

Nubian Agricultural Practices, Crops and Foods: Changes in Living Memory on Ernetta Island, Northern Sudan

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Agricultural practices in northern Sudan have been changing rapidly but remain little documented. In this paper we aim to investigate changes to crops grown in living memory and their uses through interviews with Nubian farmers on the island of Ernetta. By exploring cultivation and crop processing practices, together with associated material culture and foodstuffs, we also seek to explore how agricultural and food heritage are connected, and to better understand reasons for crop changes. Several cereals and pulses that were previously important subsistence crops are now grown as comparatively minor crops. The replacement of the *sagia* (waterwheel) by diesel pump irrigation, the introduction of commercial crops, and the reduction of the annual flood have led to fundamentally new cropping patterns within household farms. At the same time, each species has its own narrative and timing of change. Shifts in crops grown are paralleled by transitions in foodways, associated material culture, and land use. The project is timely, as much of the information about past crop uses resides in the memories of elderly farmers. The findings highlight the broader global need to document endangered memories of cropping patterns, traditional ecological and food knowledge, including local terms for foods and crops.

Key Words: Crop diversity, agricultural heritage, traditional ecological knowledge, orphan crops, foodways, oral histories, ethnobotany, archaeobotany

Introduction

With the globalization of commercial agriculture, many historically grown local food crops or varieties have become increasingly minor or

been displaced, and knowledge about their cultivation and use lost or endangered (IPBES 2019; Nabhan 2009; Reed and Ryan 2019). Globally, food systems have increasingly focused on a narrow range of modern varieties bred within agri-research to be high yielding, but which are generally high-input (Pingali 2012). Worldwide, it is now estimated that, even where local crop varieties persist, these are commonly grown alongside modern varieties, and that such changes in agri-practices and diversity are little documented (FAO 2019). The selection of

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specific species and varieties can also be viewed as dynamically connected to local food systems and cuisine, culturally specific agri-practices and preferences, language, and ecology (Kuhnlein et al. 2009).

Agricultural practices along the middle Nile valley have been changing especially rapidly in recent decades, mirroring these global trends. The culturally iconic *sagia* (cattle-driven wooden waterwheel) was replaced between the 1950s and the 1970s by diesel-driven irrigation pumps, accelerating the introductions of new crop varieties (Abu Salim 1980; Al-Batal 1994; Allan and Smith 1948). Since then, the completion of the Merowe Dam in 2009 has substantially reduced the annual flood northwards of the 4th cataract. Previously, the planting of crops in freshly deposited silts was a key point in the agricultural calendar. Today, small-scale family farms persist alongside varying scales of agricultural schemes, and the extent of agri-development is regionally variable.

Here, we discuss changes to crops grown and their uses since the mid-20th century in family farms on Ernetta Island in the Sukoot region, and the reasons why. Are there connections between crop choices and alterations to land use and cultivation practices, crop and food processing methods, or in the erosion of intertwined linguistic and agricultural knowledge? Given the lack of vehicles and mains electricity (prior to its introduction in 2019), and the continued use of vernacular architecture and domestic fixtures, Ernetta provided a rich case study for such research. The presence of elderly farmers also provided insights into farming during the time of the *sagia*.

This paper draws on research conducted as part of three interconnected projects that sought to situate crop uses within the local cultural, agroecological, and temporal contexts. The first compared recent and ancient crop use in northern Sudan, focusing on modern-day Ernetta Island and the nearby late 2nd millennium B.C.E. island town of Amara West (Ryan 2017; Spencer et al. 2014). Comparative interviews were also undertaken in neighboring Abri, and during short research trips to other Nubian villages in the broader Sukoot and Dongola regions to assess any differences in agricultural practices (Ryan and Homewood 2016). The more in-depth interviews on Ernetta covered

a wider range of topics, offering insights into crop choices, local food and agricultural terminologies, food uses, and endangered heritage. A subsequent project focused on writing a community-oriented book centered on Ernetta, and on-going ethnobotanical research has focused on wild plant uses and plant-based material culture.

Sudanese Nubia and Ernetta Island

The region usually defined as Nubia has changed over time, extending from around the 1st Nile Cataract near Aswan to various southern limits, extending beyond the 6th Cataract during the Medieval period (Edwards 2004). Today, riverine Nubian languages are still spoken downstream of ad-Dabba (located between the 4th and 3rd cataracts). There, Andaandi (Dongolawi) is spoken in Nubian villages up to the 3rd cataract, and this language is almost the same as Mattoki (Kenzi), which is the northernmost Nubian dialect, spoken in the area to the south of Aswan prior to the Aswan dam, and today in areas around Aswan (Rowan 2017). Between these, Nobiin is spoken northwards of the 3rd cataract by the Mahas, Sukoot, and Halfawi in Sudan, and the Fadija in southern Egypt (Fig. 1). These names reflect the people, sometimes the language, and the regions occupied prior to the large-scale resettlements of Nubians living north of the Sukoot following the building of the Aswan High Dam and creation of Lake Nasser/Nubia in the 1960s (Bell 2006).

Modern Nobiin is the closest descendant of Old Nubian, one of the oldest written languages in Africa, its script derived from Greek, Coptic, and some Meroitic, is known from documents dating to the medieval Nubian kingdoms (Bell 2006). Today, Arabic is the official language, with Nubian languages only spoken and considered endangered (Rowan 2017), though there are efforts to revive a writing system using contemporary Nubian characters based on Old Nubian script (Bell 2006). Significantly, it is well recognized that a connected endangerment can exist between botanical knowledge and languages (Maffi 2005).

The northern Dongola Reach and the Sukoot lie within the hyper-arid Northern State, with a mean annual rainfall of around 25 mm, thus agriculture is entirely dependent on the Nile (FAO

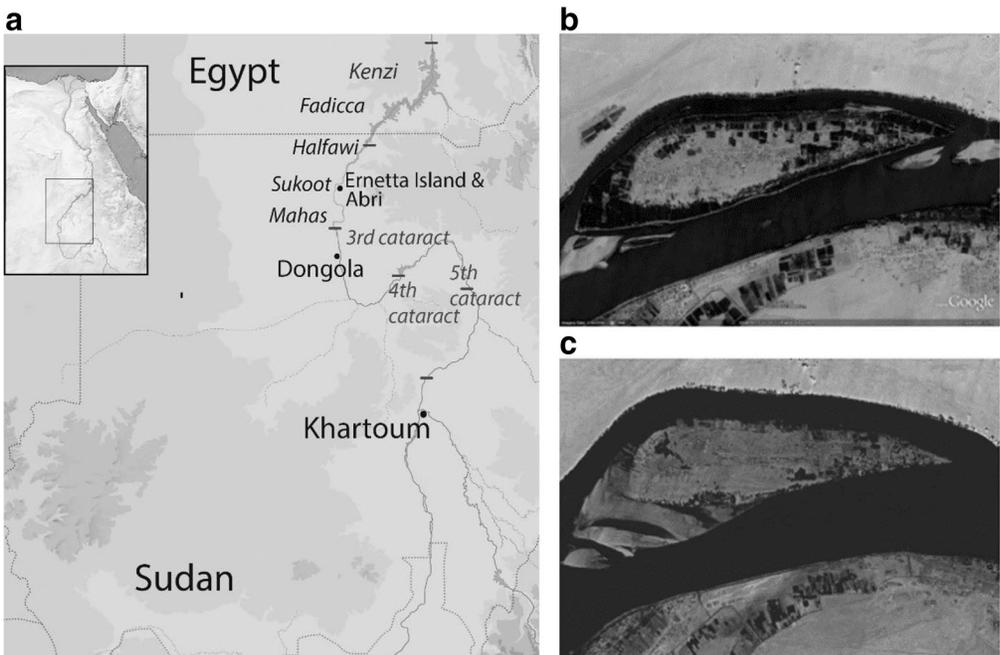


Fig. 1. (from left) **(a)** Map showing the location of Ernetta, major towns, and contemporary Nubian regions; **(b)** Google Earth image of Ernetta Island and Abri, February 2017; **(c)** Corona Satellite imagery of Ernetta Island and Abri 1968.11.17.

