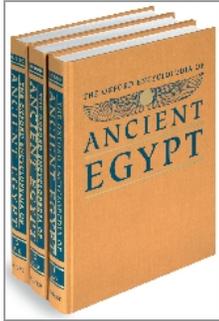


Oxford Reference



The Oxford Encyclopedia of Ancient Egypt

Edited by Donald B. Redford

Publisher: Oxford University Press

Print Publication Date: 2001

Print ISBN-13: 9780195102345

Published online: 2005

Current Online Version: 2005

eISBN: 9780195187656

Natural Resources.

Before agriculture, in the Nile Valley the peoples of prehistoric Egypt subsisted on what they gathered along the banks of the river and in the adjacent desert. For example, the plants identified at Wadi Kubanniya, a prehistoric site near Aswan, included nut-grass tubers, club-rush tubers, and dom-palm fruits— cat's tail (or reed-mace), bullrushes, and papyrus would have been gathered. Young reed and rush rhizomes may be baked, steamed, or roasted, and commonly used would be the rhizomes of the waterlily (*Polyganum*), as well as sedge nutlets, acacia seeds, wild palm dates, capers (*Capparis*), the fruits of *Zizyphus* and *Citrullus*, and *Rumex*, *Chenopodium*, and wild millet (*Panicum*).

The Nile provided abundant fish and other aquatic resources, the most important being catfish (*Clarias*), but *Tilapia* and *Lates* were also caught. Catfish were caught in shallow, muddy water, but *Lates* require deep-water fishing. Turtles and mussels were also taken. One of the prized Nile catches was the hippopotamus, but prehistoric hunting was mostly focused on the pursuit of wild cattle (*Bos primigenius*) and hartebeest in the floodplain, and gazelles, wild ass, and hares from the edge of the desert. Geese, ducks, and coots wintering in Egypt from October to March were taken when the tubers and waterlilies matured. From spring to high summer (before the floods inundated the valley), hunting, fishing, and foraging for root foods under the floodplain muds, as well as the consumption of acacia seeds, provided a variety of food resources. Beginning in early July and reaching its peak in mid-August, rising Nile water inundated the floodplain; during peak flood, water occasionally extended into the adjoining dry wadis that cross the low desert bordering the floodplain. Plants and animals of the floodplain were restricted to the higher grounds and to the edge of the floodplain. As floodwater receded, catfish were stranded in abundance in pools; the seeds of grasses and other plants that grew in the wake of the flood also provided a rich food resource.

The Nile's channel is bordered by natural levées at the concave sides of its meanders and by sand bars along the convex sides. Sand islands have formed within the channel. The surface of the floodplain has become high close to the channel, because of the great deposition rate of muds during the flood season. Depressions in the floodplain, called flood basins, retain water after the flood and thus sustain the growth of plants. At the outer edge of the floodplain, low areas receive seepage water, which supports an outer fringe of wetlands and ponds, a favorite place for migratory fowl. In

addition to food resources, the Nile provided fuel, from the *Acacia* and *Tamarix* trees; their wood could also have been used for digging sticks and other implements. The reed *Phragmites* was used for arrows, and the *Papyrus* sedge, as well as *Cladium*, *Juncus*, and the palm and dom palm were used in basketry and matting.

For stone tools, prehistoric Egyptians utilized the chert bands and nodules found in the limestone outcrops, as well as the quartz pebbles and cobbles in the Nubia sand-stone. Grinding stones were mostly manufactured from quartzite, from the Nubia formation, or from silicified or dolomitic limestone. Clay was taken from local Nile muds or made from shales and marls from the geologic formations in the hills adjacent to the Nile Valley. Reeds, tree branches, animals hides, and mud provided the basic materials for dwellings. The utilization of those resources continued after the agricultural villages were settled in and near the Nile Valley; but hunting for food had almost vanished by the Middle Predynastic (c.3800 BCE), because of the depletion of wildlife in the vicinity of the villages and the emergence of an agricultural ethos centered on cultivation and herding. In later periods, wild animals, fowl, and fish were hunted by the elite for sport, and the ponds, marshes, and swamps bordering the Nile became a recreational resource.

The principal natural resources of pharaonic times were the fertile floodplain and the Nile waters. Flood basins, irrigated by the annual inundation, were ideal for growing barley, wheat, and flax. The cultivation of cereals conflicted with the herding of cattle and sheep on the floodplain. Because cereal cultivation is more productive than herding per unit area, cattle herding was favored in both the Delta marshlands and the uncultivated marshy areas of the floodplain, while sheep and goats were raised on the edge of the floodplain and allowed to graze in the fields after the harvest. The river continued to provide ample fish resources.

