

FAUNA FLORA AND FISH: A PREVIEW OF DAILY FOOD PATTERN IN INDUS VALLEY CIVILIZATION

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Abstract

As the Indus Civilization was recognized in 1829 by Charles Mason, followed by the discovery of Harappa and Mohenjo-Daro Metropolitans and thousands of all type settlements qualified the occurrence of a complex civilization was agreed throughout the globe. This civilization spread over South Asia where five million people lived and interacted to each other. Many sociocultural features remained complicated. water and fodder is basic key for survival thus, the question is What did they eat and where did they obtained their food.

In this paper the issue of food pattern is examined and for concrete understandings, other ancient civilization of Mesopotamia and Egypt are considered as a guide for (a) getting knowledge about social setup and (b) what and how did they eat. Further support is taken by the ethnoarchaeological documentation. The discussion also includes the availability of food vessels and their utility; the ways and types of food obtaining; cooking procedures and places like hearths and oven and utensils involved are given due place. The types and kinds of serving utensils are elaborated for frequent and infrequent use, ritual and regular use and the vessels expressing the status division in given society. The significance of present work is fabricated in new direction of perceiving the results about social setup through feast and feast furniture of the Indus Civilization.

INTRODUCTION

In the total Indus civilization region, the communities lived in seven metropolises having thousands towns, numerous villages and camps. All settlements were interlaced through interaction networks. The living patterns were hierarchical, the cities had intensive activities with high degree of cultural diversity. To comprehend the basic question of this paper that what Indus people eat? Is based on Archaeological, Archaeobotanical, Ethnoarchaeological and Zooarchaeological documentations and have i all people of Urban Phase dated 2600-1900BCE in Indus valley were enjoying a huge food varieties consisting of meat, fish, fruits, honey, breads and

vegetables. They ate cooked food in ghee/oils obtained through animal and fish fat, seed oil and clarified ghee as milk byproduct. The food was flavored with various spices (Pokharia *et al* 2011, Pokharia 2011, 2008, Channarayapatna 2018, Chase 2005, 2012, 2014, Chase *et al* 2020, 2014, Belcher 2019, 2011; Bates *et al* 2021, 2021, Abhayan 2016, Fuller 2019, Biagetti *et al* 2022, Bogaard 2021, Joglekar 2013; Bates 2019). The hearths, bones, charred grains, charcoals attested the food was cooked. The similarity of cooking utensils of the urban phase 2600-1900 BCE to the traditional vessels in contemporary times is

strongly perceived (Kenoyer 1998). The bread i.e. *Roti*, vegetables and meat items were cooked in very similar way as in contemporary kitchens of South Asia (Bates 2019). All types of meat, fish and vegetable curries were flavored with seasonings such as, cinnamon, nutmeg, clove, black pepper and others. The varieties of fruits were also enjoyed such as Mango, Jamun Amala and walnut at Hulas site (Kenoyer 1998, Bates 2019, Saraswat, 1993 as cited by Bates 2019) have been a part of the Indus diet.

The discussion in this paper contains data from excavated sites such as Mehrgarh (Jarrige et al 1995) Mundigak (Casal 1961), Gumla (Dani 1970-71) Taraki Qila (Allchin 1981), Rehman Dheri (Durrani, 1982, 1988); Harappa (Dales and Kenoyer 1991) Lakhianjo-Daro (Mallah 2009-10, 2013, 2017) Chanhu-Daro (Mallah et al 2017), Taloor-ji-Bhit (Mallah 2000-2001), Poonger-Bhanbho (Mallah 2016), Nuhato (Mallah 2019). The subsistence data have been obtained more than fourteen settlements where scholars like Steven Weber, and others (1989, 199 & Weber et al., 2011b) documented the Farmana, Rojdi; Setha Reddy, (1994, 1997, 2003) focused on popular sites named as Oriyo Timbo and Babar Kot. The Shortughai, Kunal, Balu, Loteshwar, Datrana Vaharvo Timbo and Kanmer were examined (Willcox 1991; Saraswat and Pokharia 2001, 2002; Garcia-Granero et al 2015, 2016, 2017a, 2017b, Kharakwal et al 2008, 2011). The settlement of Masudpur, Chugta, Burj and Bahola were investigated (Bates, 2016; Petrie et al., 2016; Bates

et al., 2017a, 2017b, 2017c; Petrie and Bates, 2017). The Alamgirour and Lahuradewa (Pokharia 2011) have also been considered. Ethnoarchaeology as a debating tool was considered (Kramer 1979; Zeigler 2020, Chase 2005, 2014, Belcher 1999, 2011, Sikbo et al 1988, 2015, Roux 2011, Tite 2008, Khan and Thomas 2019, Dimc 2011).

Having focus on the food/feast and food-ways as seen in three major ancient civilizations like Mesopotamia, Egypt and Indus. It is amazing to see the vibrant scenes of food-ways made in the tombs and palaces of both Egypt and Mesopotamian civilizations showing human cuisine environment and social behavior.

Indus civilization had mixed agrarian foundation; the diet incorporated **wheat, barley, pulses (mung, chickpea), and oilseeds**, with millet and possibly rice in certain regions. Fruits (dates, figs, grapes), spices (cumin, turmeric, garlic), and vegetables (mustard greens, gourds) added culinary and nutritional diversity. Sesame and flaxseed oils were also used, and tandoori-style ovens indicate advanced cooking methods

([History of Ayurveda](#)).

Anil.K. Pokharia (2011) describes the site Lahuradewa excavated in 2001-2000 has strong agriculture and herding system. There remains of *Oryza Sativa* rice along with some species of wheat and Jowar grains and millets, lintels, chickpeas suggested the nature of cultivation system (figure1).

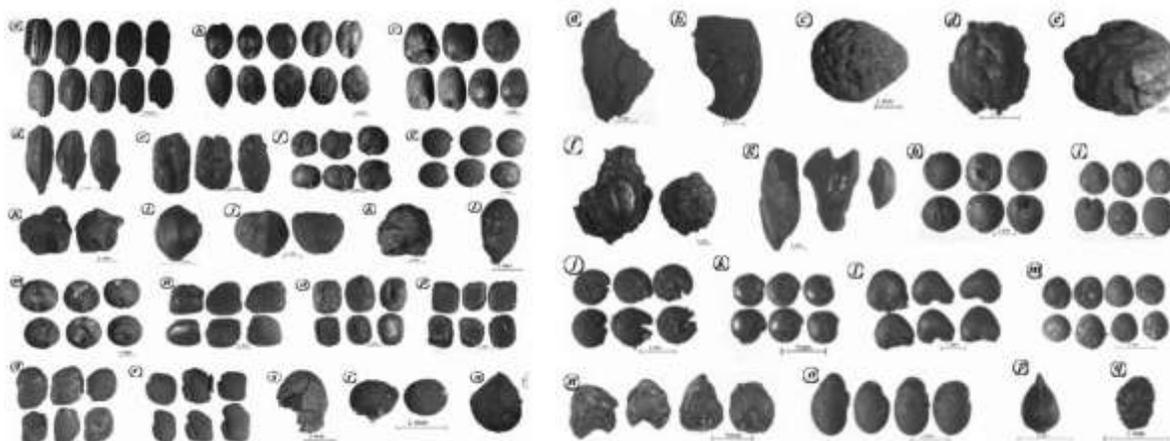


Figure 1: Charred seeds from Lahuradewa site.

Background Studies

The archaeological sources of Gujarat have made easy for scholars to understand the faunal and floral bases of Gujarati people of Indus Valley. The focused settlements are Rojdi, Oriyo Timbo, Babar Kot, Farmana, Shortughai, Kunal and Balu, Loteshwar, Datrana, Vaharvo Timbo, Kanmer, Masudpur, Dabli, Chugta, Burj and Bahola (Bates 2019). The more sites are Girawad, Mitathal, Bhirrana, Karsola, Rakhigarhi, Rupnagar (Ropar) and Lohat (Joglekar 2013).

The study provided by J. Bates (2019) in her paper describes the oilseeds, spices, fruits and flavor used in the kitchen of Indus settlements. Bates has noted more than 260 edible species from various phases such as Indus phase to Painted Grey Ware (PGW) period sites located in Gujarat.

J. Bates has followed the schemes as discussed by Weber (1999) who suggested three tiers of the crops as first Tier contains the most common crops like wheat, barley and millets, second Tier plants has peas, lentils, oilseeds of flax, and jujube fruit. The third Tier of Weber's scheme is about melon and rice which is still in infancy to collect the information. However, the wild species of melon is indicated at the settlements of Rojdi and Harappa and the rice remains found at Harappa. Bates illustrates the spices as garlic discovered at Balu and Farmana and says that there are a total of 62 types of spices used as food flavor additives. Indus cooking spices has wide range from oilseeds of brown mustard, fenugreek, ginger and turmeric, garlic cloves, black pepper, nutmeg, cinnamon, and asafetida as a part of the Indus food flavors. Bates (2019) further illustrated the eggplant vegetables and fruits such as mango, date palm, sugarcane, banana with *Musa* sp. and *Vitis* sp. grape were the part of Indus people's diet.

Another vital research carried by, Joglekar, Pramod (2013) in his review paper on faunal diversity in Haryana region brought the diet information. He mentioned seven domestic species of mammals as cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), goat (*Capra hircus*), sheep (*Ovis aries*), pig (*Sus domesticus*), dog (*Canis familiaris*), and ass (*Equus asinus*), gaur (*Bos gaurus*). The wild buffalo (*Bubalus arnee*) and bear (*Melursus*

ursinus) and barking deer (*Muntiacus muntjak*) were hunted. The fox (*Vulpes sbengalensis*) living in bushy shrubby areas near cultivation in Savanna. The wild pig blackbuck, hare, and nilgai were also hunted. Joglekar P. (2013) has pointed out some ecological niches used by the Indus people for hunting purposes.

