THE DEMISE OF GREAT ZIMBABWE, AD 1420–1550: AN ENVIRONMENTAL RE-APPRAISAL

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The decline of Great Zimbabwe is poorly known due to limited archaeological data and vague historical sources. Environmental data indicates that Great Zimbabwe declined when climatic conditions were favourable, which may have prompted the ruling elite to make decisions that impacted on the immediate surroundings of the settlement and beyond. The shifting character of the Zimbabwe Culture[1] *since the 12th century was a human response to the vagaries of the savanna environment, as well as the changing patterns of trade in the western Indian Ocean involving eastern Africa and the auriferous Zimbabwean plateau hinterland. It is within this context that the demise of Great Zimbabwe as the urban centre of a powerful political system must be understood.*

INTRODUCTION

Great Zimbabwe (AD 1270–1550) emerged in the southern plateau regions of Zimbabwe from an Iron Age agricultural community.[2] By the 14th century it was at the helm of a political hierarchy controlling territory and a community equivalent to a state.[3] Its rulers accumulated considerable wealth and power from the large cattle herds[4] they managed and from gold and ivory traded with the east African coast.[5] It was the cultural and political successor to Mapungubwe (AD 1220–90), based in the middle Shashe-Limpopo valley. Mapungubwe developed into the political and cultural centre of a community living in the area and founded by communities identified archaeologically with Zhizo and Leopard's Kopje cultures.[6] It controlled society at state level in the area. The reasons for its demise are probably environmental.[7] Its environment became too dry to sustain both human and animal populations leading to segmentation and migrations towards ecologically more sustainable places.[8] Great Zimbabwe only became important after the demise of Mapungubwe taking over the control of long-distance trade. The Save River and its tributaries became important inland routes from the Indian Ocean coast. Great Zimbabwe, like Mapungubwe, derived some of its wealth from taxing traders and rewarding gold miners with cattle. The coastal entrepots serving Mapungubwe waned

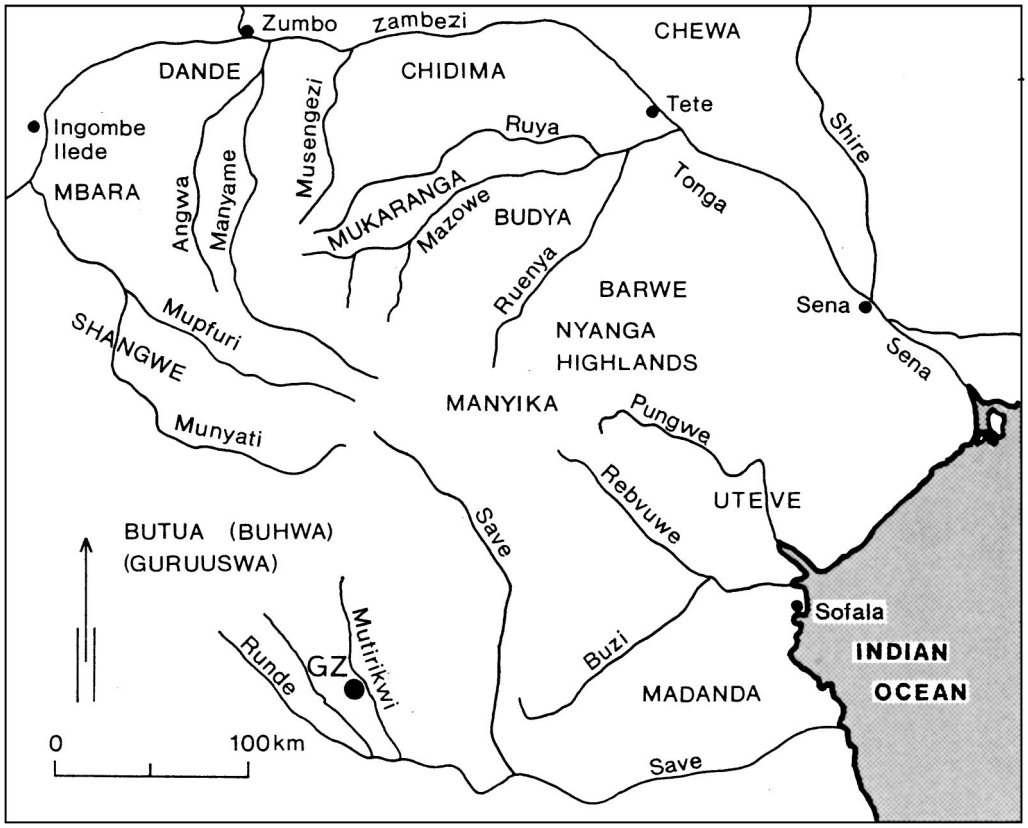

FIGURE 1. Zimbabwe Culture states. Great Zimbabwe probably controlled a state (marked 2), which took over from Mapungubwe (1). The Indian Ocean trade which was channeled to and from Great Zimbabwe through Sofala, shifted towards the Zambezi from the 15th century onwards. Mutapa (marked 3a) and Torwa/Rozvi (3b) states are cultural successors to Great Zimbabwe.