2015). Riverine vegetation forms a green corridor that contrasts sharply with the surrounding desert. In contrast to the more continuous floodplains and inland basins of the Dongola Reach, as the river runs northwards through the Mahas and then the Sukoot, it becomes characterized by higher riverbanks with riparian sand dunes up to 15 m tall, with more limited stretches of cultivable land. In the Sukoot, villages cluster on the east bank (which is more protected from windblown sand), and on two large, inhabited islands, Sai and Ernetta, the latter opposite the small regional center/town of Abri.

Differences in riverine morphology have impacted regional trajectories of 20th century agri-development. The most extensive schemes in the arid north are found upstream of the 3rd cataract, among the Kerma and Selim basins in the Northern Dongola Reach (Wilson 1991). There, initial canal building dates from the start of the 20th century, and large-scale canals and various government, private, and community schemes were

constructed during the 1940s. In the Sukoot by contrast, agri-expansion has been at a smaller scale. We were told by key informants in Abri, that the narrow (<1 m) canal network that extends cultivation inland of the riverbank farms and market area was also originally built in the late 1940s, creating extra land mostly for small-scale family farmers. An area (close to the main road) was later commercially run but was no longer being cultivated during the years of our fieldwork.

In recent decades, with modern technologies, commercial private schemes are now also created further inland, in previously uncultivated areas, often deep into the desert (Fragaszy and Closas 2016). Some of these are relatively short lived, such as the desert schemes west and north of Ernetta/Abri close to the riverbank, again of relatively small to medium scale, observable on Google Earth. Extensive modern “pivot” schemes are more concentrated on inner fringes of previously uncultivated alluvial land in regions like the Dongola Reach, and the

characteristic circular shapes are also visible on Google Earth.

Ernetta Island is 4 km in length and made up of three adjoining villages arranged around three mosques, with one small shop, a bakery, and a junior school. On the east and north of the island the houses are situated within their fields, whereas those in the center of Ernetta cluster around pathways. A comparison of 1960s satellite imagery, aerial photography from the 1980s, and Google Earth today shows continuity in locations of older houses, and an increase in houses in the central/west of the island (Ryan 2017). All the houses are owned, and today people that have moved to Khartoum periodically return to check on houses and crops.

Most houses on Ernetta Island are made with vernacular techniques, typically built in rammed mud (*jalous*) with rooms arranged around one or more interconnected, rectangular inner courtyards. Most, however, are going through a transitional process, with the spaces originally used for certain types of cooking, grain storage, and grinding all being reconfigured, and additionally, the introduction of modern materials (cement, vinyl floors, fired bricks, zinc roofing etc.). These transitions are further advanced across the river in the town of Abri (Dalton 2017). Older houses in Abri and conjoining villages ran parallel to the river, and some are now abandoned, with families building newer houses closer to the roads and market. There are a few government buildings along the waterfront in Abri, and both junior and secondary schools. Other changes have included the introduction of motorboats from the 1980s, reducing the crossing between Ernetta and Abri to 10 minutes, and a new tarmac road between Khartoum and Egypt, reducing journey times from the capital to Abri (720 km) to 7–8 hours.

Research Methods

Interviews were semi-structured and open-ended, the former focused upon which crops farmers grow today, their uses, where and when they are grown, and whether there have been any changes. We asked elderly farmers about mid-20th century agricultural practices using a similar range of questions. More

open-ended conversations added details on cultivation practices and crop processing. Visits to households and farms included demonstrations of agricultural tools and grinding stones, and how different dishes were cooked. Cereals and pulses, the region's key dietary subsistence crops, were the primary focus of research. The archaeological record also preserves evidence of these crops, important for the original deep-time component of the research project. We did, however, also document the broader range of crops grown and asked farmers which types of crops they regarded as the most important.

Overall, on Ernetta, 55 interviews were undertaken in 2014 to 2015 (participants identifying as aged 24–104), with some focusing on specific topics such as crop processing (not fully discussed here) or irrigation. We inventoried the cereals/pulses currently grown by 24 households, and interviews with 14 elderly farmers (aged 75+) enabled a degree of semi-quantified temporal comparison between the crops grown today and in the mid-20th century. Although assessing the validity of information from memories can be difficult, on Ernetta, farmers are still engaging in light farming activities into their 80s, and their accounts of farming and foods in the time of the *sagia* were specific and corroborated by each other. The main household interviews were led by the male heads of the family, but other adult men and women in the fields and home also contributed, often through multiple visits to houses or during walks, tea, and meals. Interviews in Abri and other villages (forthcoming) focused more narrowly on comparing the range of cereals and pulses grown over time. A local agricultural officer from Abri, then living on Ernetta, provided insights into his farm and broader trends.

Interviews in 2018 were focused on the creation of a community-oriented book and key participants were revisited. Although information from prior interviews provided a starting point, further consultations while writing the book in Sudan enabled the content to be refined with previous and new interviewees, and to be edited with the help of two local primary and secondary school teachers. The book was aimed at multigenerational local audiences, as it was based on the memories of older farmers and made accessible to younger audiences. During this phase of

the project, additional discussion about the crops used in different foods occurred, more so than in the original interviews. The process of creating the book also involved ascertaining consensus views on how to summarize such information.

During fieldwork we lived in a traditional village house on Ernetta Island, used by the Amara West Research Project team during winter field seasons (January–April) between 2010 and 2019. This allowed us to draw on an existing network of relationships and contacts within the island’s rural communities, and to meet potential interviewees, while other interviews were arranged in advance via introductions. In collaboration with co-author Prof. Maha Kordofani, plant specimens collected during fieldwork were deposited at the Herbarium in the Botany Department at the University of Khartoum.

Fieldwork was guided by Prof. Katherine Homewood (University College of London—UCL, anthropology) in line with UCL’s ethical standards, and following the 2006 International Society of Ethnobiology (ISE) Code of Ethics. Prior to community interviews, verbal consent was obtained, and the project introduced. A project description was printed in Arabic, but we soon switched to a verbal description as this was deemed socially preferable. Literacy levels are lower in older generations as, unlike today’s children, they did not all attend school.

Interviews (led by Mohammed Hassan and Mohammed Saad in 2018) were conducted in a mix of Nubian (Sukoot Nobiin) and Sudanese Arabic, and wordlists made for key terms in Arabic and Latin script. Arabic script is limited for transcribing Nubian sounds (especially as Arabic has fewer vowels) but is the most accessible writing system. Latin script used here follows international approaches (that are more standardized than using English) following Werner (1987) and Satzinger (2018), with vowels having Latin/Italian pronunciations e.g., e like English “ay,” and i like “ee.” Long vowels are indicated by doubling the letters, but tone sounds are not indicated here. In a collaboration with linguist Marcus Jaeger since late 2020, Nubian words have also been written here in contemporary Nubian characters that are closely based on Old Nubian script (using Sophia Nubian font).

Seasonality, Land Use, and Irrigation Practices

The dynamics of the agricultural cycle reflects both seasonal temperature variations and the rise and fall of the Nile. Maximum and minimum mean temperatures (in Dongola) can range from 9 to 34°C between November and March, and from 18 to 43°C between April and October (April–Oct) generally peaking in June (Walsh 1991). During our interviews, present-day agriculture crops were described as “summer” or “winter” crops. However, three agricultural seasons were described, especially when discussing past practices: the winter (late October–April), summer (May–July), and flood seasons (late July/August–October). Nile levels rise locally around late June/July and can begin to recede at some point between the end of August to early October. Since the completion of the Merowe Dam, river levels still become higher during these months, but now usually inundate lower lying areas and sloping riverbanks.