The fertile plain of the Nile Valley primarily results from the annual accumulation of silt deposited by floodwater. The annual load of silt is variable. (It ranged, for example, in recent times from 59 million tons in 1943 to a maximum of 228 million tons in 1936.) The additions of silt to the floodplain are not uniform and vary both laterally away from the channel and in the different parts of the Valley and the Delta. The rates of deposition are also influenced by changes in the volume of Nile flood discharge. The natural levées that border parts of the channel are topped by high Nile floods, and may also be breached, thus altering the preexisting depositional regimes. The position of the channel has also shifted in places. The dramatic changes in floodplain geomorphology is provided by the changes in the Cairo area from 942 to 1281 CE, which were coincident with two major episodes of low Nile floods (930–1070 CE and 1180–1350 CE). Near Memphis, the Nile channel shifted in pharaonic times to the east from its original position near the Old Kingdom capital. After the mid-seventh-century Arab conquest of Egypt, the Nile channel also shifted—this time to the west—from Fustat, north of Memphis. Such changes would have influenced not only the water supply and the agricultural hinterland of urban settlements but also direct access to the channel for transport by boats.

The configuration and distribution of the optimal land for ancient Egypt's farming has thus varied though time. Protection from the Nile floods necessitated the construction of dikes. Canals were dug to provide water for areas deprived of floodwater (because of diversions of the channel or a change in the geomorphic setting) or to irrigate areas rarely reached by flooding. The Nile's channel (6.75– 8.52 meters/21–26 feet deep) was also subject to silting in—the accumulation of bottom deposits. The height of water necessary to irrigate the ancient fields was therefore a function of the volume of Nile flood discharge, the shape and depth of the channel, and the height of the floodplain relative to the depth of the channel. When the volume of flood discharge was low or when the floodplain rose faster than the channel, it was necessary to deepen, or dig, new canals that delivered water to outlying fields. From south to north, the gradient of the river (from about 1:10,000 to 1:15,000) controls the flow of floodwater over the floodplain. In historical times, the flooding required a coordination of activities among communities to control the flow downstream; they built artificial dikes that had gates, which could be opened to release floodwater downstream.

Because of the differences in the width of the floodplain—which varied from 2 kilometers (1.5 miles) at Aswan to 17.6 kilometers (11 miles) at Minia in Middle Egypt—the agricultural potential of different districts along the Nile Valley was not uniform. The area of the floodplain ranged from 72 square kilometers for Elephantine to 650 square kilometers for El-

Ashmunein. The total area of the floodplain is estimated at being about 8,000 square kilometers during the New Kingdom. The productivity of the land depended on the height of the Nile floods, which varied considerably, both episodically and annually. For example, in recent times, Nile water discharge during the flood peak ranged from 474 million cubic meters per day in 1941 to 935 million cubic meters per day in 1938. There were also major variations in pharaonic and later historical times that drastically influenced land productivity. Accordingly, the variations in Nile flood discharge, the amount of silt carried by the floods, the episodic climatic events, the concomitant changes in both geometry and channel depth, the topography, and the relative height of the floodplain, were all inherent elements of the ancient Nile landscape. The agricultural resources of the Nile Valley were thus subject to significant and at times abrupt fluctuations, which must have played a role in social and political affairs.

The Nile also served as a major transport artery; it flowed from south to north, with an average speed of 4 knots (about 7.4 kilometers/4.5 miles per hour) during the season of inundation. Day travel was favored because shallow sand islands were not easily avoided at night. During the low flood season, the speed of the current was only about 1 knot, and the river was extremely shallow (2–5.3 meters/6–16 feet). Nile traffic was therefore slowed considerably. The trip from Thebes to Cairo, a distance of 900 kilometers (550 miles) by the Nile could have been accomplished in two weeks during the flood season, but it would have required as long as two months during the drought season. In general, the trip from north to south—against the current—would have been extremely slow until sails were developed, to take advantage of the northerly and northwesterly winds blowing off the Mediterranean. The bend near Qena, where the Nile flows from east to west and then back from west to east, slows riverine travel considerably. Changes in the position of the channel, as well as the topography of its floor, influenced navigation and landing sites, which necessitated the deepening of access to ports, the digging of canals, or the repositioning of some riverine installations.