into insignificance with the rise of Great Zimbabwe during the late 13th century. The entrepot of Sofala mentioned in earlier Arabic sources in connection with the Swahili trade, was from the 14th century onwards directly connected through overland routes with the Zimbabwe plateau.[9]

At its peak during the 14th century Great Zimbabwe occupied an area over 700ha. with population estimates of up to 20,000 people;[10] although late 19th- and early 20th- century antiquarian investigators destroyed a significant portion of its stratigraphy.[11] Later, more systematic, excavations demonstrated that the town developed from the nearby hill, where stone enclosures were first erected.[12] The settlement seems to have expanded southwards and eastwards with the construction of the neatly coursed, structurally massive Great Enclosure[13] and other smaller enclosures located in what is now termed 'The Valley'. These structures attest to the opulence of Great Zimbabwe as a city, as well as a centre of political power.[14] In

managerial terms this entailed control of a skilful human resource base and possession of resources required to finance long-term construction projects. It would appear that the town was presided over by an elite, who had control of the agricultural base, the cattle herds, and the surplus wealth in terms of gold. This control and management of vital resources enhanced their status among the local population and the external traders, who must have frequented the town.[15] It is still not clear how the various parts of the town functioned, but some scholars have used Karanga and Venda ethnographies to interpret the use of space and the development of the town.[16]

By the middle of the 15th century, Great Zimbabwe had declined in both political and economic significance.[17] There are suggestions that the population living in and around the town could have impacted on the physical environment, triggering its abandonment and the break up of the state that it controlled.[18] It has been further suggested that in this process it also lost control of the gold trade,[19] prompting the rise of successor states namely Torwa/Rozvi (AD 1450–1830) and Mutapa (AD 1450–1900) in the western and northern regions of the Zimbabwe plateau respectively. Ceramics recovered at Great Zimbabwe show that few imports reached the town after 1450, confirming the decline of long-distance trade.[20] Recent research suggests environmental degradation may not have been primarily responsible for the abandonment of the town,[21] as climatic conditions prevailing at the time were favourable.[22] This does not mean that that the physical environment had no role to play in the eventual demise of the state. It is necessary to understand the general dynamics of the savanna environment in which the Zimbabwe Culture states were spawned.[23] This considered, the extension of Great Zimbabwe influence to other areas and the eventual demise of the town appear to have arisen from the political and economic decisions taken by the ruling elite to enhance state power and wealth. This had long-term environmental and socio-political consequences.

STATE FORMATION AND DECLINE IN THE SAVANNA ENVIRONMENT: A QUESTION OF ENVIRONMENTAL DETERMINISM?

If we argue that the decline of Great Zimbabwe was prompted by environmental degradation, we risk invoking environmental determinism, which sees human action and economic activity being strongly influenced by climate.[24] Such a premise needs to be supported by empirical data. Generally, the link between climate and culture is complex, but there has been renewed confidence in environmental determinism based on numerous apparent correlations between the timing of social and environmental changes.[25] Some scholars are resorting to the use of cross-regional comparisons to determine possible causes for the decline of some social formations, although this remains largely speculative.[26] It is not uncommon for environmental change to cause societal upheavals, as probably happened to Jenne-Jenno in the upper Inland Niger Delta in West Africa, the Swahili coast in Eastern Africa, the Great Lakes region and Aksum in the Horn of Africa.[27] These conclusions are largely based on the knowledge that between AD 1100–1400, the climate in sub-Saharan Africa grew increasingly dry, causing political upheavals resulting in the abandonment of regions that could no longer sustain livestock and crop farming. These factors have been implicated in the

decline of Mapungubwe in the middle Shashe-Limpopo valley,[28] and Great Zimbabwe, which thrived during the period in question and only encountered decline under improved environmental conditions.[29] In western Uganda for example, past environmental change has influenced the activities and social organisation of pre-colonial societies raising the need to reexamine human-environmental relationships in a manner not necessarily deterministic. The emergence of large polities here during the early 2nd millennium AD coincides with a brief period of humid environmental conditions, while the abandonment of earthworks is linked to dry phases towards the late 17th century. Settlement shifts are evident, with nucleated permanent settlements changing towards dispersed, peripatetic homesteads.[30] Sedimentary sequences from the region also indicate human impact on the environment.[31] Overall, environmental factors contributed to some changes in human activity, and the establishment of centralised authority was probably an attempt to buffer against risk.