Agricultural land on the island is subdivided into different categories based on soils, water management, and cultivation practices. These topics were a key element of the early interviews. Three main areas of agricultural land were distinguished (Fig. 2a–d, Table 1). Low sloping riverbank areas with deposited Nile alluvium are known as *jarf*, which can extend inland up to 40 m. This is more common in the eastern part of the island, as the western stretch has steep or densely overgrown banks that limit cultivable area. The flat area of upper riverbank land (that used to be flooded) is known as *gurer*, extending up to 150 m inland in the east and 500 m in the west. Beyond the old flood belt, sandier less fertile alluvial soils and land are known as *barju*. The proportions of *jarf* and *gurer* has also changed in recent decades. Notably, 1960s (satellite) and 1980s (aerial) footage shows the expanse of now fixed *gurer* fields on the western side were previously sandbanks and *jarf* land (Ryan 2017).

Saluka land refers to the wet alluvial soils that can be farmed when floodwaters recede, and this used to include both the *jarf* and *gurer* areas. Today, as the high Nile still covers the *jarf* areas they can be farmed in a similar mode, but the *gurer* land is now fixed land and irrigated with diesel pumps year-round. Date palms (*Phoenix*

dactylifera L.) run parallel to the Nile at the outer edge of the *gurer* land, and this is commonly observable in other villages. The dates here (farmers explained) can be grown without watering once established, and old trees can stretch back four generations. The date palm groves that run parallel to the river form a distinct ecological niche, and provide a means to distinguish the land categories and past potential extent of the flood and *saluka* cultivation (Ryan et al. 2021).

Shadufs (hand-operated lever and pole water lifters) and *sagias* (cattle drawn waterwheels) were used on Ernetta up until the late 1960s or early 1970s. Three farmers explained how *shadufs* were used to irrigate small areas of vegetables or help *saluka* crops on higher land when soils started to dry. After the *saluka* season, *sagias* were used to irrigate *gurer* and some *barju* land, and when the river was high again, the *sagia* would be moved to the boundary of the flood zone to irrigate the *barju* areas. *Sagia* well-pits can also still be seen in places on the island. A series of *shadufs* or *sagias* could also reach higher land when the river was low. Farmers either had their own, or sometimes shared *sagias*.

As in the recent past, farms on Ernetta Island are small-scale family farms with cultivated field areas of very approximately 0.5 to 1 hectare, not including the house itself, or the animal pens scattered in the sandy uncultivated stretches or between old palm trees. Old palm trees can have shared ownership and variable locations. Given the different soil types, areas farmed can be patchily located, especially in the case of older houses. In the early 20th century, *sagia* areas were mapped and numbered by local officials to fix land ownership; these demarcations are still referred to in some parts of the island. The mosaic of land use is still changing due to the dynamic of seasonal interaction with the Nile and variable soils, although this is less the case now that the flooding is limited.

Farmers now use diesel pumps (typically one per household, used to generate electricity on the island until recently) and, as in the past, water is channeled into narrow irrigation channels (approximately 0.5 m wide), which run around networks of small (3–5 m²) plots on *gurer* and *barju* land (Fig. 2d). The plots are

edged by low earth bunds, which are regularly reconstructed, and water is let in by opening and closing small gaps with a hoe (for more on agricultural terms see Table 1). The areas cultivated by diesel pumps are still the same as under the *sagia*, with the central widest sandy parts of the island still uncultivated. Along the main riverbank, farms in Abri and conjoining villages are worked in a similar manner, but the mid-century canal extension has specifically extended *barju* cultivation.

Crops are still harvested by hand, but a key change was the introduction of the threshing machine in the mid-2000s. Prior to this, crops were threshed using donkeys or beaten with palm fronds. Since the 1990s some farmers have used a shared tractor to help prepare land. Another major change is that chemical fertilizers are now commonly used rather than manuring on inner island *barju* soils. The introduction of motorboats has also made it easy to transport crops from Ernetta to the local market and beyond.

In the Ernetta and Abri household farms, both women and men undertake activities such as weeding or small-scale cultivation, especially in relation to household crops. Men take on the more physically demanding activities linked to machinery or hand harvesting monocrops. Similarly, in the past, “work-parties” for large-scale harvesting, or operating the *sagia* were composed of men, while women helped with tasks like winnowing.

Changing Crops and Cultivation Practices

CEREALS AND PULSES IN THE MID-20TH CENTURY

Interviews with the elderly farmer group provided unique insights into past agricultural practices. During the mid-20th century, and prior to the introduction of diesel pumps, all elderly farmers (over 75 years old; n=14) used to grow hulled barley (*Hordeum vulgare* L.) and sorghum (*Sorghum bicolor* [L.] Moench), with some also growing maize (*Zea mays* L.) and pearl millet (*Pennisetum glaucum* [L.] R. Br) (Fig. 3, Table 2). Although farmers reported growing wheat (*Triticum aestivum* L), farmers



Fig. 2. **a** Lower riverbank (*jarf*) with patches of crops; **b** Upper riverbank (*gurer* land) with broadbeans; **c** Inner island (*barju* land) with broadbeans and Nubian house; **d** Small, irrigated plots on *barju* land.

that could recall the 1940s (n=5) reported that hulled barley was the main winter cereal and that wheat was first grown on the island during the 1950s by a woman they all remembered called “*Hajia Jira*,” and “*for every bag of wheat she gave you, you would return two bags at harvest time.*” A wide range of pulses were also grown, and of these, all the farmers (n=14) grew lablab (*Lablab purpureus* [L.] Sweet) and cowpea (*Vigna unguiculata* [L.] Walp.), and over 70% grew lupin (*Lupinus albus* L.) and broadbean (*Vicia faba* L.).

Hulled barley and sorghum were described as the most important cereals, with lablab, cowpea, and lupin as the most important pulses (Fig. 4). All were grown as subsistence food crops for the household. Hulled barley, sorghum, pearl millet, lablab, and cowpea were grown as fodder crops to feed household sheep, goat, and cattle (Fig. 5), and grass pea (*Lathyrus sativus* L.) for food and fodder. Few farmers provided information on grass pea (Nubian name *guru*), a plant little known today and identified by us in 2019 when a farmer led us to some growing feral in a broadbean field.

Cereals and pulses formerly grown by the elderly farmers as *saluka* crops, included hulled barley, sorghum, lablab, cowpea, lupin, and lentils. Cultivation and harvesting extended to the receding line of the flood (*décrué*). Following the harvesting of *saluka* crops on the flat upper riverbank *gurer* land, plots were prepared for *sagia* irrigation. The winter season irrigated crops, including wheat hulled, barley, and broadbeans, were then sown from approximately late October onwards (Table 3, Fig. 6a). At the same time, *saluka* crops continued to be grown and sown in small patches on the lower riverbank *jarf* areas. From March to April, heat tolerant crops such as sorghum, maize, pearl millet, lablab, and cowpea were sown again in the riverbank *jarf* area while the river was low (summer season), and then again in late June/July in *sagia* irrigated plots on higher *barju* land (flood season). The key crops were fast growing: hulled barley (80–90 days), sorghum (70–90 days), the pulses ranging from 2.5 to 3 or 4 months, with several such as lablab harvestable several times.

When asked which other crops were important, all elderly farmers recalled that the date palm was viewed as the most important crop alongside sorghum, hulled barley, and lablab.

In each case, “importance” reflected the role of these species for household subsistence. Elderly farmers also described dates as particularly culturally important, and additionally watermelon (*Citrullus lanatus* [Thunb.] Matsum. & Nakai) and sesame (*Sesamum indicum* L.) as special crops. Sesame was grown as an oil crop on Ernetta until the cattle drawn wooden oil extraction equipment was destroyed by termites during the 1950s, and farmers recollected how everyone grew watermelons on extensive sandy areas that used to exist along the north and western island riverbank edges.

Elderly farmers described how crops were not grown to sell but were exchanged among themselves or traded in the Abri market or with boats that came to the island. We were told “*At the time they would pay the *sagia* man in wheat, there was no cash exchange.*” They explained that, at the time, many farmers did not use money—but that this changed once diesel pumps and commercial crop varieties were introduced. Dates form an exception to this—as well as being important food crops and culturally iconic, dates were also described as especially valuable and “*almost like currency.*” While the elderly Ernetta farmers we spoke to did not discuss selling them for money, this may have been the case for others among their contemporaries. Dates from the Sukoot region used to be exported northwards to Egyptian Nubia and beyond, prior to the construction of the Aswan Dam (Ryan et al. 2021).

