm. In the summer cattle stay at home and people collect plants to feed them. In the summer and autumn, after the harvest, they graze on the harvested fields, while during the winter they are kept at home and supplied with fodder.

Summer/Autumn activity

All the households interviewed reported that there is little variation in animal husbandry practices between the summer and autumn. Therefore, although the information described here was largely recorded as summer activity, we can reasonably assume this is representative of autumn activity as well.

Households involved in small-scale cattle husbandry take their animals out for daily grazing during the summer. Household 1 took their cattle to graze by the mound in the river-catchment area, but also supplied them with some supplementary feed (Table 5.2). Household 4 told us that, as in the spring, they take their small herd of cattle out to graze locally anywhere they can that is not under crop.

Household 2 grazed their large sheep/goat herds on the fallow fields around the village after harvest, which we observed them doing during our summer field season (Fig. 5.10). In summer the sheep and goats are also penned directly on the fallow fields while cattle remain at the house. The daily routine for the sheep and goats is that they are taken out at about 6am, returning for an hour or two to their pens in the early afternoon, before going out grazing again and returning at approximately 6 pm. The sheep/goat pens are moved when they become too dirty – which effectively means that they are moved three to four times during the summer. This practice facilitates the spreading of dung directly on the fields providing a natural fertiliser for subsequent cultivation. Cattle pens meanwhile are cleaned out twice a day, once in the morning and once in the evening, and three times if particularly dirty. Figure 11 shows a picture of the summer sheep/goat pen of Household 2 to the east of the village on the fallow fields. The pen had been in place for about six weeks and we were told that it was quite dirty and might soon be relocated. The sheep and goats penned within this included both Household 2's herd, and also the herdman's animals (not a family member): in total about 300 individuals.

Table 5.3. Questionnaire results from two families in relation to animal management in the past. Key: sheep (S), goat (G) and cattle (C)

		Household 3	*Household 4*
ANIMALS			
Number		8	50
Type		C	S/G
Milk		yes	yes
Meat/eggs		sold for meat	sold for meat
Breeding		yes	yes
Wool/hair		no	yes
Dung (fuel/fertiliser)		pre-1980's dung fuel for cooking	fuel for heat/cooking (summer)
Other uses			marrow
Grazing	Spring	hills and around the mound/river/fields	hills (3 months)
	Summer		fallow fields
	Autumn		
	Winter	kept in-no grazing	hills (good weather only)
Grazing duration		during the day only	3 months day and night in the Spring
Supplementary Feed		straw (collected in other seasons). None bought	straw, barley
Penning	Summer	pen for adults and pen for calves	n/a
	Winter		S/G together
Pen location	Summer	house	n/a
	Winter		house
Hunting?		birds (in the mountains)	fish and birds

Winter

During the winter Household 1 did not take their cattle out grazing, rather the animals were provided with supplementary feed (Table 5.2). Household 2, however, described that there was some graze around the river, but that all animals were mostly fed at the house with supplementary feed consisting of straw, barley, wheat, alef, and 'bad flour' (Table 5.2). During the winter all Household 2's animals are penned at the house, with sheep and goats penned together and cattle kept separately. The sheep/goat pens are cleared out once a day, when the animals go out grazing in the morning. Cattle pens are cleaned out twice a day, once in the morning and once in the evening, and three times if dirty, as in the summer.

Past animal husbandry practices at Bestansur

In the recent past, there was also a diversity of practices, with the two households interviewed indicating separate focuses: one on sheep and goats, the other on cattle (Table 5.3; Households 3 and 4 respectively).

Sheep and Goat Husbandry

One elderly man in the village (Household 3) described to us his father's husbandry practices relating to a period *c*. 70 years ago. His father had around 50 sheep and goats and in spring the animals were taken to the foothills (see Fig. 5.2) and stayed there continuously for around three months. He said that seven families would take their herds together totalling maybe 500 sheep and goats, and that a male member from each household would stay each night with the family's herd, sleeping out in the open, with no tent. They would also take a dog (*Canis familiaris*) (presumably for herding/protection) but animals were not penned. Every day the women would bring buckets and bowls for milking and every night they would take food up for the men as well as bringing the new-born animals back to the village.