Population growth also transformed the physical environment in a significant way, especially when economic and cultural lifestyles fostered production and consumption levels that were highly parasitic in nature. This often led to environmental decline, or catastrophe. Regulating or restricting population growth in a given culture can avoid this. It is therefore interesting to see how the Zimbabwe Culture handled environmental resource constraints. On the other hand, although large populations impact on nature, they do not always exhaust the physical environment. Yet when social systems reach a level of complexity and differentiation equivalent to states, they attain a capacity that can degrade the environment. When society rapidly transforms nature in a way that the latter fails to regenerate itself, ecological degradation and crises emerge. To some extent, this can be demonstrated at Great Zimbabwe,[32] but the town's immediate environment as an important source of its economic life must be reconsidered.[33]

THE ENVIRONMENT OF THE ZIMBABWE CULTURE

The Zimbabwe plateau and adjacent lowlands are peneplained remnants of geomorphological processes dating from Precambrian times.[34] Drainage is dominated by the Zambezi, Shashe-Limpopo and Save-Runde river systems that dissect a plateau rising 1,500m. in the central and western parts, and 2,500m. in the east. The geology is composed of intrusive granites and other igneous rocks, with the sedimentary formations straddling the Zambezi and the Limpopo basins. The central greenstones produce gold, mined since *c.* AD 800.[35] The greyish to reddish-brown sandy soils are geologically derived but those to the north west are Aeolian in character, deposited by winds from the Kalahari during Pleistocene times.[36] Vegetation is mixed savanna woodland, composed of Brachystegia miombo, Colophospermum mopane, Acacia and numerous grass species. Miombo and Acacia grow in the highlands, while mopane is mainly confined to low altitude river basins and dry south-western plateau margins.[37] Around Great Zimbabwe is Brachystegia woodland and wetland areas known as *dambos*, which were cultivated.[38]

The tropical climate brings cool to cold dry winters and hot, wet summers. Rainfall is influenced by both relief and tropical air masses, with highland regions

receiving more than 1,500mm. annually. The Zambezi and Limpopo basins receive less than 800mm. of rainfall per year. Around Great Zimbabwe, much of the rain comes in the form of mists, locally termed *guti*, which are favourable for agriculture.[39] Droughts are a common, recurring phenomenon in the area where Great Zimbabwe is situated. Famine and epidemic disease were largely responsible for population stagnation during the pre-colonial period.[40] Thus methods of ameliorating crop failure, such as food storage, mutual aid, mining and hunting were devised. These drought mitigation practices ensured that communities coped with uncertainties.[41] Natural severities sometimes resulted in wholesale abandonment of regions, which may not have been the most appropriate human response, but a consequence of faulty evaluation of the effects of the situation.[42]

Pre-colonial Zimbabwe Culture societies perceived the physical environment in multiple ways, essentially designed to cope with the effects of nature. This was a land of ancestors, entrusted to the ruling elite and their appointees. Mountains, rivers and forests not only represented natural frontiers or zones, but symbolised the presence of these ancestors in numerous contexts.[43] Ritual was crucial in appeasing them, and thus became intricately connected with the environment. Co-ordination of such ritual and ceremony was done by the elite, concerned to ensure a successful agricultural season lest this negatively impacted on their legitimacy as links between the ordinary people and the ancestors. Failure to meet such expectations, it was thought, would result in drought, disease and famine. Forecasting rain became a matter of concern to farmers in marginal regions, who had to reach into their reservoir of experience to predict a successful farming season.[44] In this way rainmakers and the ruling elite exercised important, intricately intertwined roles. However, pre-colonial societies were not passive respondants to the dictates of nature. Apparently, system collapse or decline in the Zimbabwe Culture resulted from over elaboration of traditional patterns. Management of states sometimes went wrong, whether nature had the upper hand or not. Here, environment did not dictate the creation of stratified societies. Rather, the social mechanism required to support stable populations presented the opportunity for some lineages to exert themselves by controlling strategic resources. Chiefdoms and states arose as convenient ways to manage the unique opportunities and hazards of the region.

Decline of states was therefore not strictly tied to the environment, but a consequence of social, economic and political management by the ruling elite.[45]

GREAT ZIMBABWE AND ENVIRONMENTAL DEGRADATION

Environmental data relating to the time that Great Zimbabwe was in existence is inadequate. Climate studies point to a cool/dry period between 1290–1425 and a warm/wet period between 1425–1675. Its rise coincides with the Little Ice Age whose impact was severe.[46] This resulted in depopulation and abandonment of towns in the Shashe-Limpopo basin, but there were a few ecologically favourable areas within the basin such as the Mateke Hills, which continued to attract human settlement.[47] These areas probably received enough rainfall to sustain agriculture, and had some advantage over other areas. The Little Ice Age was thus largely responsible for the

demise of Mapungubwe in the Shashe-Limpopo basin and the rise of Great Zimbabwe to the north. This attracted population concentrations in some areas, strongly suggesting that state formation in such difficult times was a political expedient designed to ward off the vagaries of nature. Concentrations of human populations also contributed to environmental change through increased demand for building materials, extensive field clearance, overgrazing, and so forth. The inhabitants of Great Zimbabwe, though responsive to the larger ebb and flow of nature, were not always controlled by it.