CEREALS AND PULSES TODAY

The interviews revealed several differences in the overall pattern of crops grown today and their uses when compared with farming practices prior to the introduction of diesel pumps. Information on crops grown today, their uses, and where/when they are cultivated was recorded for 24 households, and included eight of the elderly farmers who were still actively involved in farming and head of their households. Today, only close to half the households grow sorghum or hulled barley, fewer grow pearl millet, and none grow wheat (Fig. 3). Sorghum, hulled barley, and pearl millet are grown for household use as fodder crops, and small patches of hulled barley are still grown to make a non-alcoholic drink (Fig. 5). Wheat was grown by many of

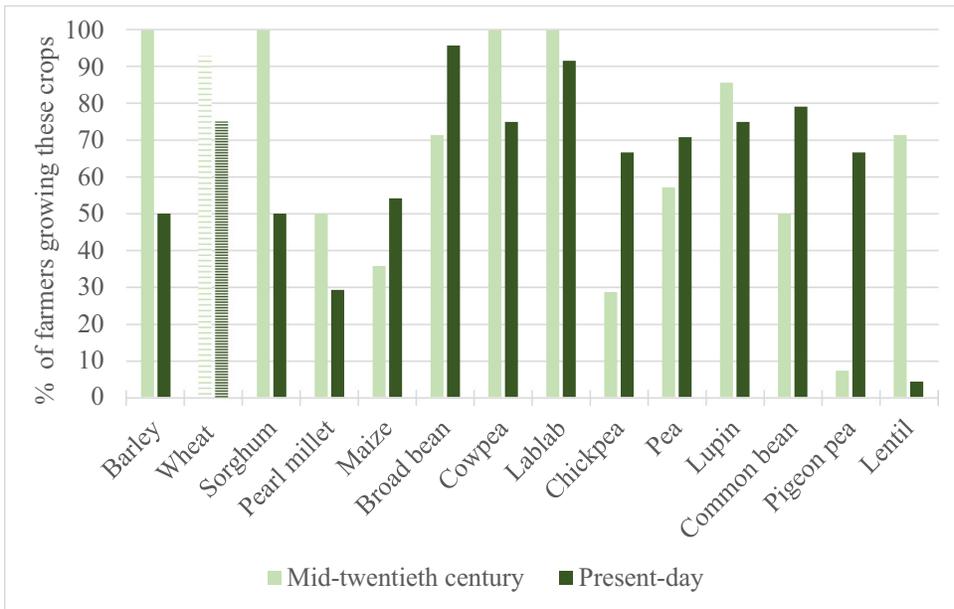


Fig. 3. Percentage of farming households growing different crops today ($n=24$) and in the past ($n=14$). *Wheat was grown between the mid-1950s and 2014.

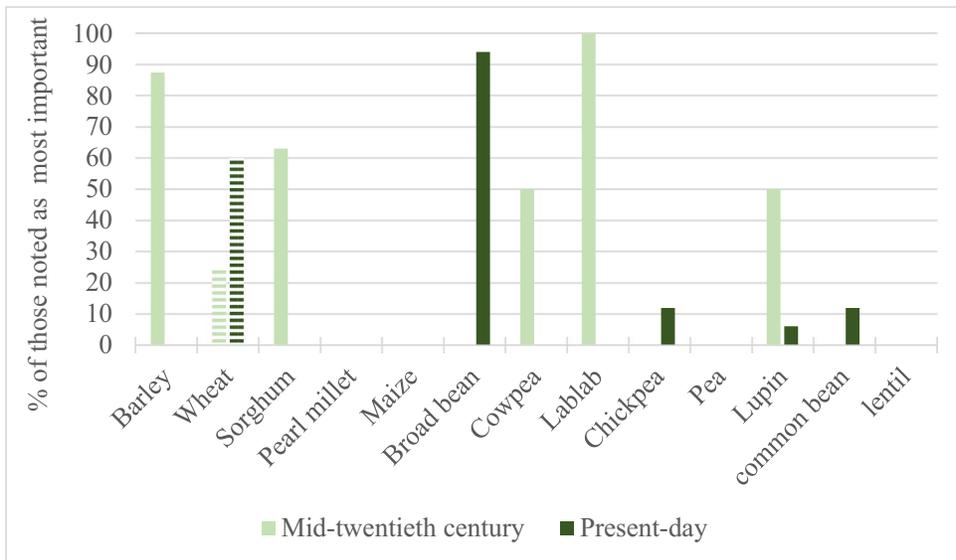
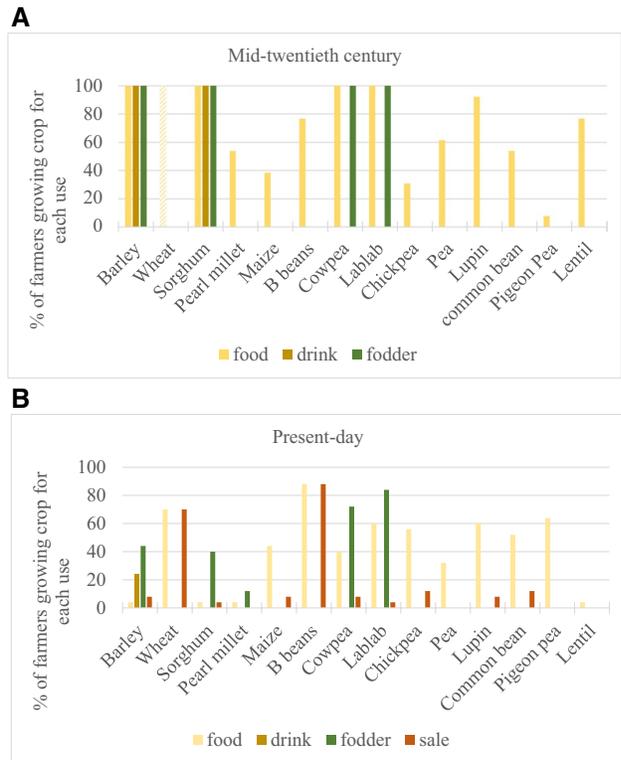


Fig. 4. Percentage of farmers referring to specific crops as the most important. *Wheat was grown between the mid-1950s and 2014.

Fig. 5. Changing crop uses (a) Percentage of farming households growing crops for different uses in the mid-20th century ($n=14$); (b) Percentage of farming households growing crops for different uses today ($n=24$).



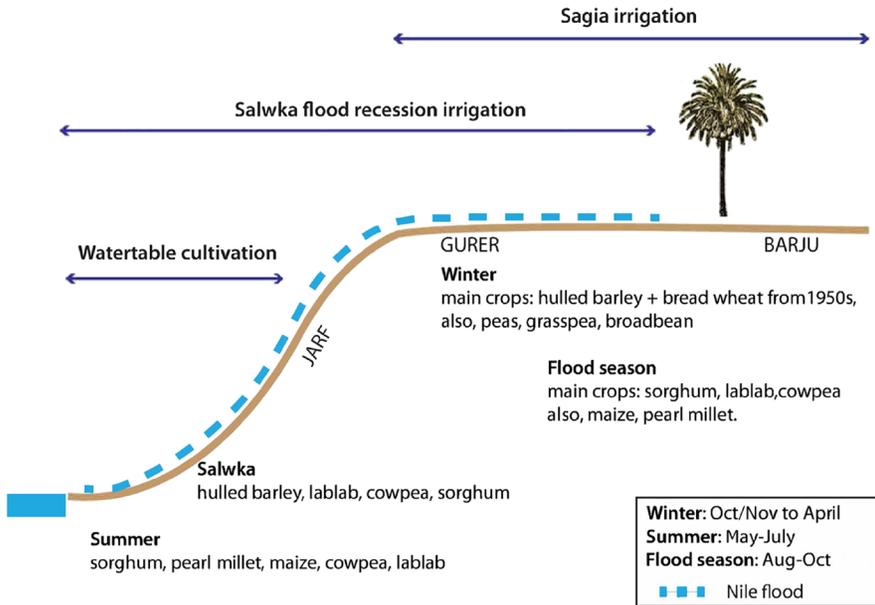
the households in 2014 for food and to sell, but farmers have since stopped growing this crop because of bird predation. Wheat was described as one of the most important crops in 2014, but by 2015 no cereals were described as important (Fig. 4).