The emergence of social stratification in Egypt (which began well before the unification of Egypt into a nation state) created a demand for a variety of resources. This demand accelerated as the upper strata of society increased in number and influence. A variety of resources were particularly required for the funerary cults, the royal tombs, and the temples, shrines, and palaces. Stones and minerals from the Eastern Desert were quarried or mined and transported by donkey caravans and then by boats and barges to their final destinations. In Predynastic times, stone for vases and plates was taken from the hills surrounding the Nile Valley; it included limestone, sandstone, gypsum, and calcite (Egyptian alabaster). From the Eastern Desert came volcanic porphyry as well as marble, greywacke, quartz, schist, serpentine, and talc. Slate was used for cosmetic and ceremonial palettes; a variety of quartz minerals—agate, jasper, and amethyst—as well as garnet and green microcline were used for beads; gold nuggets were obtained from placer deposits in the wadis of the Eastern Desert. From the Red Sea lead ores, galena was used for kohl eyeliner. Copper ores came from both the Eastern Desert and the Sinai; green copper minerals such as malachite and atacamite were used for cosmetic pigments. Calcite (Egyptian alabaster) was obtained from the Wadi Garawi, south of Helwan and opposite Memphis, but the most important calcite quarries were at Hatnub, southeast of Tell el-Amarna. Quartzite (a naturally cemented sandstone) was available near Cairo, at Al-Gebel Al-Ahmar, and in association with the Nubian sandstones south of Edfu. Basalt, used as a special building material because of its black color, occurred in many parts of Egypt; sources close to the Nile and building sites include Abu Rowash and Gebel Qatrani (Widan el-Faras), north of the Faiyum Depression, since the Faiyum was the main source of the basalt used in ancient Egypt. Greywacke (a dark, varicolored, attractive stone) was obtained from the Wadi Hammamat between Luxor (Thebes) and Qusseir. Anorthositic gneiss (the so-called Khephren diorite) was quarried from a restricted area in the desert west of Abu Simbel. Granite was one of the favorite building and ornamental stones and is widespread in the Eastern Desert and the Sinai; there are also outcrops near Aswan. As indicated by the causeway inscriptions of King Unas, granite was quarried, shaped into objects, and then polished before transport by boats down the Nile. Talc and serpentine, softer and easier to work than granite, were used for a variety of objects, including weights, spinning wheels, and beads; both were common in the Eastern Desert region east of Edfu.

For common use, salt was obtained from the shores of the Mediterranean and from Red Sea lagoons and sabkhas. Natron, used with other substances for dyes and for mummification, was obtained from the Wadi Natrun. During the Old

Kingdom, gypsum was ground into pastes and used for plaster and for the production of a variety of objects. Both gypsum and ground limestone were used for white pigments; malachite provided green pigment; red and yellow ochers supplemented the color palette. The oases of the Western Desert contained abundant ocher deposits. Colors were important in Egyptian ideology, and the use of paint pigments and colored minerals was therefore common. Gold (yellow), turquoise, and lapis lazuli (blue) as well as red agate and red-brown carnelian were highly desirable and were obtained from a variety of sources. Amethyst was obtained from the Wadi el-Hudi, some 35 kilometers (22 miles) southeast of Aswan, and it was greatly prized during the Middle Kingdom. During the Greco-Roman period, emerald was mined from Zabara, Um Kabo, and Sekkait and from Nugrus in the Eastern Desert; peridot was then obtained from the Zabargad Island in the Red Sea.

In ancient Egypt, gold was obtained from at least ninety gold mines in the Eastern Desert (between 22°E, and 27°50'N); gold is associated with quartz veins in basement rocks. Copper minerals, including turquoise, were obtained from the Sinai and the Eastern Desert, the main source being at Serabit el-Khadim and Mughara in the Sinai. Nile Valley copper ores for the production of copper metal were limited in comparison to those in the northeast, at Wadi Araba (located between Jordan and Palestine), but copper ores came from Attawi, Gebel Dara, Dingash, Hamash (together with gold), Abu Sayal, Um Samiuki, and Abu Ghousoun in the Eastern Desert, and Wadi Nasseib in the Sinai, and several other locations. Although iron ores are known from Egypt, near Aswan, the **technology** of iron smelting seems not to have been developed there even as late as the New Kingdom.

The stone and mineral resources of Egypt expanded during the Greco-Roman period to include granite from Mons Claudianus, which is pale in color with small dark spots of iron-rich minerals. A variety of porphyritic rocks, including "Imperial Porphyry," were obtained from Gebel el-Dokhan, Gebel Abu Harba, and Gebel Gattar—from west of Hurghada in the Red Sea Hills. The Romans also exploited the greywacke and green breccia of the Wadi Hammamat.

Sandstone in the South and limestone in the North had always been used for building purposes. A mixture of sand, shale, and limestone rubble (available from lenses or beds interlayered with sandstone and limestone formations) provided a durable mortar. Nile muds were used, and gypsum was used as mortar and filler. The limestone varied in quality, with the best limestone quarried at Tura and M'asara, opposite Memphis. These quarries go back to the third dynasty. The bulk of the limestone used for the Giza pyramids was obtained from nearby quarries, with the superior Tura limestone reserved for the outer casing. Limestone outcrops continue from Tura to beyond Thebes. Although sandstone became the predominant cliff-forming stone from Esna to Aswan, it was not widely used until the New Kingdom; the most important quarry for sandstone was Gebel es-Silsila, located between Kom Ombo and Edfu. Limestone and sandstone for palaces, temples, tombs, and statues overshadow the most common building resources in Egypt—namely, the Nile muds and sands from the older Nile formations—which were exposed in the low desert, adjacent to the floodplain. They were used to make mud bricks (both unfired and fired); local woods and reeds were also used for common construction.