Available archaeological data can be exploited to answer questions of an environmental nature relating to the demise of Great Zimbabwe. The Zimbabwe Culture represents the development of urbanisation, associated with population growth. As this directly impacted on nature, it is critical in the definition of culture-nature relations. Both urbanisation and population growth are linked to human accumulation of surplus and wealth. Urbanisation resulted in large amounts of natural resources and food being transported to these places to cater for populations accumulating there. Increased population led to intensive building activity. Urbanisation thus becomes resource intensive and resource dependant on its immediate and distant surroundings,[48] transforming the physical environment, leading to ecological disasters, some of which triggered the spread of diseases.[49] Ecological degradation occurred when nature-culture relations became extremely exploitative.

The evidence for large cattle herd management[50] attests to considerable ecological consequences for Great Zimbabwe, but remains unquantified. Elite and commoner housing at the site indicates a large population living in the town, which must have impacted on woodland resources for fuel, the *dambos* for cultivable land and drinking water.[51] The location of Great Zimbabwe in a region favourable to crop farming apparently permitted the maintenance of a large population.[52] Wood for fuel for the town's large population and its industry was exploited to meet the high consumption levels of the town, accelerating the socio-economic transformation of the state. This also created other socio-economic needs, such as trade, to meet the reproductive and expansionary tendencies of the ruling elite. This led to increased population and urbanisation as human lifestyles reproduced themselves to meet their social needs. Iron working was not necessarily targeted for the building of the stone structures but was also linked to gold production. We know that the ruling elite sponsored gold mining and facilitated its trade.[53] Trees were also rapidly cleared to create room for agricultural land.[54] The impact of such activities was clearly marked, and remains visible today in regard to the absence of Brachystegia *spiciformis* from the immediate site surroundings.[55]

From the limited evidence available there was environmental degradation around Great Zimbabwe but this was long-term.[56] So, could this have triggered disruption between 1420–50 when climatic conditions were generally favourable? Perhaps human aggregation in the form of states was no longer necessary. Human management at this scale posed new difficulties. With gold resources becoming widely available in other areas of the Zimbabwe plateau, the ruling elite could have exploited this opportunity to extend their control and influence beyond the traditional confines of the state and attempt to control distant regions. The favourable environment could

have enticed enterprising individuals to look beyond the state for opportunities provided by the availability of gold and ivory, both of which could be traded in exchange for imported luxuries. The role of long-distance trade in the demise of Great Zimbabwe is best understood in this context.

GREAT ZIMBABWE AND THE IMPACT OF LONG-DISTANCE TRADE

Gold has long been traded from the Zimbabwe plateau to the Indian Ocean coast in exchange for glass beads, sea shells, cloth, Far- and Near-Eastern stoneware, earthenware and porcelains since the 9th century AD. This trade sustained the wealth of Mapungubwe and Great Zimbabwe.[57] It transformed local Zimbabwe Culture societies, leading to suggestions that it was a prime mover in the emergence of complex societies in the region.[58] With the emergence of Great Zimbabwe during the second half of the 13th century,[59] there was increased gold production and trade on the Zimbabwe plateau, matched by corresponding prosperity in east African coastal cities.[60] Great Zimbabwe was at the helm of this commercial expansion. The site yielded Persian bowls, Persian tin-glazed earthenware bowls, Chinese celadon, Chinese stoneware vessels, near Eastern glass, some coral pieces, a variety of copper objects, bronze crotals (hawk bells), yellow and green glass beads, brass wire and cowrie shells. The imported glass beads and ceramics compare closely with those found in east African towns while the iron and copper point towards regional trading networks. Items such as copper crosses, ivory, barbed spearheads, and iron gongs, although indigenous, were not necessarily local in origin and were frequently brought from central Africa. Local products include soapstone dishes, perforated gold sheaths, gold wire and some gold beads.[61]