- ❖ Thick woods/Forests
- ❖ Thin forests/Marginal Forests
- ❖ Humid evergreen open jungles
- ❖ Shrubs, savannahs, bushy areas near cultivation
- ❖ Desert/ Rann/Sparse thorny vegetation
- ❖ Wooded jungles, swamps and tall grass
- ❖ Found anywhere

García-Granero *et al* (2022) recently compiled data through the paper in which Lipid and Starch Grain studies was carried from containers to explain prehistoric foodways in Northern Gujarat, India. The paper focused on monsoon crops cultivation native to South Asia, like millet (*Panicum sumatrense*), brown top millet (*Brachiaria ramosa*), foxtail (*Setaria verticillata*), green foxtail (*S. viridis*), Kodo millet (*Paspalum scrobiculatum*) and barnyard millet (*Echinochloa* spp.). The tropical pulses found were as horsegram (*Macrotyloma uniflorum*), mung bean (*Vigna radiata*) and black gram (*V. mungo*) and Sesame (*Sesamum indicum*). García-Granero *et al* (2022) also have mentioned about barley (*Hordeum vulgare*) and, wheat (*Triticum aestivum/turgidum*). Animals like pigs buffaloes, goats, sheep and Cattle (*Bos* sp.) were main herds for secondary products. The fish hunt for curry and roast were part of Indus food.

The studies carried by Abhayan *et al* (2014) from fishing village site excavation at Vizhinjam in Kerala district in India; where total 488 bone were identified associated with animals include cattle and buffalo (*Bos indicus* and *Bubalus bubalis*), goat and sheep (*Capra hircus* and *Ovis aries*), pig (*Sus* sp.), hare (*Lepus nigricollis*), dog (*Canis familiaris*), cat (*Felis catus*), Bandicota Rat (*Bandicota indica*), birds, turtle, fish and mollusks. This information fills the gap and shows the continuation of food resources from Urban phase 2600-1900 BCE of Indus valley till today.

Richard H. Meadow and Ajita K. Patel (2003) carried research on the prehistoric pastoralism. They found twelve animal species, for example, the wild sheep (*Ovis orientalis*) and goat (*Capra aegagrus*) from the hilly environment. The chinkara (*Gazella bennetti*) from the foothills and plain ecology. The onagers (*Equus hemionus*) and blackbuck (*Antelope cervicapra*) from the drier plains regions. The nilgai (*Boselaphus tragocamelus*), large deer (*Cervus (?) duvauceli*), smaller deer (*Axis (?) axis*), boar (*Sus scrofa*), water buffalo (*Bubalus arnee*), wild cattle (*Bos namadicus*), and possibly elephant (*Elaphas maximus*) from better-watered zones of the Indus valley.

Meadow and Patel (2003) explain that both type of remains such as bones and figurines show the zebu (humped) cattle (*Bos indicus*) were dominant (Meadow 1984b). They have investigated the DNA of cattle forms as *Bos indicus* (zebu forms) and *Bos taurus* (European nonhumped forms) research strongly attest the separate origins of both taxa.

Richard H. Meadow (1989) explains the faunal bones of locally domesticated animals belong to the 8th millennium BCE are the zebu cattle (*Bos indicus*), sheep (*Ovis aries*), and even goats (*Capra hircus*) gazelle (*Gazella bennetti*), blackbuck, Asiatic wild ass (*Equus hemionus*), and pig (*Sus scrofa*) have been attested (Meadow 1989).

Richard H. Meadow (1996) has documented 03 wheat forms as food flora of Indus period dominate in the Indus region for instance, *Triticum aestivum*, *T. compactum* and *T. sphaerococcum* (or *T. aestivum* subsp. *vulgare*, *compactum* and *sphaerococcum*) (Kajale 1991, Costantini (1990: 330 - as referred by Meadow 1996).

Looking at single settlement of Nausharo, Meadow (1996) points five forms of wheat and three forms of barley similarly Costantini (1990) has recognized *Lens culinaris* (lentil) and *Linum usitatissimum* (flax/linseed) peas (*Pisum sp.*) *Cicer arletinum* (chickpea) at Harappa, Chanhu-Daro, Kalibangan and Rojdi (Weber 1991, Vishnu-Mittre & Savithri 1982, Mackay 1943: 250, Vats 1940: 467).

The oil plant like cotton (*Gossypium sp.*) indigenous to South Asia was first used in the

Indus valley were the dates (*Phoenix dactylifera*) and grapes (*Vitis sp.*) were also available to the Indus People (Costantini 1984: 32).

The other major crops were *Oryza sativa* (rice), *Panicum miliaceum* (common/prosol broomcorn millet), *Panicum sumatrense* (*P. miliare*-little millet), *Setaria italica* (foxtail millet), *Sorghum bicolor* (jawar, sorghum), *Pennisetum typhoides* (*P. glaucum*, *P. americanum* - bajra, bulrush/pearl millet), and *Echinochloa coracana* (ragi, finger millet). Some of these cereal grasses were local and were available wild in South Asia,

At Hulas 1700-1000 BC in western Uttar Pradesh, Saraswat (1993) has identified five types of charred grains such as sorghum, rice (wild and domestic), wheat, bread wheat, barley, oats, finger millet, cowpea and mung (*Vigna spp.*), lentil (*Lens*), grasspea (*Lathyrus*), chickpea (*Cicer*), field pea (*Pisum*), horsegram (DoUchos), cotton (one charred seed), ivy gourd (*Coccinia*), pipal-tree fruit (*Ficus*), anjan grass (*Cenchrus*), walnut (*Juglans*), almond (*Prunus*) and castor (*Ricinus*). This wide range of both Rabi and Kharif crops is typical of second millennium sites in western India

Naveed Abro and his team members (2020) investigated fish from Indus River flowing in Sindh. The Indus course begins at Manasarovar in the region of Tibetan Plateau; continues in the Ladakh region towards Gilgit-Baltistan and the Hindukush ranges towards Punjab and plains of Sindh to reach the Arabian Sea near Karachi Sindh and covers a length of 3,200 kilometers. The River provide drainage to the total area around 1,165,000 square kilometers which is more than the Nile and three times larger from the Mesopotamian Tigris and Euphrates Rivers.

Abro et al 2020 have explained 44 fish types. Among them the *Cyprinidae* was the most had 13 species; *Bagridae* 4 species similarly, *Cichlidae* had 4 species, and the *Siluridae* had 3 species. The other families they illustrate were *Clupeiformes*, *Osteoglossiformes* and *Synbranchiformes* all documented in the waters of Indus River in Sindh (Abro et al 2020).

They explain that the *Cyprinidae* was the richest family having with 13 species. On the second level they found was *Bagridae* with 4 species; *Clupeidae*

and *Cichlidae* with 3 species; *Notopteridae*, *Channidae*, *Xenocyprididae*, *Siluridae*, *Aliidae* and *Mastacembelidae* with 2 species and *Ambassidae*, *Belonidae*, *Danionidae*, *Gobiidae*, *Heteropneustidae*, *Latidae*, *Mugilidae* and *Sisoridae* with only one species were recorded (Abro *et al* 2020).

Abro and his team also recorded 5 oceanic species associate with 3 families like *Clupeidae*, *Gobiidae*, and *Mugilidae*. They also documented 3 more species surviving in both the sweetwater and sea environments those species are *Belonidae*, *Cichlidae*, and *Latidae* (Abro *et al* 2020).

J. Bates (2020) investigated fishing methods in which the efficiency of fishing net fiber is explained that the marine and river fishing was an important aspect of South Asian food procurement resources. The noted types of *Pomadasys argenteus* (silver grunter), *Labeo rohita* (carp) and *Epinephelus* sp. (sea bass/groupers) fishes were caught with net and argued that such types of nets were used.

J. Bates (2020) with reference of Belcher (1999) illustrates the fish motifs painted on the Indus Pots and classified at least 50 fish or fishing motifs on the Indus pots. According to the reference of Belcher, (1999), Bates explain painting of a Harappa man hold and throwing a net. The fishes are shown standing near the net. This motif is painted around the base of given potsherd. In their studies the boat models and images on the seals recommend that the Indus peoples had rivers transportation and the carried fishing for supplementary food (Bates 2020).

William Belcher, (1991) in his studies sees the potential of fish within the contemporary rivers of South Asia. The *cyprids* (craps) and the *silurids* (catfish) are found as major fish types. Belcher measured some fish varieties of Indus river and explain that most varieties range in size from 10cm to 50 centimeters, and the carps and catfishes measure as a meter or more in body size. Similarly, the shad (*Hilsailisha*), grow up to 40 cm in length. The catfish *Rita rita*. Bones are registered during the excavation of Harappa by Vats during the 1920s and 1938 (Vats 1940). The 856 recognized samples nearly half are *silurids* (catfish) and *Wallago attu* hold the second level. The *Mystus* sp. and the

Ariidae family of marine catfish bones were also identified.

William Belcher (2018) explicate the fish for fertility and represent as a female organ as fish goddess. Fish symbolism is given the 'heat' connotation and a 'phallic' look. The heat is related with fertility, and eating fish and fish broth has been traditionally use for removing the infertility. Sanskrit writings carry details about rohita (*Labeo rohita*) and the sakala (murrel or snakehead, *Ophicephalus* sp). In mythological accounts, the red massive star Rohinī, as a partner of the moon god is admired by a woman because she is always near her husband. On the other hand, the moon is a symbol of faithfulness. The sakala fish is considered the symbol of Rohinī.