We were told that they were taken to the hills in spring because there were crops growing in the fields. The animals grazed purely on grass in the hills, as there were apparently no trees in our informant's father's time, although the landscape was greener (our note: perhaps related to higher ground water levels? – see above). After the 1980s there were more trees, as people began to plant trees and orchards. In summer and autumn animals grazed the fallow fields around the village after the crops had been harvested, as is the current practice. They used the hills for grazing during the winter too, but not when it was raining or snowing in which case animals would remain at the house. Supplementary feed was only given to the animals in the winter, especially when there was snow which could last up to a week. Supplementary feed consisted of a mix of straw and barley. We asked if locally available vegetation such as tree leaves or reeds were collected, but our informant said no and that he thought reeds were bad for the animals.

During the spring, the milk collected by the women was made into yogurt and cheese. Male animals were culled at 2 or 3 months old and sold in the bazaar in Sulaimaniyah (which took 6 hours to walk to from Bestansur) although sometimes the families ate the meat themselves. Females

were kept into adulthood and any sick animals were killed. Wool was collected and sold at the bazaar.

Cattle Husbandry

Household 4 provided information on past cattle husbandry: they would keep around eight cattle but never sheep or goats. The family elaborated on their past choices, by saying that cattle herding was easier as they are brought home every night, and sheep and goat herding was more difficult as they were kept in the hills during spring. Cattle were grazed in the hills and by the mound (our note: perhaps referring to the river catchment area more generally). No tractors were used at this time and so fields were ploughed using cattle to provide traction. Consequently, there was less area under crops and more space to graze locally. They commented that farming is easier now rather than in the past, but that grazing is harder. They did not buy extra food, but only collected straw for additional feed. Straw was collected for feed to be given during the winter and cattle were also kept back at the house during the winter.

Dung Use

People would only process dung in the hotter months when conditions were favourable. In the winter they dumped the dung as it cannot dry during this time, due to insufficient sun. They used the dung from the summer throughout the year as a fuel, which was burnt when baking bread and cooking in the summer and for cooking, baking and also heating the house during the winter. Cattle dung was formed into blocks like wood with no additives and dried in the sun. They did not process sheep and goat dung, but used the unprocessed pellets collected from the animals. In the winter, after cleaning the pen, they would add straw to dry the pen. The use of dung as a fuel stopped in the 1980s, as gas fuel became more accessible to the general populace.

Discussion

Animal husbandry at Bestansur: context, continuity and change

The village of Bestansur fits the general pattern described by Maran and Stevanovic (2009, pp. 103–104) for village-based food production in Iraqi Kurdistan. Sheep and goats are the most numerous livestock in the village, and their husbandry is most visible in the local landscape. Cattle husbandry, however, may be of greater significance to household food production as opposed to market production. Small-scale cattle keeping for dairy production appears to be relatively common around the village, with one or two animals kept in many households' yards and taken out to graze either by family members (often sons) or the village cowherd. These animals are kept for regular household yogurt production. We have not systematically investigated arable production, but observations appear to concur with the picture provided by Maran and Stevanovic. Crops observed, or reported as growing, in the river catchment area include: watermelon (*Citrullus lanatus*), cucumber, tomatoes, onions, okra, and black eyed beans (*Vigna unguiculata*). We also observed a local orchard near the spring head, and barley being grown specifically for animal fodder.

Figure 5.11. Summer sheep and goat pen to the east of the village in fields (Household 2) – dimensions c. 20 × 14 m; metal fencing (September 2012).

The results from informants discussing past and present practices provide insights into the degree of continuity in practices over time. These largely reflect the constraints of the annual farming calendar, as influenced by seasonal variation in the climate (Fig. 5.4) and the seasonal needs to integrate and separate the pastoral and arable components of the economy. We see today, and in the recent past, grazing and penning varies seasonally and spatially according to available/accessible resources. Manuring of fields by grazing (Fig. 5.10) and penning (Fig. 5.11) sheep and goat herds on fallow fields during the summer also forms an integral component of the arable calendar. We also see differential use of the landscape for grazing according to the physiological needs of the animals: cattle require more water than sheep and goats (Bendrey, 2011; Silanikove, 2000; Temple, 1984) and are more commonly grazed in the river catchment area, compared to sheep and goats that make greater use of the landscape. It is also evident that integration of plant and animal resources exists in the form of local consumption at a household and village level, and via a number of households externally to supply markets for regional consumption (see also Elliott *et al.*, in press).