Great Zimbabwe thus had extensive regional trading contacts with central Africa[62] as well as the Indian Ocean coastal towns. The immediate beneficiary of the gold trade from Zimbabwe was Kilwa (12th-15th century), the largest port city on the east African coast. Coincidentally, Kilwa controlled the trade coming through Sofala on the Mozambican coast, which included gold and ivory from the Zimbabwe plateau and the Shashe-Limpopo basin.[63] The traders from Kilwa were certainly in contact with Mapungubwe and subsequently Great Zimbabwe. The hinterland successively controlled the distribution of trade goods from the coast and helped in the procurement of ivory and gold destined for export. Apart from glass beads, Persian and Chinese ceramics, the recovery of a coin minted by al-Hasan ibn Sulaiman (AD 1230–33), a ruler from Kilwa, attests to the commercial intercourse and importance of trade between Great Zimbabwe and the east African coast.[64] The Great Mosque and the Grand Palace of Husuni Kubwa at Kilwa are some of the monumental buildings which reflect the wealth and building boom generated by this trade during the early 14th century, a time of renewed international demand in gold. This demand is also mirrored at Great Zimbabwe with the emergence of monumental architecture, particularly the building of the Great Enclosure during the 14th century.[65]

Great Zimbabwe gradually took advantage of the gold trade, such that between AD 1350–1400 it became the largest, most influential and wealthy city in southern Africa. Despite the fact that Europe was experiencing a collapse in demand for gold,

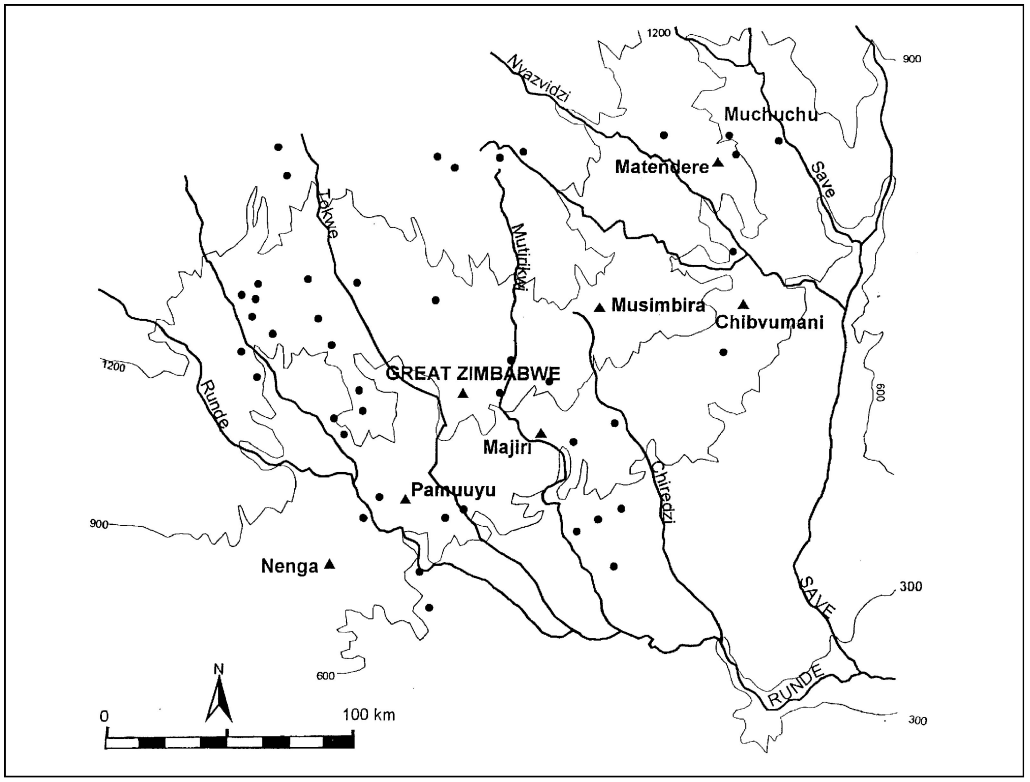

FIGURE 2. Map of Great Zimbabwe showing the positions of the Hill Complex, the Great Enclosure, the valley enclosures and the enclosures on the periphery of the main settlement.

which had a significant impact on Kilwa, Great Zimbabwe must have utilised the advantage of being at the source of the gold, and could have managed to exploit alternative markets in Asia. This explains the continued prosperity of the city in a world apparently facing an ecomomic depression. Thus while it is tempting to link the demise of Kilwa with that of Great Zimbabwe, researchers must recognise that the decline of the latter could have been triggered more by local than global factors, which in turn affected its commercial links with the western Indian Ocean trade. Long-distance trade represented an over elaboration of traditional political and economic structures, which the ruling elite tried to exploit to achieve dominance over the Zimbabwe plateau and beyond. The decision to expand beyond its immediate confines at a time when environmental conditions were clearly favourable, brought the first signs of decline.