Later on Jākata and Tantric Buddhist writings also illustrate significant role of a royal fish rohita (*Labeo rohita*). In contemporary times, Bengali consider fish essential part of the wedding ceremonies (Parpola 1994a: 191). Similarly, the red forehead mark (*Shindor*) of married Hindu women portrays the star Rohin as the rohita or rohu fish contained red dots in the center; is associated with wedding ceremonies (Parpola 1994a: 190).

The fish bones found from Mehrgarh and Nausharo are associated with freshwater fishes identified as catfish and carp. Five marine or brackish water fish like carp, *Labeo* sp. and *Labeo rohita*, catfish, *silurid* catfish (*Wallago attu* and *Aorichthys* sp.), *bagrid* catfish (*Rita rita*), and *sisorid* catfish (*Bagarius bagarius*) have been recorded.

The fishes like spiny eels (*Mastacembelidae*), snakeheads (*Ophicephalidae*), shad (*Clupeidae*), and knife fishes (*Notopteridae*) were utilized as food and obtained from freshwaters of river or river channel. It is documented that the catfish has size from one to three meters and even larger. This type of fish is a significant source of animal protein and fats best for fish oil/ghee.

The seawater fishes like grunters (*Haemulidae*), tunas/ mackerels (*Scombridae*), marine catfish (*Ariidae*), and jacks/trevallies (*Carangidae*) traded dried and/or salted in the Harappa city after more than 850 kilometers traveling distance.

From Balakot a total of 7278 bones identified in which include: grunters (*Haemulidae*, *Pomadasyshastalargenteus*), marine catfish (*Ariidae*, *Arius thalassenis*, *A. maculatus*, *A. dussemieri*, and *A. sona*), (*Carangidae*), (*Sciaenidae*, *Protonibea diachanthus*) and many others.

Other Marine fishes occurred as *Scaridae*, *Lutjanidae*, *Serranidae*, *Sphyracidae*, *Trichuridae*, *Ephippidae* and large mackerels or tunas (*Scombridae*). Cartilaginous fishes include large and small sharks (*Carcharhinidae*). The teeth collection showed large eagle rays (*Myliobatidae*). Freshwater catfish (*Siluridae*), spiny eels (*Mastacembelidae*), and carp (*Cyprinidae*) are signified.

From Allahdino site, two major groups of 10 fish families were identified. Among them grunters (*Haemulidae*, *Pomadasy hasta cf. argenteus*) was dominant.

Rafique, M., Najam Ul Huda Khan (2012) discuss about the freshwater fish of Pakistan. Their findings registered 193 fish types. Among the total of 86 fish species; 8 are exotic and 78 are indigenous. The *Glyptothorax kashmirensis* and *Tor putitora* species, are declared endangered'. The 35 indigenous fish types like *Ompok bimaculatus*, *Ompok pabda*, *Wallago attu*, *Ailia coila*, *Chitala chitala*, *Bagarius bagarius* and *Schizothorax plagiostomus* are classified as endangered close to wipeout if not conserved properly

It is noted that the native types such as *Danio rerio*, *Megarasbora elonga*, *Schizopygopsis stoliczkai*, *Triplophysa stoliczkai*, *Nandus nandus*, *Badis badis*, *Monopterusuchia*, and *Macrognathus aral* are exceptional in the waters of Pakistan.

Another research carried by Urooj *et al* 2011 explained more than 186 fish species from freshwater bodies in Pakistan. The most important species are: *Labeo rohita*, *Gibelion catla*, *Cirrhinus mrigala*, *Cirrhinus reba*, *Channa straitus*, *Channa marulius*, *Sperata sarwari*, *Wallago attu*, *Rita rita*, *Bagarius bagarius*, *Tenualosa ilisha*, *Notopterus notopterus*, *Tor putitora*, *schizothorax spp.* and *Clupisoma nazirri* (Peter1999).

Mohenjo-Daro had Free-threshing wheat (*T aestivum* and *T compactum*), barley, dates (*Phoenixdactylifera*) (Stapf 1931; Luthra 1936). Chanu Daro had Free-threshing wheat (*T*

sphaerococcum)(Shaw 1943)and *T vulgare T aestivum*). Harappa had Free-threshing wheat (*T aestivu*, and *T sphaerococcum*) (Burts 1941; Luthra 1941), barley, *Sesamum indicum*, (Vats 1940: 467). melon (*Cucumis melo*), dates (*Phoenix dactylifera*). Khokhrakot had Rice (*Oryza sativa*), naked barley (*Hordeum vulgare var. nudum*) (Sahni 1936).

According to the Fuller (2002) several crops originate in Africa, for instance, three major savanna millets, Sorghum, *Pennisetum*, and *Eleusine* which were earlier claimed for having an Indian origin of ragi/finger millet (*Eleusine coracana*, (cf. De Candolle 1886; Vavilov 1992 [1950]; Porteres 1976; Vishnu-Mittre 1971; Vishnu-Mittre *et al.* 1984). Fuller 2002 has indicated about the discovery of hybridizing wild *tetraploids* in the East African highlands provided strong evidence for an African origin. These discoveries are supported by numerous studies (Mehra 1962, 1963; Phillips 1972; Hilu and De Wet 1976; Hilu and Johnson 1992; Werth *et al.* 1994; Hilu 1995; De Wet 1995b).

Heather Margaret-Louise Miller (1991) has focused on the uses of domesticated and wild plants; culinary technologies, types of fuel, and the use of plant products. Miller in her discussion mention that the Wheat predominantly forms of (*Triticum aestivum*), barley (*Hordeum vulgare*), and a variety of legumes (*Lens*, *Pisum*, *Cicer*, *Vida*) were the major food crops and were important subsistence sources for Indus people.

Brad Chase (2012) argues that the recipes of meal making and cooking which are exercised and passed from one generation to another in a home are significant for understanding social peculiarity. The raw materials and ingredients for the cooking procedures to be followed for the meals and material culture to events and recipes disclose the cooking skills of cuisine.

For the processing meat in the Gola Dhoro settlement, "V" shape cut marks on the bones suggests the use of chert stone implements and the "U" shape cut marks indicate use of metal tool. This suggest that meat was perhaps processed for cooking purpose.

Background of Feast (Food)

Feast in its nomenclature synonyms include meal, dinner, buffet and others. The anthropologist and archaeologists have provided almost similar meanings and usage of word ‘feast’ with communal background history. In the present paper context, the feast is discussed in its simplest

boundless form as a “Food”. Thus, the food is something to eat, given/provided by anybody at any particular or common place and time. It carries a definite process of cooking and involved the concrete factors as shown in food ways phenomenon following chart (figure2)

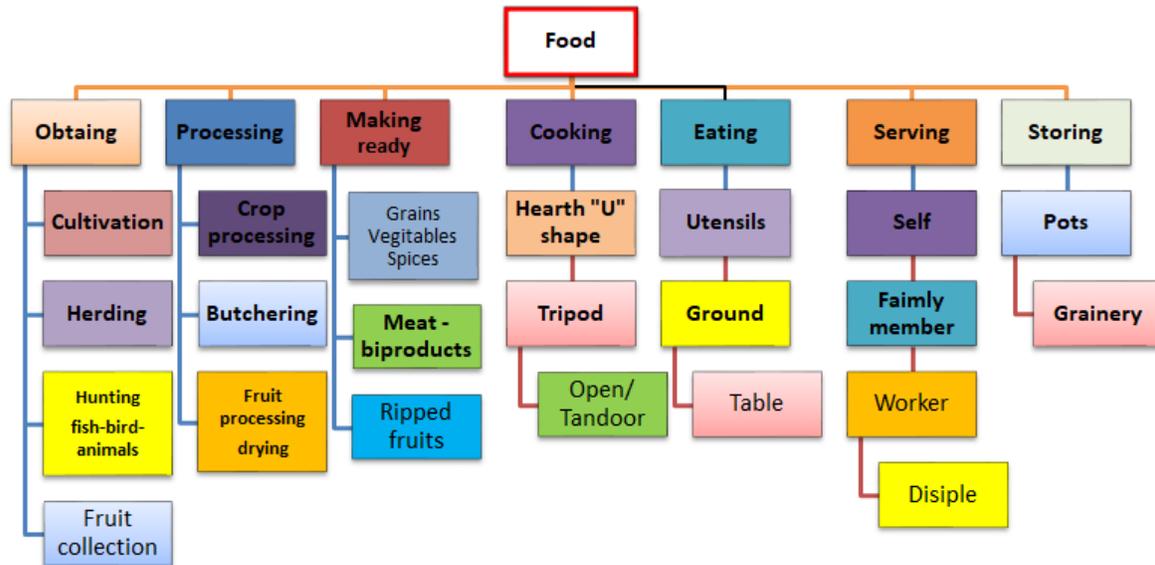


Figure2: Food Ways chart

Today in common traditions in South Asian cuisine context; the food is given at home, religious and ritual place, Marriage garden/Hall or any other place decided by the food provider. The food preparing involves material, arrangements, and serving activities as shown in table of Food Way part two.

Food

The research has strongly proved that staple foods domestication happened in Mesopotamia. The Mesolithic hunter-gathers 10000 BCE used local grasses with grains like wheat, barley, peas, and lentils. Mesopotamian agriculture cross through two major phases as one at the end of Mesolithic era when in Mount Taurus, Levant and in Zagros region called “Fertile Crescent”; where some grasses were deliberately cultivated. Archaeological research shows that the second phase occurred in

the Near East during 4th millennium BCE known as the “agriculture revolution “with huge diversity of products (Potts 1997: 75; Sherratt 1981: 261–305). During this phase, the cultivation tool (plough) and deliberate water system was utilized and the animals like sheep for wool cattle for dairy products and fruits like olives, grapes and date palm garden were raised and added to the list of staple food sources.