Fewer farmers now grow lablab, cowpea, and lupin. Although they are still used for food, cowpea and lablab are now grown more commonly to feed household animals (Figs. 3 and 5). Broadbeans are grown by most farmers today, both for household consumption and to sell. In contrast with the past, cowpea, lupin, and lablab are no longer described as among the most important crops, and instead, broadbeans are now described as the most important crop by most farmers (Fig. 4). More farmers now grow chickpeas (*Cicer arietinum* L.) and common beans (*Phaseolus vulgaris* L.) than in the past, mostly to eat, but with a small number also growing them to sell. Today, only one farmer interviewed still grew lentils, and in contrast now over 60% grow pigeon peas (*Cajanus cajan* [L.] Huth), in both instances for food, but

notably in small amounts. These temporal differences in uses and importance are further illustrated when considering where and when crops are cultivated.

A greater number of cereal and pulse species are grown along the lower riverbanks (*jarf* soils) compared with the other land categories. Here, they are grown in small patches for household consumption, and include hulled barley, lablab, cowpea, lupin, common beans, peas, lentils, pigeon pea, sorghum, maize, and pearl millet. By “patches” we mean anything from a few plants to a few m^2 (see Fig. 2a). Sown once the river level has lowered, the planting is staggered from late October onwards; we routinely observed plants from the same species at various stages of growth. Of note, the timing of the river level lowering can be a little later since the dam completion compared with the past. This area is also characterized by multiple configurations of multi- and inter-cropping. For example, lablab and cowpea are sometimes planted individually or together, sorghum within patches of lablab or cowpea, or barley within patches of lablab. As

a *Mid-twenieth Century*



b *Present-day*

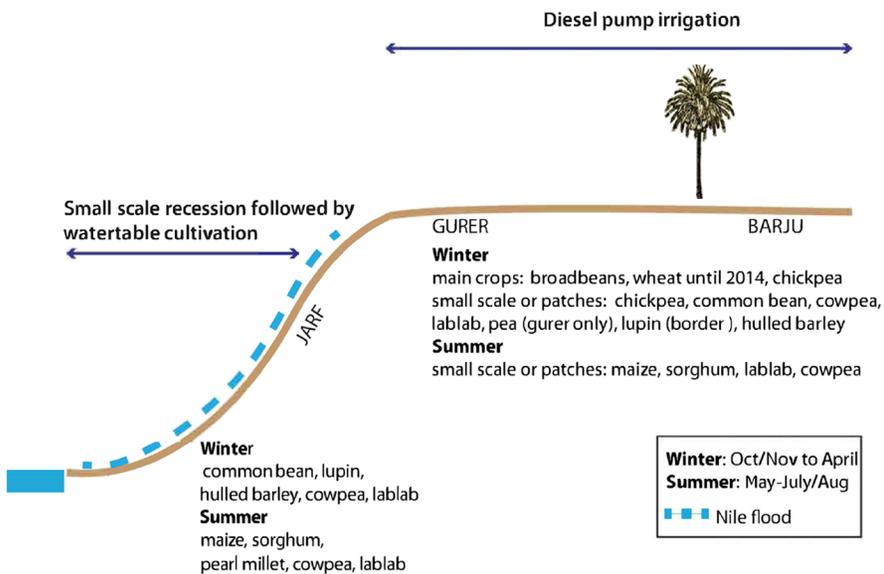


Fig. 6. Cross section of Ernetta Island showing the different land and irrigation areas during (a) the mid-20th Century, above (b) the present-day, below.

in the past, *jarf* cultivation (using the watertable) becomes focused on the heat tolerant species by April/May (Table 3, Fig. 6).

Broadbeans and chickpeas (and previously wheat) are grown on diesel pump irrigated *gurer* (upper riverbank) and *barju* (inland) soil fields during the winter season. Other cereals and pulses grown in small patches in the irrigated areas (for home use) during the winter include cowpea and lablab, especially by households that had limited access to *jarf* land. Lupin, and more occasionally hulled barley, are grown as border crops around broadbean and chickpea plots, respectively. From March, maize and sorghum are sown in *gurer* and *barju* plots after the broadbean harvests, and patches of lablab and cowpea continue to be grown, but all farmers commented there is very limited cultivation in hotter months on the island (Table 3, Fig. 6b).

Our interviews were focused on the species level, but we also asked about newer and older seeds. Older local farmers varieties (landraces and regional cultivars) are called “*baladi*” (Arabic “of the country”) and did not have additional names. Some commercial seeds (such as particular wheat and broadbean hybrids) had individual names. Three main types of broadbean are grown, a *baladi* variety and two larger seeded modern introductions. All three are grown for home use and to sell, but the *baladi* variety was noted especially for its taste and the larger varieties for their commercial value. The *baladi* broadbean was also preferentially grown on *gurer* rather than *barju* soils, as this was also reported as impacting taste and the “softness” of beans. Sorghum, lablab, cowpea, lentil, hulled barley, and lupin were each predominantly represented by one *baladi* variety, and a second lablab and sorghum variety were also recorded. It was also reported that the pigeon peas, chickpeas, and common beans grown today are mostly represented by new seeds. In addition, we observed two non-local sorghum seeds and a large cowpea variety in the local market, bought for direct use as food rather than to grow.

Interviewees elucidated the chronology of changing crops. Hulled barley has been grown more as a fodder than food crop since this 1970s, with some households not cultivating it at all (one stopped 10 years ago, two others

in the 1960s). Six households stopped cultivating sorghum for food between the 1970s and the 1980s, and a further four in the 2010s. Five households said they had continued to grow sorghum as a fodder crop (for goat/sheep) but stopped growing the crop entirely between the late 1980s and 2010. Pearl millet also appears to be a very minor household fodder crop today, and five farmers reported they were growing pearl millet as a food crop until between the 1980s and 1990s. Five farmers reported abandoning lentil cultivation in the 2000s, while four said that pigeon pea and chickpea are new crops that appeared around that time. A consensus view was that broadbeans became an increasingly important crop from the late 1980s onwards, coinciding with the introduction of larger varieties. These overall timings were further confirmed in discussions with teachers and households.

In contrast with the past, different cereals and pulses are mentioned as important today, and all of these are being grown to sell in addition to their household uses (Figs. 4 and 5). Date palms were routinely described as among the “most important” crops, being usually the most valuable to sell, along with broadbeans. Dates were the only crop to have retained its importance although elderly farmers note that attitudes have shifted towards them, with some people taking less care of them—which can include removing fronds and watering to help them be more productive. Spices and vegetables (especially okra and onions) were also noted by a few farmers as especially important (by 6 and 2, respectively), again with these being grown to sell for income. Aside from these crops, today and in the past, all the farmers we met grow small amounts of vegetables, spices, and salads for household consumption (see the Electronic Supplementary Material [ESM] 1 and ESM 2 for an overview of all (45) crops grown, and their regional antiquity).

Changes Over Time: Linking Crops, Processing, and Foods

Families used to use both rotary grindstones (N: *jai*) and handheld quern stones (N: *essin jai*) to grind cereals. Small mechanical grinding

mills were introduced in Abri during the 1950s and by the 1960s, in Ernetta, after which grinding stones were infrequently used. It is common to still see either the rotary grinding stones, or the remnants of emplacements, in Ernetta houses, mostly in inner courtyards. We were also shown small quern stones, which are portable, and thus less visible. The use of quern stones stretches throughout prehistory in the region, while the rotary quern is a later introduction with finds noted in publications from medieval times (Edwards 2019; Obłuski 2019).