The results also indicate a degree of change through time, brought about to a large degree by modernisation of the local infrastructure, transport and living conditions. In the past villagers grazed their animals on the limestone foothills for three months during the spring; a practice which is no longer in existence. The main catalyst for the reduction in

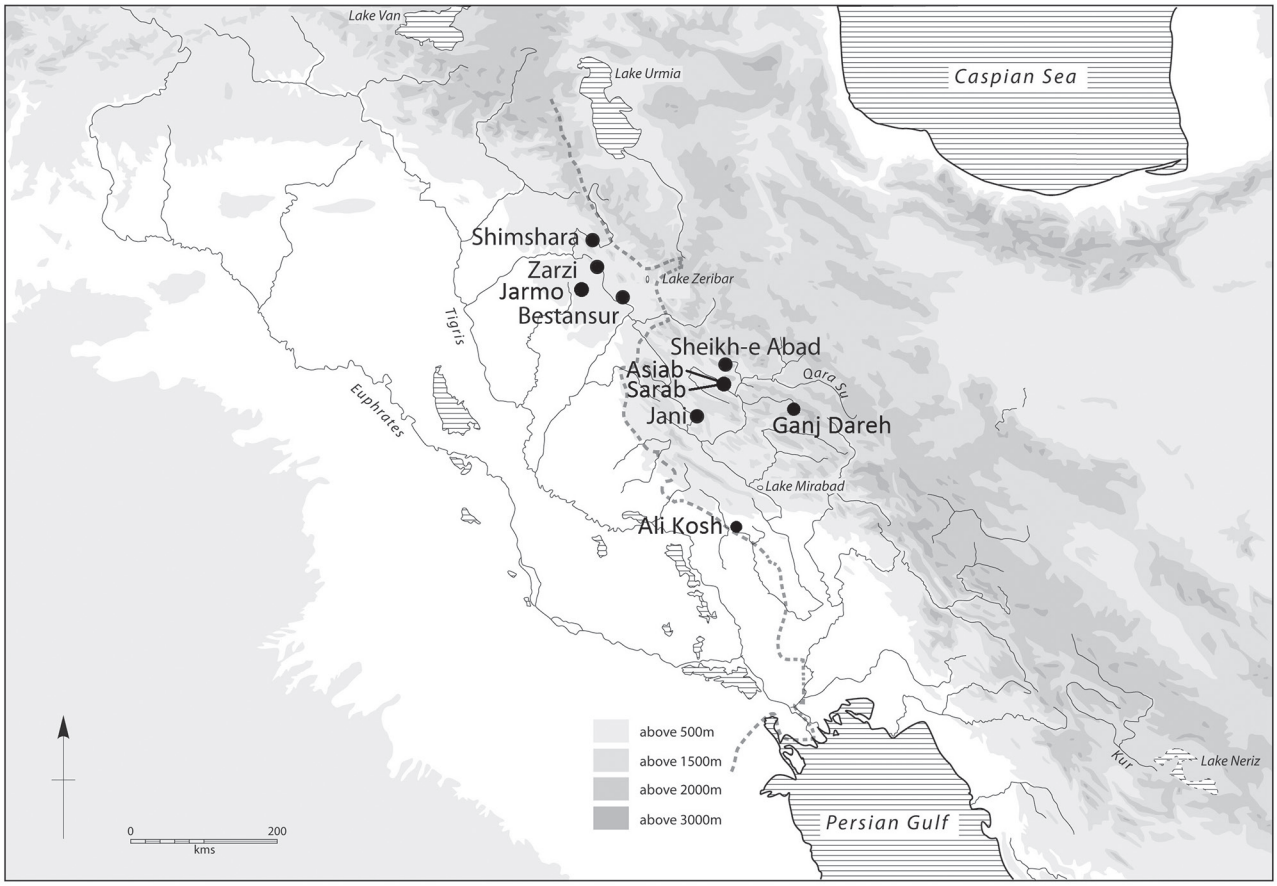

Figure 5.12. Location map showing Bestansur in the piedmont zone on the western side of the Zagros mountains in relation to some other key Early Holocene sites in the region.