The Samarra culture dated as 6200-5700 BCE remains of deliberate irrigation system have been found at Choga Mami in central Mesopotamia. The irrigation water was managed to the fields through canal system. In 1900 BCE, the Akkadian cuneiform tablets mentioned 800 food items, 300 bread varieties and 20 types of the cheeses (Jimmy Joe 2024).

Crops

Mesopotamia was great cereal producer of the grains i.e. [barley](#), and [wheat](#). The barley was grain crop in Mesopotamia from which the beer was made frequently. They had fruits and vegetables in diet. In the variety list of fruits were apples, cherries, figs, melons, apricots, pears, plums, and dates. Similarly, Vegetables lists lettuce, cucumbers, carrots, beans, peas, beets, cabbage, and turnips in their dietary arrangements. The fish, and livestock of goats, pigs, sheep, and cows were for the beef obtaining. They had hunted deer and gazelle and birds as diet supplement. They had domesticated geese and ducks for eggs. Beer, was the most popular beverage in ancient Mesopotamia. The people drank strong wine or water (Mark 2014). A number of crops such as Barley, flax for cloth and lamp oil, sesame; chick peas, vetch, lentil, beans eggplants, turnips and onions were additional to their primary food resource. Among vegetables the green leaves and leeks, garlic, cucumbers were used. The fruits were apples, figs and pomegranates quinces, melons, plums, figs, apricot, pistachio, apples and pears. Later on the olives were added.

The Mesopotamian text mentioned about Barley in great detail along with its cultivation methods and season. The Sumerian manuscript known as the Instructions of the Farmer clearly mentioned cultivation process and procedures ([Potts 1997](#): 70-86; Lion & Michel).

Vegetables

Around the end of the 3rd millennium BCE sesame was introduced to Mesopotamia, from Indus valley and became the most popular and important crop after cereals. The sesame oil was used for various purposes including cooking food, maintaining hygiene, and as lamp fuel for light. The sesame seeds were eaten in food and used as spices or test enhancer ([Potts 1997](#): 67-68;). Various legumes, like vetch ([kiššanu\(m\)](#)), chick peas ([hallūru\(m\)](#)) and lentil, beans, onions and several other vegetables containing green leaves, [cucumbers](#), [leeks](#), [garlic](#) were supplement to the cereals ([Joannès 2001](#): 472-473).

Fruit

The fruits such as [pomegranates](#), [figs](#), [apples](#), [quinces](#), [pears](#) and [olive](#) were part of their diet ([Postgate 1992](#):170-172; [Potts 1997](#):. 62-66 & 69-70). The bas relief carvings of [Neo-Sumerian period](#) have orchards of [date palms](#) mentions that after plantation, a Date tree becomes mature in five years and continues providing fruits for sixty years ([Joannès2001](#): 624-626).

The Animals

The Mesopotamian had domesticated sheep and goat for milk, wool, meat and leather ([Postgate 1992](#):159-163; [Lion & Michel:2001](#):610-612). Cattle although was different in breed than Indus Valley but was essential source of milk, meat, leather, plough and transportations. Donkey domesticated during 4th millennium BCE and the dog was pet animals and was used for hunting by noble class of the Mesopotamian societies. Pigs included in the faunal category ([Lion & Michel 2001](#):670-671). Around the 1st millennium BCE some birds were introduced from Indus Civilization such as [geese](#), [ducks](#), and [pigeons](#) and [Chickens](#) for the meat and eggs ([Lion & Michel 2001](#):49-50;603-606). Finally, [honey](#) and [beeswax](#) were collected from wild honey hives ([Michel 2001](#): 532)

Hunting and Fishing

The Mesopotamians hunted and captured both large and small mammals like wild cattle, wild goat, gazelles, and boars; hare and fox etc. all were additional source of food. The ancient text mentioned that a large variety of fish at least 50 different types/ species of fishes were caught and utilized ([Jimmy Joe https://www.timelessmyths.com/history/ancient-mesopotamian-foods](#)). For which all water bodies such as rivers, canals, lakes, and saline swamps and even from the sea in Persian Gulf fish was caught ([Lion 2001](#): 179-180; [Lion & Michel 2001](#): 638-640).

Feast Opportunities in Egypt Civilizations

The magnificent civilization of Egypt of the Nile having palaces of pharaohs/ kings, pyramids and the sphinx where domestication of plants and animals was extended ([Adhikari 2019](#)). Egypt had

excel into food varieties and diversity with rich diet (figure3) than Mesopotamia and Indus valley. The information about food-ways is mentioned in their writings, paintings, and carvings in the tombs and palace and is based on pictures on walls, offering trays, scrolls of hieroglyphic writings and food kept in the tombs. The artwork depicts the growing, obtaining and preparation of food. Many tomb walls contain scenes of people hunting, fishing, and working in the agricultural fields.

Egyptian ate bread as a staple food item. The Pharaohs were the first to have baking knowledge and cooking food items (Adham 2022). Hence, the bread was considered an essential food for sacred rituals and Lotus flowers on offering tables, for an adornment and beautification for food (Adham- 2022). Egyptologists discovered many forms of bread from the tomb of King Ramses III. The flour for bread was mixed with some wase test flavor additives like yeast, salt, spices, milk, and eggs and was cut into pieces for baking purpose.



Figure3: Elites food varieties and workers in Egyptian civilization.

Animal and Birds

The meat diet obtained from fish and poultry were staples diet of the poor and the elite feasted on meat (Adhikari 2019). Domesticated animals include cattle, sheep, and goats delivered dairy products, and meat. The fat used for cooking food. Cow's milk was used for ghee or butter. The lower class Egyptians eat the rodents, mice and hedgehogs. The Geese, ducks, quail, pigeons, pelicans and their eggs were also eaten. During 4th or 5th centuries BCE, chickens were introduced

Vegetables

The Egyptians ate vegetables on daily basis as their routine meals and were commonly utilized by the poor and rich (Adhikari 2019). The vegetables were green onions, garlic, leeks, lentils, cabbage, radishes, turnips, legumes, and cucumbers, lettuce, watercress, radish, cabbage, cauliflower, dill, parsley, and coriander. The Legume types included lupines, chickpeas, broad beans, and lentils were the part of daily foods (Gill 2019, Adham 2022). The bread and beer was commonly taken with vegetable and meat dishes. The fruits for the lower classes were figs, sycamores and date palms called Amhat (Adham 2022). One of the favorite ingredients was *Hab alAziz*, the papyrus plant. It is delicious tubers eaten fresh, dried, or roasted and found in tombs of pre-dynastic period of Egypt (Adham- 2022).

in Egypt (Gill 2019). Bird meat was famous among both the rich and the poor of ancient Egypt. The common poultry for food supplement was geese, swans, ducks, quails, cranes, pigeons, and even doves and ostriches. Among this list, the Pigeons, geese, ducks and other domestic poultry were considered as popular food for the richest and the cranes, swans, and wild ostriches were for the poor. Egyptian preserved the Poultry with seasoning for later on consumption (Adhikari 2019).



Figure4: Hunting birds and ploughing of 2700 BCE Tomb of Nefermaat and Itet (*Wikipedia*)

Egyptian hunted animals in delta and/or the desert region. The wild cattle, Oryx, and antelopes were best sources of meat for temple rituals (Adhikari 2019). Animals herds and the number

of the herd animals would represent the prestige of the owner, and the temple that worshiped those animals. The dairy products like curd, whey, and cream were popular (Adhikari 2019).



Figure5: Cow milking and servants the beer and bread

The fish from the Nile was eaten; some fish species were connected to the Egyptian god Osiris (Adhikari 2019). The Nile Fish was diet

supplement for poor and was infrequently eaten by the well-off Egyptians (Gill 2019).



Figure6: Bird preparing for cooking and Fish, Birds and fruit in Tomb of Menna

Oils and Spices

The Egyptians used spices and oil for cooking. They had 21 different vegetable oils mainly derived from bean-nuts and linseed sesame, castor, flax seed, radish seed, horseradish, sunflower, and colocynth (Gill 2019; Adhikari 2019). Horseradish oil was known to have been very popular. They also liked a lot of spices like salt,

aniseed, cinnamon, coriander, cumin, dill, fennel, fenugreek, marjoram, mustard, and thyme (Adhikari 2019). They also had Spices like juniper and poppy seed (Gill 2019). Honey was available as a sweetener (Gill 2019). Salting of fishes and ducks was common in order to preserve them for a long time (<https://ask-aladdin.com/ancient-egypt/food-ancient-egypt/>).



Figure7: Priestess or elite women checking the aromatic flowers

Fruit and Drinks

The Egyptians grown, eaten and made drinks from Apple, Grapes, figs, olive, and pomegranate. The Coconuts were imported luxury foods afforded by rich Egyptians (Adhikari 2019). The other Fruit included melon and dates (Gill 2019). The raisins, dates, carob, and even the root of the

chuba grown in the delta marshes, had a nice sweet flavor and was also used for sweetening purposes. The honey and the unfermented grape juice as a syrup was consumed (Adhikari 2019). Egyptian word for wine is *jr* have a long history and was consumed as early as 3000 BCE. During 18th

dynasty both red and white wines were available to everyone throughout Egypt (Adhikari 2019).



Figure8: Bread and Beer use

Grapes were grown for wine. Around 3000 BCE, the Egyptians adopted the Mediterranean Grape cultivation and started making red wine. The carved scenes of wine making process and procedure is shown in ancient temples and pyramids. The upper classes used wine mainly for ceremonial purposes (Gill 2019). Beer was the most popular drink used on a daily basis. It was the preferred drink of gods, the rich, adults and even children. Beer was sold as commodity and was used for remunerations to the workers for their service. Any employer will give bread, oil, vegetables, spices and Beer as a daily ration. During Pharaonic times, daily beer quota was two jars containing more than two liters for each person. The Beer was supposed to be a healthier drink than the water drawn from rivers or canals which were often polluted (Adhikari 2019).