Egypt's wood resources were limited and of poor quality in comparison to the woods imported from the Levant. Wood was used for boats, needed to transport food and other resources on the Nile and in the Red Sea and the Mediterranean. Wood was also used for funerary purposes and for the transport of the king and his noble entourage. Papyrus was used to craft small boats and rafts. Local woods—the acacia, sycamore fig, and the tamarisk—were mainly used for domestic furniture and some tools. The Egyptians also exploited certain plants and trees for their resins and for the production of perfumes, which were both luxury items and used for religious purposes. One of the key resources for ancient Egypt was the papyrus plant, a sedge that grew in the Nile marshes, used for boat-building, basketry, and food; it became the fundamental raw material for Egypt's paper industry, which was important until the Arabs in the seventh century CE introduced paper-making, based on a Chinese **technology**.

Ceramics and the use of pottery in the Nile Valley are associated with the beginnings of Egyptian agricultural villages. Initially, Nile mud (silt mixed with sand) tempered with dung, straw, or grog was used to produce domestic vessels (fired

in kilns). In late Predynastic times, marl and shale from the hills adjacent to the Nile Valley were used in the manufacture of hard pottery wares. In Predynastic times, the Egyptians also developed faience—a vitreous ceramic—from copper minerals, quartzose sand, limestone, and natron salts. Subsequently, pigments were added to mud pastes to produce colored and glazed ceramic objects.

The geological setting of Egypt favored it with the fertile Nile floodplain and the rock and mineral resources of the surrounding hills. In prehistoric times, the wild food resources of the Valley and the adjacent deserts provided sufficient subsistence resources for its sparse inhabitants. Stone for tools was also available. With the establishment of agricultural villages, the floodplain supported farmers who not only changed its ecology but also fashioned a social organization and an ideology that required the economic integration of the resources of the adjacent deserts. Internal and external trade encouraged the building of boats, for use on the Nile, the Mediterranean, and the Red Sea. Today, Egypt still focuses on the Nile for its livelihood, but the growth of population well beyond the feeding capacity of the floodplain has necessitated farming outside the Nile Valley, utilizing groundwater resources and the cultivable land of ancient dry lakebeds; urbanization is still reducing the areas devoted to agriculture, and industrialization is adding a new element to Egypt's ecology. Egypt has begun to exploit its geopolitical position, its oil deposits, and its cultural heritage—as well as the sunshine, desert allure, and fine beaches—in an effort to secure a prosperous and peaceful future.

See also FAUNA; FLORA; GEOLOGY; GOLD; MINERALS; NILE; and QUARRIES AND MINES.

Bibliography

Brewer, D. J., D. B. Redford, and S. Redford. *Domestic Plants and Animals: The Egyptian Origins*. Warminster, 1995.

Find This Resource

Houlihan, P. F. *The Birds of Ancient Egypt*. Cairo, 1988. A fully illustrated source book on the birds of ancient Egypt.

Find This Resource

Hussein, Abdel Aziz. Mineral Deposits. In *The Geology of Egypt*, edited by Rushdi Said. Rotterdam, 1990.

Find This Resource

Kees, Herman. *Ancient Egypt: A Cultural Topography*. Chicago, 1961. An essential account of the historical and cultural geography of Egypt, with a detailed treatment of the environmental elements of the countryside, cities, and districts of ancient Egypt.

Find This Resource

Lucas, A. *Ancient Egyptian Materials and Industries*. 4th ed. London, 1962.

Find This Resource

Said, R. *The River Nile: Geology, Hydrology, and Utilization*. Oxford, 1993.

Find This Resource

Wetterstrom, W. Foraging and Farming in Egypt: The Transition from Hunting and Gathering to Horticulture in the Nile Valley. In *The Archaeology of Africa: Food, Metals and Towns*, edited by T. Shaw, P. Sinclair, B. Andah, and A. Okpoko, pp. 165–226. London, 1996. A comprehensive summary of plant-food resources.

Find This Resource

WAS THIS USEFUL? Yes No

PRINTED FROM OXFORD REFERENCE (www.oxfordreference.com). (c) Copyright Oxford University Press, 2013. All Rights Reserved. Under the terms of a single entry from a reference work in OR for personal use. Subscriber: University of Chicago; date: 28 May 2014



Log out