grazing on the foothills was described as the construction of the main road heading from Arbat travelling east over the border into Iran (see Fig. 5.2), which made this part of the landscape less accessible for grazing. In addition, the introduction of gas cooking and heating in the 1980s effectively brought an end to the use of dung as fuel. Today, dung is still, however, used as a fertiliser, either directly deposited onto fallow fields during grazing or penning, or collected into dung heaps and added to 'kitchen gardens' (Table 5.2). Indeed, one informant (Household 3) told us that everything is very different now from the past in that in the past there was very little money – it was not a cash economy – and produce was mainly acquired via local exchange (within the village). In addition, he also said that they moved produce by horse (*Equus caballus*), not by car. Another perspective in the mechanization of transport is visible in the small number of donkeys (*Equus asinus*) visible round the village. One informant (Household 2) told us that donkeys had been used to bring crops back from fields, but since people now owned cars there is no use for donkeys and so they are effectively 'in retirement'.

Archaeological implications and applications

As described above, this work has been undertaken to provide a local framework and control data for ongoing archaeological investigations focusing on the nearby Early Neolithic site of Bestansur (Fig. 5.2). The results of the semi-structured interviews presented in this paper can help develop testable models of animal husbandry within the local landscape, especially in terms of the integration of animal husbandry and plant cultivation and frameworks for understanding intensive or extensive Neolithic farming practices (Bogaard, 2005; Gregg, 1988; Henton, 2012).

The Early Neolithic archaeological site of Bestansur (Fig. 5.2), dating to the earlier 8th millennium BC (Matthews *et al.*, 2014), sits in a region of the ancient Near East with early evidence for the emergence of goat husbandry (Fig. 5.12). The emergence of animal husbandry in the Early Holocene in the Near East occurred slowly and gradually over millennia. Animal husbandry evolved from hunting strategies and the intensification of relationships between humans and wild animals into the management of, at first, morphologically unchanged animals, generally within their natural habitats (Conolly *et al.*, 2011; Zeder, 2011). The

evidence suggests that the early domestication of sheep, goats, pigs and cattle occurred in multiple centres of the Fertile Crescent and followed markedly different trajectories in different regions and locales before a coalesced farming package emerged (Arbuckle, 2014; Zeder, 2011). As stated, the Central Zagros region of the eastern Fertile Crescent is one of the key areas with early evidence for goat husbandry. Here, the earliest identified evidence for the presence of domestic goats comes from Ganj Dareh (Fig. 5.12), where the demographic profile indicates a managed population of goats dating to *c*. 7900 BC that are morphologically unaltered from wild animals (Zeder and Hesse, 2000). During the course of the 8th millennium BC we see the adoption of domestic goat husbandry outside the preferred natural upland habitat of goats, appearing at Ali Kosh in the southern Zagros lowlands by *c*. 7500 BC and Jarmo in the western piedmont by the later 8th millennium BC (Bendrey, 2014; Hole *et al.*, 1969; Stampfli, 1983; Zeder, 2008). In the Zagros, it is only from *c*. 7000 BC that goat herding is combined with sheep husbandry. These animals enter the region from further north, with domestic pigs present in the region by the early 7th millennium BC and cattle perhaps as late as the 6th millennium BC (Arbuckle, 2014; Hole *et al.*, 1969; Zeder, 2008).

The composition of Early Neolithic domestic animal herds in the Central Zagros, would thus have been very different from the modern range of domestic species. In addition, whether or not secondary products such as milk and hair were exploited from the earliest periods of animal husbandry are unknown and the evidence is contested (e.g. see Orton, 2014, and references therein). However, the presence of ruminant dung is well-attested at all of the Early Neolithic CZAP sites in the Central Zagros: Bestansur, Sheikh-e Abad, Jani and Shimshara, (Fig. 5.12). The identification of ruminant dung within these Early Neolithic settlements indicates very close animal proximity and settlement co-habitation (Matthews *et al.*, 2014). Matthews *et al.* (2014, 271) argue that dung was widely used as a fuel in the Zagros from *c.* 8000 BC and also that it may have been especially important at the lowlands Zagros sites where fewer charred plants and wood charcoal remains have been identified. Early Neolithic household practices and decision-making in relation to domestic animal husbandry would thus have been significantly different to the combined farming components and practices present in the modern and recent period (e.g. where we see cattle as significant in terms of household dairy production).