Kitchen and Eating Pattern

The kitchen was usually located at the end of the house and was covered with straw and twigs. The Egyptian kitchen includes clay oven and the necessary cooking utensils like mortar, grinder, and dough trough. The kitchen tools were baskets, sieves, pots, spoons, and knives etc. (Adham 2022).

Cooking was carried in clay ovens like *tandoor* or over open fires. Wood was burnt as fuel, and sometimes prepared charcoals were used. Food in ancient Egypt was baked, boiled, stewed, fried, grilled, or roasted depending on the diet type. The kitchen had no fixed place. It was commonly located at the corner of the courtyard or on flat roofs and it was well ventilated and lightly roofed or at end of house

(<https://ask-aladdin.com/ancient-egypt/food-ancient-egypt/>).

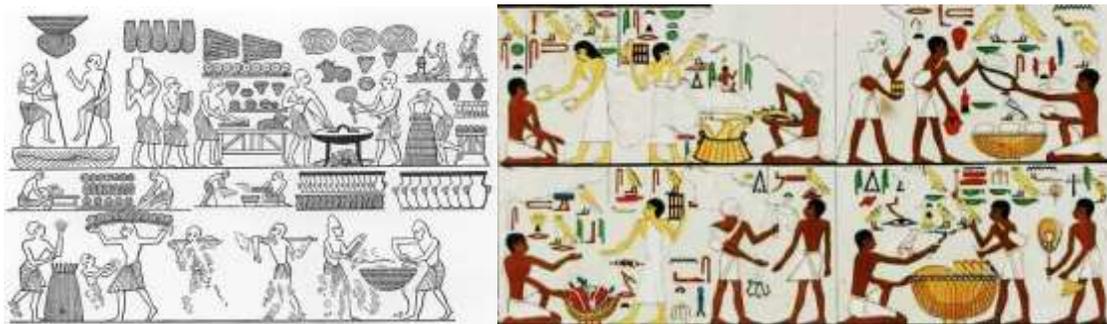


Figure9: Bakery of Ramesses III of 20th dynasty and Royal Bakery of the kings

The Egyptian used to eat three times a day as breakfast, lunch and dinner. One of these meals had to be a family meal which must include the whole family. They ate their food with their hands

while sitting around a tray on a small table. They washed their hands before and after eating Egyptian offered and served food in pots to the family and to their gods (Adham- 2022).



Figure10: Food collected by workers for large feast

Feast Opportunities in Indus Civilizations

Archaeological research has recorded thousands of settlement located with one million square kilometer region of Indus civilization. After serious classification, the settlement pattern contained four tier hierarchy as cities, towns, villages and camps (Smith 2012). As per basic information there were six Mega cities as urban centers were (i) Mohenjo-Daro, (ii) Lakhano-Daro, (iii) Harappa, (iv) Ganweriwala, (v) Dholavira, and (vi) Rakhigarhi and many others. These cities differ in size cultural complexity (Kenoyer 1991). Each city contained various towns, villages and camps around which were connected through pervasive interaction network and people moved settlement to settlement. Four categories of food resources were available to Indus people such as (a) through cultivation and collection like grains, vegetables, spices and fruits, (b) topography based like mammal herding and hunting (c) aquatic based like fishing and (d) supplementary like birds were exploited as staple and supplementary subsistence. However, the Indus people were familiar with honey and may have utilized.

Crop System

The traces of plough field from Kalibangan and terracotta model of plough from Banawali demonstrates the *Rabi* and *Kharif* crops were deliberately and intentionally grown (Chakrabarti

1999:190, Meadow, 1992, Kenoyer 1991). The water for cultivation was commonly managed through, flood, rain, dams called Gabarbands, springs and wells depended upon the water source type and availability. Cultivation in Sindh - Baluchistan hilly regions of Khirthar hilly sequence known as Kohistan has a specific system of “Khushkaba” or the “Barani” means ‘the rain crop’ (Fairservis 1975:171, Mallah 2009). The *Rabi* crop provided wheat, barley, pluses, mustard, masoor, peas and vegetables. The *Kharif* crop season has Rice, sugarcane, cotton, maize, mong, mash millets, bajra and jowar crops. The fruits like dates and melon were favored crops of this season (McKean, 1983; Possehl, 1987; Weber, 1992).

Among these crops as a staple food were barley (*Hordeum vulgare*) Wheat (*Triticum aestivum*) and legumes like (*Lens*, *Pisum*, *Cicer*, *Vida*) were consumed largely as main diet (Miller 1991). Other crops were Rice (*Oryza sativa*) mustard (*Brassica* sp) linseed, flax (*Unm usitatissimum*) sesame (*Sesamum indicum*) and millets (*Eleusine coracana* ssp, *Coracana*, *Panicum miliaceum*, *Pennisetum typhoides*, *Setaria*,) and Sorghum bicolor sp. (Weber 1989, Weber and Fuller 2008, Pokharia et al.2014, Willcox 1991, Liu et al. 2017 Lister et al. 2018).

Oil

The sources for oil extraction were from butter as clarified ghee, animal and fish fat and from

mustard (*Brassica* sp) linseed flax (*Ulmus* *usitatissimum*) sesame (*Sesamum indicum*) (Singh *et al.* 1965); Within contemporary contexts, it is observed that the clarified ghee can be used in each curry type. The other oils extracted from seeds is another source for any type of curry including meat and fish. The animal fat can also be used for same purpose.

Spices

The Indus people were familiar with ginger, turmeric and yams obtained from tubers and roots. Furthermore, the presence of garlic (*Allium sativum*) and ginger was available (Weber *et al.*, 2011b; García-Granero *et al.*, 2017a, 2017b, Saraswat and Pokharia, 2001). The spices like turmeric and ginger (Bates 2016) and more

spices like nutmeg, black pepper, cloves, asafetida and cinnamon (Kenoyer 1998).

Fruits

J.M Kenoyer argues that Indus people enjoyed the native tropical fruits like mango, jamun and amala (Kenoyer 1998). Various other fruits like banana, jujubes, grapes (sweet raisins), and dates (Madella, 1997, 2003; García-Granero *et al.*, 2015, 2016, 2017a, 2017b; Bates, 2016; Bates *et al.*, 2017a; Fuller and Madella, 2009; Saraswat and Pokharia, 2002:128). The common fruits were date (*Phoenix dactylifera*), grapes (*Vitis vinifera*) and jujube. *Zizyphus* in wild were consumed as dried and fresh. The remains of these fruits are found from several larger and smaller settlements of Indus civilization (Miller 1991, Reddy 1991).

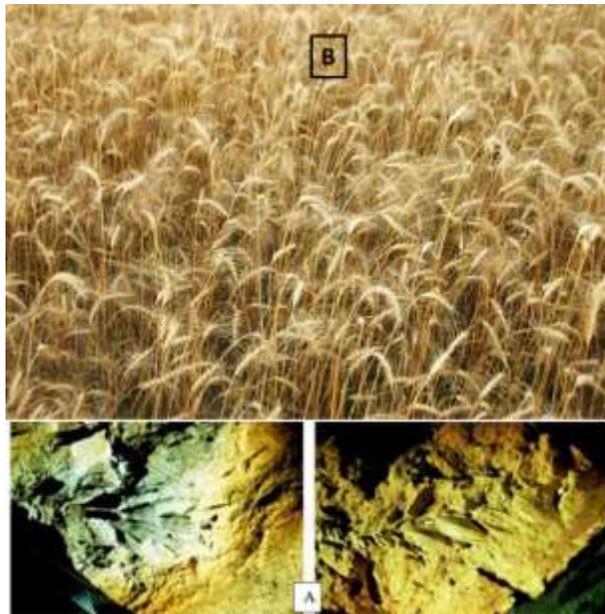


Figure 11:A: Wheat impressions from Mehrgarh B: contemporary wheat crop.

Animals

The Zooarchaeological analysis and documentation of bones, figurines, painting on terracotta objects, and depiction on the seals have attested the presence of animals used for various purposes including staple food sources. At least seven domestic mammal species were utilized in the Haryana region settlement during Indus period. Those were the goat (*Capra hircus*) sheep (*Ovis aries*) cattle (*Bos indicus*), buffalo (*Bubalus bubalis*)

pig (*Sus domesticus*) dog (*Canis familiaris*) and ass (*Equus asinus*) (Meadow, 1989). All sizes (large, medium and small) wild animals were hunted. The several species of large bovids and cervids as gazelle, swamp deer, nilgai, blackbuck, onager, spotted deer, ass and pigs, and wild sheep and goat, were hunted (Chakrabarti 1999:192, Pöhsel pp27). Indus people were familiar with chicken and dog (Meadow, 1989, 1991; Ratnagar, 1986; Pöhsel, 1979). The butchery pattern of animal

and meat eating at some of the Indus settlements portrait “social difference” (Chase2012a, 2012b). From Farmana settlement; the aquatic faunal resource recorded include as teal (*Anaso crecca*), peafowl (*Pavo cristatus*), soft shell turtle (*Trionyx gangeticus*), Indian mud turtle (*Lissemys punctata*), Indian Sawback turtle (*Kachuga tecta*), (Joglekar et al 2013).

Ethnoarchaeological studies show that the cattle, goat, sheep and water buffalo are common fauna. The animals are utilized for daily and commercial purposes. The milk, meat, butter, clarified ghee, yogurt, and skin are used and commercialized. The animal pens are found within each type of settlement from urban to open savannah patches where nomads roam with herds.