In the time of the *sagia*, we were told that all households had what were described in interviews as “traditional” kitchens. Molded and tempered alluvial clay was used to make low stoves and (far more rarely) small, open, dome-shaped bread ovens. Some houses on Ernetta still have these spaces in use, in other houses these rooms and features have fallen out of use but are still present, and in some cases the rooms no longer exist. All houses now use gas stoves and sometimes ovens, set up in different forms of room.

In one household, we were shown how hulled barley and sorghum was processed in the past using grinding stones. In the case of hulled barley, the lemma and palea is tightly fused to the grain and was time-consuming to process, requiring sieving to remove out the papery chaff after grinding. This was cited as one reason for barley’s rapid replacement by wheat as a winter food crop. One farmer explained *barley is easy to grow and the birds cannot eat the grain, but wheat is easier to prepare*. The sorghum grains were ground on the rotary quern, then made into a paste with water, and ground a second time on a portable quern stone. Two families said they still occasionally use grinding stones for chickpeas, okra, dried tomatoes, and more occasionally lupin.

We were shown how to cook thin barley and sorghum flatbreads (A: *kisra*) by two households (Fig. 7). Batter mixture preparation is variable, and in the case of sorghum, was left overnight to ferment, before being smoothed over a round metal (previously ceramic) hotplate (A: *dokka*) fixed above a low stove. The fire underneath is fueled by fast burning date palm fronds, with a flatbread fully cooked in two to three minutes. Thicker style flatbread/pancakes (A: *gurassa*) are commonly cooked on gas stoves.

Elderly farmers said the importance of wheat as an ingredient, and of baked bread over flatbreads, increased from the mid-20th century onwards. Older style kitchens with low stoves for flatbreads were complemented by bread ovens within homes and these became more common from the mid-20th century (due to the popularity of wheat). Now, neither are used often, with baked (wheat) bread (A: *aish*) mostly coming from two commercial bakeries in Abri, one of which uses charcoal and the other electricity, and occasionally the small island bakery.

Elderly farmers explained that a wider range of flours was used in the past to make flatbreads and porridge-like dishes, including from all the cereals as well as the pulses cowpea and lupin. Table 4 summarizes the main dishes discussed, and crops used. A thin flatbread made from pearl millet, no longer made today, was favored for traveling due to its good preservation. Today, thin flatbreads are especially made from sorghum flour, or from wheat or maize, and are mostly served at breakfast (A: *fatur*), the main daily meal eaten mid-morning. The sorghum and wheat grains or flour are now bought in Abri. We were told thin flatbreads were more frequently eaten in the past, and that they are more commonly eaten today on Ernetta Island than in Abri. The thicker spongy style flatbreads are still commonly eaten, are now mostly made from wheat, and are served with a tomato-, meat-, or okra-based sauce, which can be an independent meal (breakfast or later). Baked wheat bread, especially eaten with caseroled broadbeans (A: *ful*), is now eaten daily at any mealtime. Baked bread, like thin flatbreads, is used to pick up food during meals.

Porridge-like dishes, described as commonly eaten in the past, are only occasionally prepared now: two families demonstrated the preparations of *sefee* (N) as a light evening meal (Fig. 7). Custard like in appearance, it is made by boiling fenugreek seeds or powder in water for flavor, then stirring in wheat flour mixed with a little milk and a pinch of mineral rich clay known as *jede*. Sesame oil (bought, not homemade) is drizzled onto the dish before serving. Other examples include a past porridge-like dish made from lablab flour (in the past), and another cereal-based one that included milk, sugar, and sometimes squash or bottle gourd (*Lagenaria siceraria* [Molina] Standl.). These porridge-like dishes are different from the savory

asida (A), which is a sorghum-based porridge dish more common in other parts of Sudan. An elderly farmer described eating *asida* in the past with okra.

All the elderly farmers noted that boiled pulses were eaten more often in the past, with a version of this dish made daily with lablab and squash eaten (Fig. 7) and served as one main shared dish. We were prepared this meal one evening after walking past a family shelling fresh lablab pods during the afternoon. The sharing of a single dish was noted as a more common mode of eating in the past. Boiled pulses (many types, and especially cowpea, pigeon pea) are now eaten more occasionally or during Ramadan. Today, the main pulse crop eaten is broad-bean, cooked as *ful*, mostly from dried beans, but also from fresh as green *ful* at harvest time. Meals today are often centered around *ful* and can also incorporate a wide range of small side dishes, including tomato-based vegetable stews

(courgette, potato, okra, pumpkin, bottle gourd), tomato salad, date honey, fried green chili peppers, aubergines (fried with garlic, or mashed), and more occasionally small meat dishes.

Non-alcoholic barley and three sorghum-based drinks were recorded, reported as more frequently prepared and consumed in past. Barley grains are roasted then ground, boiled in water and left to cool, and the drink is regarded as having medicinal properties. Barley and wheat grains are also sometimes eaten as toasted grains as a snack. Lupin seeds are detoxified by either stages of soaking and boiling in salt or leaving them for three days in the Nile in a basket, and are then eaten directly soft and cold or dried and eaten as snacks. Cowpea leaves are eaten as a cooked green vegetable side dish, in a meal known as *ittir dessi*, which translates as green meal and can include several cooked leafy greens (see ESM files for a broader list of plants grown).



Fig. 7. (a) Lablab; (b) Lablab and bottle gourd pre-cooking; (c) Cooked lablab and bottle gourd; (d) Cooking kiswa in a traditional kitchen; (e) Breakfast, with green ful, gurassa, kiswa and date syrup; (f) A custard-like dish, sefee.

Table 1. Agricultural terms discussed in the text, with local Arabic and Nubian (Nobiin, Sukoot dialect) terms.

Description	Local Arabic		Nobiin (Sukoot)		
	Latin script	Arabic script	Latin script	Arabic script	Contemporary Nubian characters (speaker)
Lower/sloping riverbank	jarf	الجرف	j/garf jerf	الجرف	ḡarḡ
Higher riverbank/freshly deposited alluvial land	qurir	القرير	gureer / gurair	قورير	ḡurair
Recession cultivation, the name of the land and the tool.	selūka	سدلوكه			
Alluvial land beyond flood zone	barju	البرجوك	barju	برجو	ḡarḡ
Tool for moulding irrigation channels	wassou	الواسوق	wasu	واسوق	wasu
Hoe	toria	مجرفة/ طورية	tubro toree	توبرو	ḡubro ḡoree
Cattle-driven water-wheel	sagia	الساقية	eskalee	أسكلى	eskalee
Hand-operated lever for irrigation	shaduf	الشادوف	kiyye	كبي	kiyye
Threshing with donkey [this differs from the threshing tool <i>norag</i> not used locally]			noree /noriegh	نوريق	noree
Storage bin	guiseba	قسبية	gussee / gusa	قوسا	ḡussee
Large storage bin			shuna	شونا	shuna

Table 2. Cereals and pulses mentioned in the text, with Arabic and Nubian (Nobiin – Sukoot dialect) terms.