Investigating modern villages with the aim of understanding past societies is therefore not perfect because present day agricultural conditions are not completely analogous to those of ancient times (Miller, 1984). Using ethnoarchaeology to interpret archaeological sites has long been criticised and evaluated due to the many challenges and practical problems (Agorsah, 1990). The introduction of modern technology, i.e. vehicles and gas, alters the organisation and functionality of society and therefore direct comparisons can never be maintained (Miller, 1984). Other factors to consider are the introduction of crops which would not have been present in the archaeological periods to which comparisons are being made (Miller, 1984). Therefore, grazing, browsing and foddering practices cannot be directly related or inferred in comparison to modern practices. Ethnoarchaeological research can be used to better understand archaeological sites but cannot be directly compared. The data collected during ethnoarchaeological research is theoretical and interpretative rather than definitive and comparable. The concept 'analogy' which is central to the ethnoarchaeological framework is often misused within this field of research (Agorsah, 1990). Ethnoarchaeological information collected may be anecdotes that describe behaviours which are not simple and could easily be misinterpreted in relation to archaeological data, however these data can be useful if it is recognised that it can be utilised as a probability or likelihood when developing theories and inferences (Hole, 1978). Thus, the ethnoarchaeological data presented here from Bestansur can contribute potential testable hypotheses, for example, for practices of Early Neolithic caprine husbandry in the local landscape, through understanding of the local ecological constraints and affordances noted in this research. Some elements of society have remained comparable over many millennia in these rural areas of the Middle East, for example the reliance on local animal and plant produce and trade networks within the village and the wider rural region.

From our data, we can see tensions between arable and pastoral practices during the key spring season. Mediation of this conflict, in the recent past, involved seeking pasture in the foothills, away from the farmed fields. Expression of this in the archaeological past may depend on the locally available land for grazing/browsing and the extent of potentially cultivated areas. The needs of the herds during the birth season would also have been important including whether or not human groups were additionally collecting their milk. Integration of the animal and plant economies occurs at key points in the calendar: application of animal dung as fertiliser and the collection of wild and/or domestic plants primarily for winter foddering being key examples. Dung is known to have been a valuable resource for fertilising fields in diverse archaeological periods, and still is in many other regions today (Broderick and Wallace, this volume; Kenward and Hall, 1997; Bogaard, 2012; Forbes, 2012; Jones, 2012).

The results from the semi-structured interviews suggest different potential models for penning duration and location both on-site and off-site in relation to the archaeological settlement, which might be expected to have a seasonal pattern. Today, it is in the hot summer months after crop harvests that animals are penned and grazed on the fallow

fields to return nutrients to the soils. The need to collect dung for fuel or other use in the past may also have influenced the geographical placement of the herd, as it was in the dry months that the collection and storage of dung would have been most amenable.

Conclusions

The seasonal and spatial 'rhythms' of the local farming calendar identified here from a small number of semi-structured interviews offer testable models of animal husbandry and use for archaeological research. These results are specific to the local landscape and environment around Bestansur and can be used for evaluating and contextualising archaeological evidence. Documentation and comparison of past and present practices indicate the strong influences of the marked climatic fluctuations, animal physiology, and changing needs to integrate or separate the pastoral and arable components of the economy. Archaeological interpretations must obviously incorporate understanding of these observations, within the context of any differences in environment (e.g. climate, local water table, vegetation) and the fullest understanding of ideas on the functioning of past human society and economy. The research presented here is intended to suggest testable possible patterns for past practices within a local context rather than to limit interpretations to only these patterns. The research also stands as a record of oral histories of the rural life of this area. Such information risks being lost as these practices and traditions are being abandoned, with younger generations lacking the first-hand experience and knowledge of their forbears.

Acknowledgements

This research was carried out within the framework of the Central Zagros Archaeological Project (CZAP) funded by the Arts and Humanities Research Council (AHRC). We would like to especially thank the families of Bestansur, without which this research would not have been possible. We would also like to thank the very useful comments of the anonymous peer-reviewers.

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