International trade began to decline during the early 15th century, as indicated by the paucity of Chinese porcelain at Great Zimbabwe, which was apparently now traded elsewhere on the Zimbabwe plateau. For Great Zimbabwe to continue prospering, it required a stable political environment. This could have been achieved by force or domination of some kind. This made necessary the expansion of its culture

on the plateau and beyond, as a way of attaining control of the gold producing areas, as well as ensuring political stability in such areas with strategic economic resources. Early centres in distant regions were established by a royal policy to extend political influence beyond Great Zimbabwe. Fourteenth-century sites are found in Botswana,[66] northern Zimbabwe[67] and south central Mozambique.[68] Great Zimbabwe experienced 'overstretch' as a result of this development.[69] This expansion, which was initially a territorial and strategic move by Great Zimbabwe, represented a demographic and economic shift to other parts of the plateau.[70] This culminated in breakaway units, leading to the formation of chiefdoms and states in regions distant from Great Zimbabwe, as evidenced in Portuguese written sources. This hypothesis is further suggested by the general tendency for breakaway groups to develop on the periphery of states.[71]

The need to consolidate its influence and control the gold trade during the 15th century was initially challenged by Ingombe Ilede (AD 1300–1500),[72] a trading emporium on the Zambezi, and later by the Portuguese who arrived in the region just after 1500. By the early 16th century, the Zambezi River had become the preferred commercial route to the south central African hinterland, diminishing direct routes to Great Zimbabwe. The environmental consequences of urbanisation are evident from this perspective. The intensive exploitation of gold had obvious ecological implications, even beyond the immediate environs of Great Zimbabwe. The transformation of the Zimbabwe plateau following the appearance of Zimbabwe Culture towns is an example of the spread of population groups from the state based around Great Zimbabwe.

These towns left some 'scars' on the terrain as a result of intensive building activity, involving the quarrying of granite and other stone. Perhaps the biggest transformation of the landscape was caused by gold mining and the secondary settlement activities which this generated. The demands of Zimbabwean gold by Kilwa during the 15th century created a situation whereby, despite increased exploitation of the mineral after AD 1500, actual production declined as implied by export figures.[73] Gold mining had become very exploitative, a situation taken advantage of by the Portuguese, but with disastrous consequences for them and the Mutapa state.[74]

Some 16th-century Portuguese written sources on the Mutapa state in northern Zimbabwe describe Great Zimbabwe in a state of decline. The account by Joao de Barros, *Da Asia*, published in 1552, reports the existence of a 'square fortress of marvelous size built of stones and there appears to be no mortar joining them'. He located this to the southern edge of Benomotapa's kingdom in a district called Toroa, the kingdom of Butua, ruled by a prince, 'a vassal of Benomotapa'.[75] De Barros' account was influenced by descriptions of Muslim architecture, for example the references to square and ancient inscriptions seen above the door of the building, but this does not make it less credible. 'The edifice is almost surrounded by hills, upon which are others resembling it in the fashioning of the stone and the absence of mortar, and one of them is a tower more than twelve fathoms high.' According to de Barros, such buildings are called 'Symbaoe', meaning royal court.[76] This account, which was collated at Sofala before 1538 and makes references to events more than

three decades old and undoubtedly refers to Great Zimbabwe. De Barros' sources were Swahili traders who were knowledgeable of the interior, some of whom had probably visited Great Zimbabwe.[77] Its remarkable architecture led him to comment: 'When and by whom, these edifices were raised, as the people of the land are ignorant of the art of writing and there is no record, but they say they are the work of the devil, for in comparison of their power and knowledge it does not seem possible to them that they should be the work of man.' Thus, to external observers Great Zimbabwe symbolised enormous political and religious power. More importantly, the account does not say Great Zimbabwe was completely abandoned. Evidently, there were some people still living there, including members of the ruling elite: 'It is guarded by a nobleman, who has charge of it, after the manner of a chief alcaide, and they call this officer Symbacayo . . . and there are always some of Benomotapa's wives therein of whom Symbacayo takes care.' This account clearly suggests Great Zimbabwe was still inhabited by the early 16th century.

Diogo de Alcacova mentions stone building activity in the Mutapa state, witnessed between 1505–16 by Antonio Fernandes.[78] Archaeology confirms this activity started in the region in the 15th century. The last fifteen years of that century were characterised by civil wars between rulers, with the Torwa emerging victorious.[79] Clearly, Great Zimbabwe was losing political control of distant regions. The consequences are given by de Barros who says, 'in the opinion of the Moors who saw it [Great Zimbabwe] it is very ancient and was built to keep possessions of the mines, which are very old, and no gold has been extracted from them for years, because of the wars'. He adds, 'it would seem that some prince who has possession of these mines ordered it to be built as a sign thereof, which he afterwards lost in the course of time and through their being so remote from his kingdom . . .'. These civil wars disrupted gold mining and trade, much to the disadvantage of the ruling elite at Great Zimbabwe, and they were to continue in other areas of the plateau and adjacent Mozambique until the late 1520s.[80]