Common name	Botanical name	Local Arabic		Nobiin (Sukoot)		
		Latin script	Arabic script	Latin script	Arabic script	Contemporary Nubian characters
Hulled barley	<i>Hordeum vulgare</i> L.	sha'ir	شعير	seringi	سيرينق	СЕРІЦ
Bread wheat	<i>Triticum aestivum</i> L.	qamh	قمح	illee	إلى	ІЛЛĒ
Sorghum	<i>Sorghum bicolor</i> (L.) Moench	durra	ذرة	maree	مرى	МАРРĒ
Maize	<i>Zea mays</i> L.	durra shami	الذرة الشامية	makada	مكادا	МАКАДА
Pearl millet	<i>Pennisetum glaucum</i> (L.) R.Br.	dukhn	الدخن	futu	فوتو	ΦΟΥΤΤΟΥ
Broadbean	<i>Vicia faba</i> L.	fūl	فول	fuul	فول	ΦΟΥΛ
Cowpea	<i>Vigna unguiculata</i> (L.) Walp.	lubia helu	لوبيا حلوة	digintee	دقينتى	ΔΙΓΙΝΤĒ
Chickpea	<i>Cicer arietinum</i> L.	kabakabe/hummos	حمص	kabakabe	هومو	ΚΑΒΑΚΑΒΕ
Lablab	<i>Lablab purpureus</i> (L.) Sweet	lubia afin	لوبيا عفن	kashrangee	كشربين	ΑΨΡΑΝΓĒ
Pea	<i>Pisum sativum</i> L.	basilla/warreg (small)	بسله / بازلا	orree	أورى	ΟΡΡĒ
Lupin	<i>Lupinus albus</i> L.	turmus	ترمس	akindee	أكيندى	ΑΚΙΝΔĒ
Common bean	<i>Phaseolus vulgaris</i> L.	fasulia	فاصو ليا			
Pigeon pea	<i>Cajanus cajan</i> (L.) Huth	lubia adassi	لوبيا عدسي			
Grass pea	<i>Lathyrus sativus</i> L.	warreg	وريق	guru	قورو	ΓΟΥΡΟΥ
Lentil	<i>Lens culinaris</i> Medik	adis	عدس			

Discussion

Today, the focus on winter commercial crops has changed the agricultural landscape visually, with broadbeans and, until recently, wheat, dominating the fields as monocrops (Fig. 2b and c). At the same time, baked wheat bread has become a more dominant food than flatbreads, the latter now made with a reduced range of flours, and broadbeans have become the favored food pulse. A similar pattern of crop change was observed in the comparative interviews undertaken in farms around Abri and in other villages in the Sukoot (Ryan and Homewood 2016), with some differences in the timing of changes.

The increased role especially of wheat and broadbeans over the 20th century is part of broader geographic and temporal trajectories in Sudan connected to urban food trends, policies, and these crops have been a focus within agricultural development (Dirar 1993; ICARDA 2003). The cooler winters have meant that the north is a primary area for growing wheat, broadbeans, and chickpeas. Combined with the advent of mobile phones, the new tarmac road between Khartoum and Egypt has also made it easy to transport produce to local and regional markets.

The connected shifts in cuisine are reflected in the terminology city–food used by some of the elderly farmers on Ernetta. In Abri, *ful* (casseroled broadbeans), and dishes such as *adis* (cooked lentils, bought also from stores in Abri), omelets, and *jalafels* (made from chickpea) are sold from restaurants and stalls and eaten with baked wheat bread. This range of foods is widespread across Sudan, from cities to roadside cafés. A project to research the impact of new food outlets, schools, and increasingly diverse livelihoods on foodways could be very informative, including about differences between Abri and Ernetta, as we know for instance that thin flatbreads are still more common on the island.

The broad changes identified within agricultural and food systems are likely to accelerate and develop in new directions, due to infrastructural developments (better roads, mains electricity, growing regional urban centers), and the resulting increased mobility of populations in Sudan, which has the potential to introduce new traditions and practices. Wider regional geopolitical factors also have local impact: during our fieldwork we witnessed processed food products

(e.g., biscuits, jam) in the local markets shifting from predominately Egyptian to Turkish goods, and back again, reflecting trading and political relationships in the Middle East and Gulf region.

Although new crops and diesel pumps have been major drivers of change, there are also local reasons, and the timing of change varies by crop. Hulled barley was rapidly replaced by bread wheat as the major winter food cereal by the 1970s, being time-consuming to process and less commercially valuable than bread wheat. Wheat is also best suited for making baked bread because it has a higher gluten content than barley, while the other cereals are gluten free (Lyons and Andrea 2003). Wheat was widely grown on Ernetta Island and in Abri until crops were particularly badly damaged by birds in 2015, but it is still a major crop elsewhere, including in family farms and schemes in the Dongola Reach. In the case of sorghum, interviewees again explained the growing impact of bird attacks on the crop, so it is now mostly grown as a fodder crop. As with wheat, they noted that changes in agri-practices had made the impact of birds worse, because when crops were grown at the same time over wider areas the impact of bird predation was shared. Additionally, in the past children helped to scare birds, pulling ropes to jangle tin cans set up from platforms in fields.

The cereal and pulse species that predominated during the mid-20th century (hulled barley, sorghum, lablab, cowpea, lupin) are more heat tolerant, faster growing, and require less water than the now dominant winter commercial varieties. Cultivation used to be year-round. Farmers explained that part of the reason for reduced cultivation in hotter months today is the expense of diesel. Previously the *sagia* costs involved potentially paying the *sagia* man and growing fodder for the cattle. It was easy to grow crops with the *sagia* when the water was high, then in the wide areas of new soils after the flood (*saluka crops/land*), and again with the *sagia* in the winter. Since the Merowe Dam was built, the flood is reduced with *saluka* style cultivation confined to low-lying areas and sloping riverbanks, and this is another reason cited for a reduction in growing older crops.

The older crops are now mostly grown in small patches for household use, especially along the sloping riverbanks (Fig. 2a). However, although this *jarf* land is limited, it is highly

TABLE 3. CHANGING CROPPING PATTERNS—THE % OF FARMERS GROWING CROPS IN DIFFERENT AREAS OF LAND THROUGH THE YEAR IN THE MID-TWENTIETH CENTURY, AND IN THE PRESENT DAY.

Season	Mid-Twentieth Century						Present Day												
	Winter		Summer		Flood		Season		Winter		Summer								
	Oct/Nov-Apr	Nov/Dec-Apr	May-July	Jarf	Lower riverbank	Barju	end July-Sept	Aug/Sept-Oct	Land area	Jarf	Lower riverbank	Oct/Nov-Apr	Upper riverbank	Barju	Inland	May-July/August			
Land name	<i>Gurer & Barju</i>	<i>Jarf</i>	<i>Jarf</i>	<i>Jarf</i>	<i>Jarf</i>	<i>Jarf</i>	<i>Gurer & Jarf</i>	<i>Gurer & Jarf</i>	Land area	<i>Jarf</i>	Lower riverbank	<i>Gurer</i>	Upper riverbank	<i>Barju</i>	Inland	<i>Gurer</i>	Upper riverbank	<i>Barju</i>	Inland
Location	Upper riverbank	Lower riverbank	Water table	Water table	Water table	Sagia	Upper and lower riverbank	Salwka Flood	Cultivation	Small flood	recession & watertable	Diesel pumps irrigation	Diesel pumps irrigation	Water table	Water table	Diesel pump irrigation	Diesel pump irrigation	Water table	Diesel pump irrigation
Cultivation	Sagia	Water table	Water table	Water table	Water table	Sagia	Salwka Flood	Recession											
Barley (hulled)	100						100		Barley (hulled)	4		42		21					
Wheat	93								Wheat			**		**					
Sorghum	100			100		100	100		Sorghum	21				21		8			13
Pearl millet	*			*		50	*		Pearl millet	13				13					
Maize	36			31		31	31		Maize	21						29			25
Broadbeans	71								Broad beans			71		58					
Cowpea	100			100		100	100		Cowpea	46		25		8		25			8
Lablal	100			100		100	100		Lablal	42		33		8		33			8
Chickpea	29								Chickpea			46		8					
Pea	57						*		Pea			33							
Lupin	*						86		Lupin	42		42		29					
Common bean	23						23		common bean	54		21							
Pigeon Pea							7		Pigeon Pea	67									
Lentil									Lentil	4									

*Noted as grown in this area, **wheat grown until 2014.

productive and requires little labor input and no irrigation or soil management. That local crop cultivars are grown in this area suggests they are suited to these conditions. Cultivation along the riverbank reflects an array of intricate practices, such as successional sowing that allows for continually harvestable crops, and various modes of intercropping. The persistence of local crop cultivars in riverbank areas for home use is reminiscent of the importance of homegardens as reservoirs of diversity (Galluzzi et al. 2010).