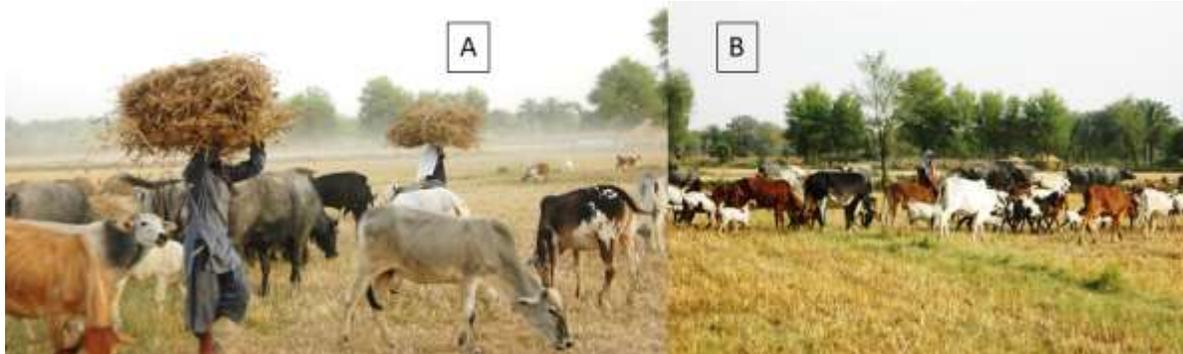


Figure12 A: After wheat crop cutting animals are enjoying the leftovers and B: cattle, goat and buffalo grazing after wheat crop (photo by author).

Fish

The Zooarchaeological indicators for the utilization of fish by Indus communities are retrieved in direct and indirect shape. The fish bones, scales and coprolites are direct evidence and the from the pottery painting, depiction on the seals, fishhooks and terracotta bead type net sinkers circular in shape with wide hole in the center for holding and tying the net attest the use of fish economy (Belcher 1919). The physical data on the fish remain i.e. fish bones documented from all type of larger and smaller settlements of Indus valley. The very recent data set occurred at Amri (Mallah 2020), Nuhato (Mallah2018) Lakhianjo-Daro have been documented (Mallah 2009-10, 2013, 2017, 2012).

Till this date a total of 531 species of fish in Pakistan are documented; among the total 233

species as listed as freshwater (Wikipedia). Freshwater fish, tortoise, and shellfish are common, while marine fish and shellfish were important at the coastal sites (Dales and Kenoyer, 1977; Meadow, 1979, Belcher 2003).

From Farmana site fish types documented are (*Catla catla*, *Cirrhina mrigala* and *Labeo rohita*), molluscs (*Lamellidens sp.*, *Diginostoma pulchella*, *Indoplanorbis exustus* and *Pila globosa*) (Joglekar et al 2013).

The types of fish used for food are the cyprids (carps) and the *silurids* (catfish). shad (*Hilsailisha*), (Qureshi 1965). The *silurids* (catfish). *Wallago attu*, *Mystus sp.* the Ariidae family of marine catfish. *Lilbeo sp.* the catfish, *Wallago attu*, the carp, catfish, *Mystus sp.*



Figure13: Fish tokens, pots and Fishing and Ethnoarchaeological fishing (photo by author)

The figures (13) above represent fish and fishing scenes. In which a human figurine holding Fishnet while the aquatic creatures are also part of the depiction; B: copper fishhook; C: Indus Seal with Fish symbol and D: terracotta fish tokens (Harappa.com). The Indus Fish pot is retrieved from <https://www.antiquities.co.uk> and another Indus Fish bowl from <https://www.artsy.net>.

Birds

The Zooarchaeological evidences of birds are also collected from archaeological settlements. The terracotta figurine and paintings on the pots and other vessels found from archaeological context depicts the Birds attest the presence and use of birds by Indus communities during the urban phase of Indus civilization. The birds are usually depicted on the pottery (Chakrabarti 1999:184). All of them are within forest context which suggests the swamps and inundation in the plain

where sufficient water and forest ecology have been best breeding ground(s) for birds. Some of them look like ducks indicating the water bodies like lakes and others. In any case the birds also supplemented the food system of Indus people.

TYPES AND KINDS OF KITCHEN UTENSILS

The essential feature in cooking is kitchen a place where food is cooked and made ready for further usage, hence it carried a central role in human history. In Mesopotamia at the end of Mesolithic and during Neolithic period when first human revolution of domestication occurred and adopted; the kitchen became a regular feature of the life. The family set up for performing activities was divided and intensified as man for fields and women stayed home cooked food for male, children and their other associates.



Figure14: Ethnoarchaeological pattern author is documenting cooking on lower left picture.

The kitchen involved some necessary items like the grains, flour and oils, spices and water for which utensils are required for storage purpose. It is also necessary to notify that where the food is actually cooked i.e. hearth is also necessary as it depends upon the number of consumers. The utensils archaeologically found are made of bronze, terracotta, stone, and shell. Ethnoarchaeologically, the kitchen utensils documented are made of metal (copper, tin, and iron) stone and clay with the traditional communities as per their social and financial affording (figure14).

The kitchen generally involves three features (i) cooking utensils (ii) the hearth types and (iii) storage vessels (figure 16). There is extensive array

of utensils used for first and last feature. However, the hearths are made into different shapes and styles as desired and are found temporary by having arrangements of three pods of any types such as stone, bricks, clay lumps and terracotta cakes. The purpose/idea is that keeping cooking vessel high from the ground to lit and maintain fire and temperature. All above mentioned features are described hereafter.

Cooking Utensils

There is huge involvement of utensils for cooking purpose. The cooking process is complex and intensive activity. It involves knowledge of cooking, diet to be prepared and utensils.

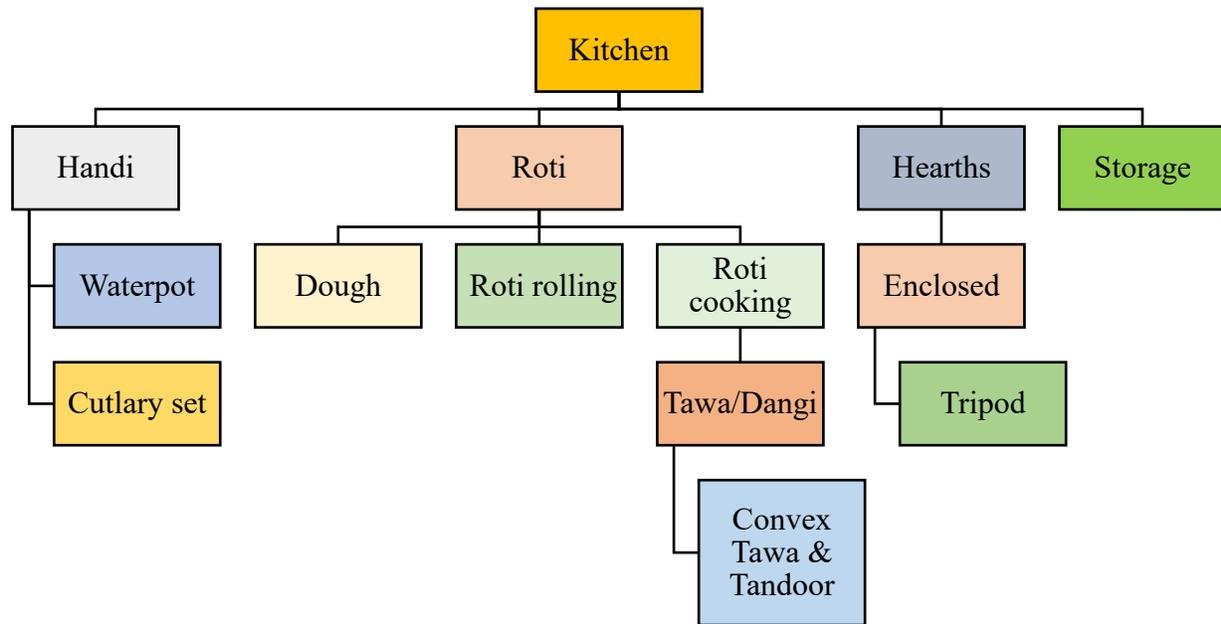


Figure15: Important works and items shown in the activity chart.

Curry Pot: The *Handi*

The most important cooking pot is a *Handi* specifically made for the curry and rice cooking. After Neolithic revolution of fauna flora domestication and preparations in earthen pot traditionally called as *Handi/Degri*. A curry pot has been found from Harappa Ravi Phase dated as 3300-2800 BCE. It was handmade from rough clay in globular shapes. Later on, the earthenware pot prepared on the wheel was intensified and both the terracotta and metal the copper/ bronze curry

pot was prepared. The evidences illustrate that Curry pot was manufactured in a particular shape as having with the open mouth, flaring rim, low neck, ledge shoulder and round bottom. In certain cases, the flat base is also given. This shape is still observed in curry pot.

Archaeologically, the cooking pot found from Ravi Phase of Harappa were in globular shape containing concave type low center. The purpose of this shape is hypothesized as to keep them from tipping over when filled with food (Kenoyer Harappa.com)



Figure 16: A Ravi Phase pot; B: Nausharo Baluchistan terracotta pot; C: metallic pot from Harappa D: Ethnoarchaeological pots (with thanks by Kenoyer)

Later on during 2300-2200 BCE, the shape of curry pots was modified having extended rim ledge shoulder and round base. In Nausharo Baluchistan, the upper part of pot i.e. neck and rim is painted. Some pots are manufactured grey-black style to maintain the variety in cooking vessels. The small pot having wide mouth may have been used for serving cooked curry.