Available traditions on Great Zimbabwe border more on mythology than historical fact. They attribute the abandonment of the southern plateau regions and the subsequent establishment of the Mutapa state to a shortage of salt.[81] The traditions imply trade and exchange of salt. It is unclear whether salt was connected with the gold trade, but the expansion of the Zimbabwe Culture settlements westwards towards the salt deposits in the Makgadikgadi Pans underlines the importance of this commodity, perhaps for domestic consumption in an economy dominated by cattle. Thus the traditions carry some environmental information, implying shifting populations facing a depletion of critical resources. They do not dispute the disruption of the gold trade from the late 15th century onwards. This points towards the high resource consumption associated with urbanisation and the gold trade. The insatiable demands of international trade dictated that gold mining become an all year round activity, which compromised other sectors of production — particularly agriculture. This undermined the basis of state political power, which could not be adequately maintained in the face of changing production and accumulation patterns.[82] For the Mutapa state, the consequences were a weakening of central political authority emanating from diffuse, individual participation in gold

FIGURE 3. Portuguese cartographic specimens, such as this chart by Manuel Godinho de Eredia (*c.* 1615–22) show the Mutapa state as the dominant political authority in the southern African interior, indirectly confirming the demise of Great Zimbabwe.

mining and trade.[83] This process began during the 15th century when Great Zimbabwe was expanding its political and economic influence over the plateau. When the Portuguese arrived, they were informed about it, as the documents cited above show.

CONCLUSION: UNDERSTANDING DECLINE IN THE CENTRAL AFRICAN SAVANNA

Central and east African regions provide useful comparative examples relevant to the discussion on the role played by the environment and trade in state decline. Palaeoenvironmental data from western Uganda shows that nature-culture relations are not necessarily deterministic.[84] Societies in the savanna belt of northern central Africa did not have to live in harmony with their physical environment.[85] Among the Lunda, the savanna environment directly shaped human settlement and socio-political organisation. Here, states arose from small-scale societies,[86] heavily impacting on the environment as they expanded and absorbed large territories. Royal courts attracted thousands to sustain the ruling elite. These courts placed excessive demands on the local population, leading to the abandonment of the area. They were peripatetic, allowing for effective redistribution of resources as well as ensuring loyalty from the various regions. These courts also inspired experimentation and innovation among

societies at the periphery, resulting in satellite states. Those that migrated introduced new forms of governance elsewhere.[87]

Cutting across these internal dynamics was long-distance trade, and the best example comes from the 17th-century Lunda, whose trade was based on the exchange of raffia, salt, iron, alcohol and tobacco, and slaves.[88] The Lunda employed provincial administrative structures and royal messengers who supervised collection of tribute, policed trading and guaranteed the safety of external caravans. The profits from trade spurred them into political and territorial expansion, drawing other communities into their imperial orbit. Conflicts generated by trade triggered peripheral groups into migrating away from the Lunda but without necessarily severing political ties with the latter. The expansion of the Zimbabwe Culture during the 15th century may be explained in this way. Sixteenth-century Marave states expanded towards the Zambezi River when the Portuguese opened trading contacts with them. This entailed control of other intervening groups whose resistance triggered the decline of Marave political authority further north. Evidently, an over-extension of political and territorial authority in pursuit of long-distance trade often leads to state decline.

In articulating the role of the environment in the decline of Great Zimbabwe, a number of issues remain unresolved. In a region where the savanna environment directly regulated human action, droughts and aridity heavily impacted on settlement systems. The exploitation of the environment to sustain urban populations and their ruling elite reached a stage where it became environmentally degrading. Settlement shifts often result from an interplay between the need to respond to the vagaries of the environment and the desire to consolidate political and economic gains by long-distance trade. Trade is often overlooked in such interpretations, but its consequences impacted strongly on the physical environment. Great Zimbabwe was created primarily to manage the opportunities and hazards of the difficult southern plateau environments, but it was also part of a global trading network. Its decline was strongly associated with the challenges arising from these responsibilities.

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NOTES

[1] A collective term referring to political formations under the control of Mapungubwe, Great Zimbabwe and successor states, see Garlake 1973; Huffman 2000; Pikirayi 2001a.

[2] This community is archaeologically termed Gumanye, and attesting to the eastward spread of the Leopard's Kopje Culture form the middle Shashe-Limpopo valley and western Zimbabwe, see Huffman 1978; Robinson 1961.

[3] Huffman 1986.

[4] Garlake 1978.

[5] Huffman 1972; Summers 1969.

[6] Calabrese 2000; Hanisch 1981; Huffman 1986.

[7] Hall 1987; Huffman 1996a; Tyson & Lindesay 1992.

[8] Manyanga, Pikirayi & Ndoro 2000.