The previously dominant local crops also have a long history of use in the regional archaeological record (see the ESM files for details on the long-term use of crops regionally). For instance, hulled barley has the longest history of regional use, and sorghum was the most important cereal since the early 1st millennium C.E., while bread wheat seems to have been a minor crop (Fuller 2014; Ryan 2017). Thus, these longer-term regional histories can connect with the ethno-historic data to further suggest the resilience of today's minor crops (Reed and Ryan 2019).

The recent changes in crops grown and agricultural practices on Ernetta Island also parallel shifts in material culture connected with both agricultural activities, food processing, and the home. Significantly, all interviewees' houses were on a trajectory of change, with a combination of used or abandoned traditional features and materials. During the time of the *sagia*, all houses on Ernetta had kitchens and storage rooms made using vernacular techniques. Today different rooms with gas stoves are used as kitchens, and the older spaces are less often utilized or are reconfigured. In Abri, these trends are further developed, with new house building, modes of construction and, for example, the use of fridges since the uptake of mains electricity, which was installed a few years earlier than on Ernetta (Dalton 2017). In older Nubian houses, food-related features like low-stoves (for thin flatbreads), bread ovens, storage, and grinding installations—typically along with walls and floors—are primarily made from coursed mud (*jalous*), and need regular maintenance (almost annually). This contributes to their falling out of use (Dalton 2017).

Although many of the households on Ernetta Island still additionally use the older kitchens or keep them as storage spaces, asking around the whole island, we were taken to see just two

examples of traditional mud-built storage bins (*gusee*) still in use, and one example of unused but well-preserved larger *shuna*. These could reportedly store grains for up to 10 years, while the *shuna* could additionally store seeds for sharing with the wider community. Future work could include assessing the differences in seed viability between older and newer storage methods, and about seed sharing in the past.

Names for some crops were more specific in Nubian than in Arabic and allowed for greater clarity during interviews. For example, *durrah*, meaning sorghum in Arabic, is also used in the word for maize (*durrah shami*), and sometimes *durrahs* refers collectively to maize and sorghum. Similarly, the Arabic word *lubia* can refer locally specifically to cowpea, but sometimes a second word descriptor is used for cowpea, *lablab*, and pigeon pea individually, while *lubias* can also refer to these crops collectively. Nubian words like *maree* (sorghum), *makada*, (maize), *kashrenee* (lablab), and *digintee* (cowpea) are more specific. The Nubian word for grass pea—*guru*—was only identified by elderly farmers, and the Arabic word *warreg* was used by farmers today variably to refer to grasspea, small peas, or pea leaves. Several Nubian words for foods did not have exact equivalents within Arabic as the dishes are regionally distinctive. As such, elements of the local food and agricultural heritage and histories are also tied to language.

A strong and widely accepted link between agriculture and cultural heritage is well attested for Nubia. In Sanaa Al-Batal's study of agricultural technology and crops during the late 1980s in the Mahas region (south of the region discussed here, see Fig. 1), the social organization and daily routines connected with the *sagia* and agricultural activities reflect an agricultural cycle intricately linked with the Coptic calendar, and the importance of intangible heritage such as songs (Al-Batal 1994). Today on Ernetta Island, farmers recalled how people would work together and co-ordinate more in the past for activities like harvesting, and remembered the different songs sung during activities like harvesting or cereal grinding.

Overall, ethnographic studies of traditional agricultural systems and foods remain limited in Sudan, with few such studies relating especially to specific locales, technologies, or cereals (e.g., Al-Batal 1994; Dirar 1993; Lancelotti

Table 4. The main food dishes (made from different crops) discussed during interviews, with Arabic and Nubian (Nobiin – Sukoot dialect) terms.

Local Arabic		Nobiin (Sukoot)			Description
Latin script	Arabic script	Latin script	Arabic script	Contemporary Nubian characters	
Belila	البليلة	arjee	أرجي	ⲁⲣⲃⲈ	Today: boiled “lubias” (cowpea, pigeon pea, lablab), Ramadan or occasional. Past: common, a version with labab and squash was a “daily dish.”
“Similar to asida”	ما يشبه العصيدة	toijin geree	توجينقري	ⲐⲐⲓⲔⲒⲚ ⲒⲈⲓⲣⲈ	Past: a light porridge with boiled cereals, milk, sugar.
“Similar to asida”	ما يشبه العصيدة	boji geree	بوجي	ⲐⲐⲓ ⲒⲈⲓⲣⲈ	Past: porridge with boiled cereals, milk, sugar and boiled squash.
Madida	مديده حليه	sefee jede	سيفي	ⲒⲈⲤⲈ ⲃⲈⲃⲈ	Today: custard-like dish, fenugreek seeds, water, milk, cereal flour (wheat, sorghum, pearl millet), and jede (mineral rich clay) occasionally eaten. Past: commonly eaten.
	مديده البلح	fenti jede	فتتي جدى	ⲤⲈⲚⲐⲐ ⲃⲈⲃⲈ	Past: fenugreek seeds boiled in water, with dates and jede (no cereals)
Gurassa	القراصة	kaabid	كابيد	Ⲓⲁⲃⲓⲃ	Today: thick flatbread, wheat, served with meat, poultry or vegetable sauces. Past: also made with other cereal/pulse flours
Gurassa	القراصة	booka	بوكا	ⲐⲐⲐⲒⲁ	Past: thick flatbread, made from sorghum, sometimes with dates and milk.
Gurassa	القراصة	salaba	سالابه	Ⲓⲁⲗⲁⲃⲁ	Past: thick flatbread made from pearl millet, used for travelling.
Fatir	الفطير	eddiwera	إديرا	ⲈⲃⲃⲓⲱⲈⲣ ⲁ	Today: thin flatbread, wheat or maize. Past: other flours, barley, cowpea, lupin. “eddi” = by hand, wera= thin
Kisra	الكسره	kabinari	كبنري	ⲒⲁⲃⲒⲚⲈⲣⲓ	Today/past: thin flatbread, made from sorghum. Kab = food/meal/bread
		ittir dessi	إتير دسى	ⲐⲐⲐⲣ ⲃⲈⲒⲒⲓ	Today/past: “green meal” cooked young leaves from cowpea, pea, other cultivated and wild greens
Aish	ع يش	kab	كاب		Baked wheat bread, Kab = food/meal/bread

et al. 2019). For example, while sorghum-based drinks, flatbreads, and porridges are well known and documented in Sudan (Dirar 1993), the specific and changing range of flatbreads/dishes on Ernetta, or the drinks made from hulled barley, are little documented. Crop data tend to focus on production figures for commercial crops at regional scale. The changing roles of old subsistence crops can, however, be partly reconstructed through oral histories and archival sources. Sudanese Nubia remains comparatively little documented compared with Egyptian Nubia, the subject of more anthropological, development, and social science research (Hopkins and Mehanna 2010).

Conclusions

Several cereals and pulses that are grown locally now as comparatively minor crops were more important subsistence and fodder crops during the mid-20th century, were important in the longer-term past, and are notably more resilient than the current dominant winter crops. The replacement of the sagia by diesel pumps, changes to the Nile flood regime due to dam construction, and the uptake of new commercial varieties, has changed seasonal patterns of land use and the balance of crops grown. However, each crop has its own story and timing of change, being additionally connected to transitions in the ways they are processed and transformed into foods and to shifting food preferences.

Interdisciplinary approaches are needed to document changing crop diversity due to the complexity of interconnections that can exist between crops grown, cultivation practices, food preferences, and endangered local language. Discussions with elderly farmers on Ernetta Island have helped to reveal an otherwise undocumented crop and food history, spanning 70 years, that offers new perspectives on the potential of otherwise overlooked minor crops. However, due to the age of those with lived experience of past agricultural and food practices, there remains a narrow window of opportunity for such studies. Nazarea (1998) and Hazareesingh (2021) have argued for an urgent need to document cultural uses and oral histories of local crops. Given the accelerated global trends towards agricultural specialization, the current study further

illustrates the urgent need to document memories of past cropping patterns and crop uses.

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