The curry pots for wealthy families were made from metal found from Harappa city contain outside extended rim, high neck and ledged rim and were morphological similar to earthen curry pots. A metallic pot was discovered during early excavations carried by Vats in 1940. This particular pot contained copper tools and such type of can also be used for other purpose as well. The usage of cooking pot produces some wear traces and micro soot deposits on either exterior or interior surfaces or the micro porous of interior surface absorb the organic residues can be studied. (Skibo 1992). The remains of carbon or soot deposit can prove best evidences for recognizing a cooking pot (Tite 2008). The uniform spread of lipids on the interior surface suggests the function of pot under analysis as it was used for boiling foodstuff and roasting meat. The bowls carry

meager presence of lipids, indicating that they were not used for cooking purposes (Tite 2008). Ethnoarchaeologically the kitchen setup (figure 18) and cooking pots are still in similar shape and size. The hearth styles and shapes are almost similar indicating the continuity of heritage features within various communities.

Water Container and Cutlery Objects

The water container either pot or jar is very essential part of the kitchen utensils for cooking anything. The water is commonly required in the process of making roti and curry. Archaeologically, various sizes of pots and jars are found from every type of site and it is assumed that any of them might have been used for the said purpose. In addition to curry pots and water container; the cutlery objects are also very essential in the setting and maintaining the curry.

Roti/Chapatti: The Bread Making

The Bread traditionally known as *Roti* or *Chapatti* in South Asian context is essential part of meal and is made in different ways, shapes and taste. It is made from the flour of wheat, Bajra, Makai,

Jowar and Rice. The chapatti is also made from the Dals (lentils/pluses etc.) as well. The most common type of roti is made simple and in round shape. Another type is layered roti made with clarified butter or ghee and is called as Paratha. For the process of this roti making; a roll of Dough is made mixing the Ghee and is flattened in required or chosen shape over the roti rolling vessel. The roti is half cooked on a tawa; the ghee is rubbed on both sides for frying and it becomes crispy on outer sides in light brown color which signifies the cooking and taste this is traditionally called 'Paratha'. The roti and/ or Paratha is mostly eaten with curries, stews, eggs dishes and a cup of tea or curd even without any supportive item.

The Aallo-Paratha and Moli- Paratha are the other types of rotis made into two layers. The crushed potatoes *aallo* or *moli* or *qeema* (crushed meat) or any sweet item like *Gurr* is mixed with other taste additive are stuffed / kept in between two thin rotis and cooked on Tawa. After few minutes' delicious roti is ready to serve. Paratha is indigenous to South Asian communities but found with other communities of the world where wheat is used as staple food source.

The chapatti making has four parts in sequence (a) water pot (b) Dough making pot traditionally the pot is called as Praat /thaal; (c) Spreading the roti or roti rolling plate and (d) cooking.



Figure17: flour making, bread and curry preparing scenes in Ethnoarchaeological studies.

Dough Preparing Pot

The flour dough for roti making is prepared in a pot traditionally is called as *Praat /thaal*. (figure19). It is a flat base plate or bowl for the mixing flour with water and waddle for some time

to make the flour in elastic or flexible condition for preparing the roti. When flour (*Aata*) is in elastic condition a handful portion is takeaway to make a ball and beat it with hand and place over the roti rolling pot for further flattening.



Figure18: a&b: large plate (Praat) from Archaeological context and C: used in traditional context

Bread Preparing or Chakra Object

In contemporary traditional context; the roti is rolled over a specific vessel made of either wood,

stone or terracotta in circular shape with or without stand so that the roti may not touch the ground and stay safe pure and or hygienic. Two

objects have been found from archaeological site of Lakhanjo-Daro (Mallah 2017). Among them, one is circular rimless terracotta plate type object in broken condition having a complete body profile measuring as 24 cm body diameter with 2.3 cm thickness. It has flat and smooth top surface. Another part of pot contains the flat and smooth top having base attachment traces suggesting that round/circular base may have been attached. On the base, incised bird design is made. This type of base provides facility to keep item tightly for further usage of making roti/chapatti. The similar type of objects can be seen in the traditional contemporary kitchens of South Asia. Nowadays, the chapatti is made on a circular object made of wood, stone or sometimes in terracotta which

looks morphologically very same to the object found from Lakhanjo-Daro.

Roti Belan: Rolling Pin

In general setup of roti preparing at least two objects are required (a) round shaped object called as Chakra and (b) *Belan* or rolling pin. The (a) is made of either stone, terracotta and wood is attested through Archaeological context and Ethnoarchaeological context as well. Now a day the Chakra made of wood measured as 9 inches' total body circumference and *Belan* has a total length of 12 inches. The end parts of *Belan* are made thinner to move easily. These tools are sold in market and through web/internet sources for example as at <https://www.flipkart.com>

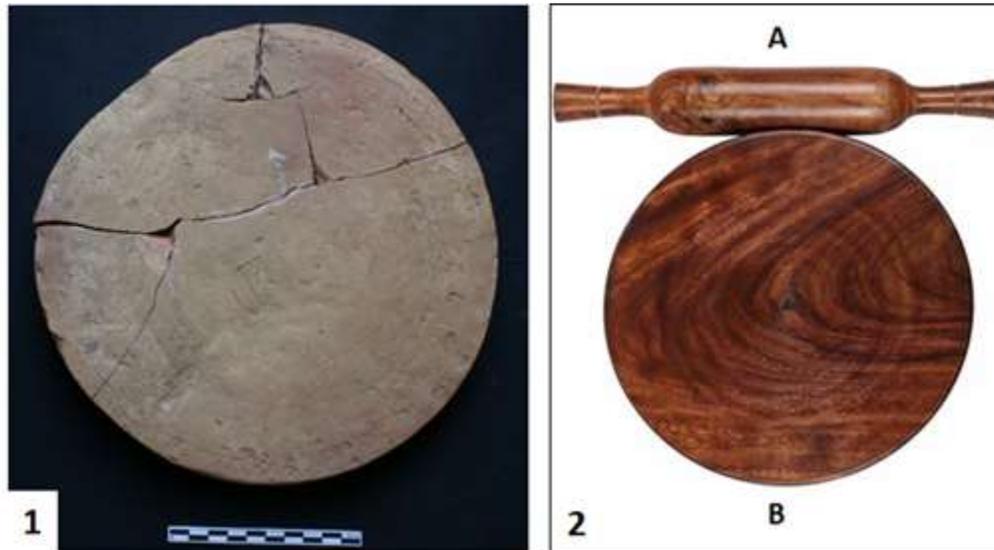


Figure 19: Bread spreads 1-from Lakhanjo-Daro and 2-A: Belan and 2B: Chakra

A round chapatti making plate was found from Lakhanjo-Daro measuring 23.5 cm in total dia (Figure 19). It is round /circular in shape and plain. On one side it is given incised circular line and "V" symbol almost at the center of the plate. Both sides are not completely smooth and have slightly bumped /uneven surface. Nevertheless, it is perfect for chapatti making.

A broken part of the similar object is found from Lakhanjo-Daro which contains bird motif on the base is made in incised line designed (figure 20). This may or may not have been used for ritual purpose as peacock is mainly used on the burial pots found from Harappa and associated with Cemetery H phase which is late Indus dated 1900-1500 BCE.



Figure20: Backside of bread spread object broken & with incised bird motif from Lakhanjo-Daro

Roti Roasting or Baking

For roti cooking three pots as (a) earthen plate (b) metallic flat plate and (c) convex metallic plate are used. It is also assumed that the triangular terracotta cakes and roughly made round shaped terracotta balls may have been used to cook the chapatti.

Archeologically, the Mesopotamian and Egyptian writings and paintings demonstrate the bread making process and procedures. But there is no any specific object has been recorded for this purpose from Indus Civilization except the roti rolling plate found from Lakhanjo-Daro. Hence, the terracotta triangular cakes, potato type terracotta balls and pebble stones are hypothesized for this purpose and can serve the purpose very precisely. The chapattis are directly cooked on the charcoals and can be prepared rolling around pebble stone (figure22).

The Ethnoarchaeological documentation of traditional cultures from all provinces Pakistan and other countries of the world suggest

peculiarities for *Roti /Chapatti* cooking into three styles as:

- ❖ Type 1: Making on Stone and Charcoal
- ❖ Type 2: Single Roti Making
- ❖ Type 3: Multiple Roti Making

Type1: Making on Stone and Charcoal

The Ethnoarchaeological documentation suggest that the nomads and people living in very remote regions of the Baluchistan still use the primitive ways of roti making. The flatten roti is directly placed over the charcoal and cooked. Another way to prepare the chapatti is to make the pebbles hot first and the dough is placed over the pebbles in round shape and kept very near to charcoals until roti is properly cooked for consumption (figure21). Nevertheless, these procedures provide precise view about the initial stages of roti preparation before the invention of any solid vessel for this purpose.



Figure21: Traditional nomadic style of roti making

Type 2: Single Roti Roasting or Baking

The single roti is baked through two type's pots as (a) earthen plate (b) metallic flat plate. The earthen pot is in slight concave plate like profiled vessel known as "Daangi" still in very common use and is available in almost all local markets. Another object is thick iron plate in circular shape having arrangements for putting on and taking off of the fire/hearth top known as 'Tawa or Tawa'. It is found throughout South Asia and other cultures of the world as well. For instance, it is called 'Saj' in Arabic and 'Sac' in Turkish. The *tawa* is metallic object made in round shape with flat but slightly concave at center in profile. In addition to bread cooking, it is also used for frying some other dishes as well. The *Tawa* is provided a handgrip to handle easily on the hearth. Both *Dangi* and *Tawa* are used to cook a single roti.

Type 3: Multiple Roti Roasting Vessels

For the large families and during any specific feast occasion; multiple breads are cooked simultaneously. This tradition is commonly observed in the hotels cuisines. For this purpose, two type of objects are utilized as (a) Convex Tawa and (b) earthen object Tandoor.

Convex Tawa

This types of *Tawa* is used for cooking multiple breads simultaneously. It is large in body diameter and concave in shape. It can be used for both purposes as the concave side for cooking curries and convex side for multiple breads. It can be settled over the fixed hearth or tripod setup of hearth. The numerous communities use this type of roti making object with different name, for example *Tawa* in South Asian communities *Saj*

with Palestinian and Arabian communities. The *Tawa* is very useful for large families, feast gatherings and hotels.

Tandoor

There is another vessel for chapatti, *Nan* baking and meat cooking known as Tandoor -having *Dhol* or drum shape made from clay in various sizes and fixed underground or kept at one place. The small size *Tandoor* can be transported at desired places and is observed with contemporary nomads and or seasonal transhumance. In its scheme, the fire specifically the charcoals are made first which makes the sides of *Tandoor* very hot; the flattened chapattis are stick with its sides and within few minutes it becomes ready and taken off of side wall. It is combination of both the hearth and chapatti cooking object (figure22).

It is rarely used to cook/roast meat or fish. The tandoor is found with central, west, east, and south Asian and with some African traditional communities. It is either placed on the ground or subsurface and hold fire inside at the bottom to keep the sides hot sufficiently to cook the *roti* or *Nan*. Several chapattis can be cooked simultaneously, thus is very practical or useful for large family and or any type of feast.

Archaeologically, the *tandoor* can be traced back over 5000 years, in human history. During 2334-2154 BCE Akkadian word *tinūru* which is combination or two words as "tin" means "mud" and "nuro/nura" means "fire". Both words are mentioned in the famous Akkadian Epic of Gilgamesh. In the other ancient languages like *Avestan*, *Persian*, and *Sanskrit*; *tandoor* was mentioned as *kandu*.



Figure 22: A&C interior view and B exterior profile of the Tandoor

Minor Kitchen Objects

Several other objects are required in kitchen like cutting tools. Because for the curry meat/Mutton or vegetable needs to be turn into pieces, thus, a cutting tool is required. Similarly, the spices are used either complete or crushed. In case of crushed, the device like mortar and pestle would be needed. In this way, the kitchen requires several minor objects very necessary for cooking processes. The preview is provided hereafter.

Mortar and Pestle

The Mortar and Pestle are one of the common and oldest kitchen utensils to make the flour and crack the nuts. The oldest example found date back as to 35,000 BCE. The common use of this object is make powder of dry spices and crush and mix whole spices for desired dishes. The mortar and pestle are made of wood, stone and ceramics. It is noted that for ceramic or earthen mortar the wooden pestle is used. The general size of the mortar bowls as total body diameter is 11 cm and height is 10cm and pestle length size is 17cm and width is about 4.5cm.

Cutting, Crushing and Smashing Implements

The cutting and crushing implements are essential part of the kitchen utensils to cut or chop vegetables, meat, fish and things required for meal making. For the crushing items like spices, a grinding stone and pestle are required. For cutting into pieces a tool required; metallic knives in contemporary times and the chert blade and

copper knife served the purpose. The chert blades were most commonly utilized in past by common Indus people. However, the copper saw, knife and axe were also archaeologically discovered.

For smashing vegetables and pluses or *Dal* to make it even or soupy, a tool made of wood called '*Dal-Mehtano*' is used. It has two sides (a) convex round side and (b) flat side where a long stick as a handle is given to work with.

This tool is used for potatoes, pluses, and other vegetables smashing for making *Aalo Paratha*; meat mixing with dal, to prepare the *Qeema-paratha* or other several items such as spinach, mustard leaves etc.

Ladles, Spatula and Spoon

The ladle, spoon and spatula are used for multiple functions during the process of curry cooking such as turning, stirring and mixing. Among these items first two are almost in similar shape with little difference. However, like spoon, the spatula is basically formed flat to turn over the food items; however, it works better for flipping and taking out the meat chunks, potato chips, fish and eggs. These objects are traditionally made from metal like bronze, iron, tin and wood having different required sizes (figure 23). The spoons are also utilized for distributing and taking out curry from serving pot onto eating plate on the dining table. Archaeologically, these objects are found made of metal and shell, wood is also hypothesized used by all ancient communities of the world.



Figure23: different spoon A- Ancient Shell spoon & B-wooden traditional spoons

Storage Utensils

There are numerous vessels types for Storage found from almost all types of Indus settlements. In broader classification two classes become prominent as (i) fixed and (ii) moveable. The grain storage specifically has remained main part of discussion with many archaeologists. The old world granaries were door less rooms found on the ground and in art. The depicted images from Mesopotamia and Egypt show that the people fill the granaries with grains by using ladders for pouring the grains into granaries through roof. The granaries are found in Mehrgarh and Amri , Mohenjo-Daro, Harappa and others settlements. The bulk storage indicate authority for controlling the grains to utilized as per their policies. The circumstances show the total social inequality and stratification. Nevertheless, the more reasonable storage for common family daily meals context are the pots and jars having good storage capacity.

Pots and Jars

The pots and jars are most distinct category of storage vessels. In its general manufacturing

profile; the pot contains three body parts as base very small, body proportionally cylindrical or drum type and the mouth narrower than body depending on its usage (Dales & Kenoyer 1986:28). The jars are usually taller in shape with open mouth and pointed base are used for fixing either base in the ground or during traveling in cart or ship, so that the damage of substance through trembling risk can be managed. The possible uses of Pots and Jars of all size are (a) Large pots for long time storage; (b) Short time storage and (c) Daily use. The first category contains the pointed base for fixing in house grounds and second category is moveable with either round or flat base. Ethnoarchaeologically, round base is kept high from the ground on any type of support and flat base can be keep on the ground and is best for kitchen use. The large jars found from Chanhu-Daro, Harappa, Mohenjo-Daro, Lakhanjo-Daro and other sites. These jars are also fit for trade through ships along water routes. The pots discovered from Mesopotamia and Egyptian civilizations also portrait similar posture of daily life (figure24).



Figure 24: Storage jars, (A& C) Harappa (B) Lothal and (D) Mohenjo-Daro & Chanhu-Daro and (F) Halaf Mesopotamia 2700-2000 BCE.

Hearth Types (figure 25-26)

For the culinary setup of kitchen; hearth play central role as all type(s) meal is cooked over the hearths. The hearth depends upon the number of user if there is single family with minimum number of members; there would be a single or double chamber “u” or semicircular shape hearth placed at a desired chosen place of house. The hearths found from Ravi Phase Harappa (3300-2800 BCE), Urban phase at Lothal, Lakhanjo-

Daro (2600-1900 BCE) and other settlements represent alike phenomenon as is perceived with contemporary traditional village settlements.

The hearths of earlier prehistoric times were made and plastered with clay; for example, J.M. Kenoyer has reported from Ravi Phase Harappa where bell shaped pits were made to store the food material and hearths were made with clay above on the ground surface.



Figure 25: Hearth found in Archaeological context

The hearths from urban phase of Indus civilization found from Lothal, Lakhanjo-Daro and other settlements are the double chambered to cook curry and roti or both simultaneously. The double

chambered hearths found in upper town of Lothal is noteworthy as the houses have been associated with upper classes which had private baths with excellent drainage system.



Figure26: Lakhianjo-Daro 2: Lothal and 3: traditional double chambered hearth

Fuel

It is true that no kitchen works without fuel and the favored forest or jungles are necessary for firewood was present, however, tamarisk, acacia, and prosopis ziziphus, salvadora, ficus and tamarix were present in Indus jungles and may have been used (Joglekar et al 2013, Wright 2010:17). The animal dung and husk from cultivated crops like Rice, wheat, etc. were also used as fuel for cooking daily meal. The ash analysis from hearth may explain the type of dung and further studies. Moreover, it is argued that terracotta cakes were added with fuel to retain or maintain the heat till required times of food preparation and save the fuel consumption.

Summary

The archaeological research indicated that human utilized cooked meal in Indus valley in Mesopotamia, Egypt and Indus Valley. Several objects have been discovered from Indus valley sites and numerous pictorial scenes are present in Egypt and the writing of Mesopotamia mentioned details about the consumption of edible things in shape of food and the food preparation and serving utensils. Scientifically, these all are further proved and supported through scientific analysis of the objects in which two evidences as (i) carbonized traces and (ii) residues and examined through devices.

The researcher explains that the process of **carbonization** on containers take place in two ways, (a) internal carbonization of food and (b) external deposition of soot from the smoke of a hearth fire. The **soot** is the product of the pyrolysis of wood from a cooking fire and it comprises of various products including tars and resins. The

experiments have shown that there are three kinds of soot patches on the exterior of vessels such as (i) flat black and fluffy soot which is deposited over any part of the pot that impacts rising smoke; (ii) soot attached to the ceramic surface because it contains resin droplets and (iii) soot found on the exterior of vessels. The patches can vary from a light gray area to an area that is completely oxidized. The carbonized remains attest and explain the cooking pot.

Another **scientific analysis** carried is the chemical analysis of residues left behind in these vessels has become tremendously dynamic area of research. It is common that every living thing has different types and combinations of fatty acids. So theoretically, at least it is possible to link residues to foods once stored or cooked in any container. Similarly, the lipid analysis of objects is also highly essential to comprehend the use of object and type of food consumed. The future analysis will certainly illustrate the detailed account of Indus diet using fauna, flora, and fish in significant details.

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