[9] Hall 1987; Sinclair 1982. See also Horton, this volume. Arab documents dating to the 9th and 10th centuries suggest that Swahili or Islamic traders who had contacts with communities in the hinterland carried out this trade. According to these documents, 'Sofala' referred to an area of shallow coast along the East African coast, south of the Zambezi mouth. One

such area is Vilanculos Bay, where Persian ceramics and glass beads were recovered at the 9th and 10th century AD site of Chibuene (see Sinclair 1982). Vilanculos Bay represents a 'Sofala' directly east of the middle Shashe-Limpopo valley where the trading settlement of Schroda is located (Gerhard Liesegang, pers. comm.).

[10] Garlake 1973; Sinclair 1987.

[11] See historiographical details in Vogel 1990; Pikirayi 2001a.

[12] Summers & Whitty 1961.

[13] Collett *et al.* 1992; Summers & Whitty 1961; Huffman 2000; Huffman & Vogel 1991.

[14] Detailed discussion on the architecture and function of these structures are found in Garlake 1973 and Huffman 1996a.

[15] Summers 1969, 1971; Huffman 1972, 1996a; Garlake 1970; Sinclair 1987; Pikirayi 2001a; Pwiti 1996; Thorp 1995.

[16] See, for example, Huffman 1984, 1996b, 2000; and the critique in Beach *et al.* 1997, 1998.

[17] de Barros 1552.

[18] Beach 1980; Garlake 1970; Huffman 1972; Sinclair 1987.

[19] Garlake 1973; Huffman 1972.

[20] Garlake 1973.

[21] Tyson & Lindesay 1992; Huffman 1996a.

[22] Huffman 1997, Pikirayi 2001a.

[23] Sinclair *et al.* 1993.

[24] See, for example, Agnew *et al.* (eds) 1996.

[25] Robertshaw & Taylor 2000; Taylor *et al.* 2000.

[26] See, for example, Kusimba 1999; McIntosh & McIntosh nd; Robertshaw & Taylor 2000.

[27] Butzer 1981; Kusimba 1999; McIntosh & McIntosh nd.

[28] Huffman 1996a.

[29] Ibid.

[30] Robertshaw 1994.

[31] Taylor & Robertshaw 2000.

[32] Herbert 1996.

[33] Bannerman 1982.

[34] See, for example, Beach 1980; Birmingham 1983; Sinclair 198.

[35] Summers 1969.

[36] FAO-Unesco 1988.

[37] Wild & Fernandes 1967.

[38] Sinclair 1987.

[39] Sinclair 1987; Pikirayi 1993, 2001a; Pwiti 1996.

[40] Scoones *et al.* 1996.

[41] Pwiti 1997a.

[42] Scoones *et al.* 1996; Pikirayi 2001a.

[43] Pikirayi 2001a; see also Ranger 1999.

[44] Scoones *et al.* 1996; Pikirayi 2001a, 2001b describes this as opportunistic farming.

[45] Pikirayi 2001a, 2001b.

[46] Tyson & Lindesay 1992; Huffman 1996a.

[47] Huffman 1996a, 2000; Manyanga *et al.* 2000.

[48] Refer to general theories given in Chew 2001.

[49] See Beach *et al.* 1998's model on the political development at Great Zimbabwe, and how he uses archaeology to support his arguments.

[50] Brain 1974; Garlake 1978; Thorp 1995.

[51] See Beach 1980.

[52] Bannerman 1982.

[53] Mudenge 1988.

[54] Sinclair 1987; Sinclair *et al.* 1993.

[55] Sinclair 1987.

[56] For a general study on the evolution of the cultural landscape around Great Zimbabwe, see Ndoro 2001.

[57] Pwiti 1997a.

[58] Huffman 1972; Pwiti 1997b.

[59] Huffman & Vogel 1991.

[60] Kusimba 1999; Horton, this volume.

[61] Garlake 1973; Huffman 1972.

[62] Fagan, Phillipson & Daniels 1969.

[63] Sutton 1980.

[64] Huffman 1972; Sutton 1980.

[65] Radiocarbon dates published in Huffman & Vogel 1991 are imprecise on the dating of the Great Enclosure, but see Huffman 1996b on P and Q architectural styles.

[66] van Waarden 1998.

[67] Pikirayi 1993.

[68] Beach 1980; Garlake 1978; Sinclair 1987.

[69] Garlake 1973.

[70] Both historical and archaeological evidence suggest that Great Zimbabwe were still inhabited during the early 16th century; see, for example, Collett *et al.* 1992; Huffman & Vogel 1991.

[71] See, for example, Tainter 1988.

[72] Rich individuals were interred there, accompanied by glass beads, copper, iron ornaments, gold, cloth and other prestige goods. The glass beads attest to contacts with East African coastal towns, which probably traded these items for ivory and gold, see Fagan, Phillipson & Daniels 1969.

[73] See graphs and discussion in Mudenge 1988.

[74] Pikirayi 1993 describes alluvial gold mining activities in the Mukaradzi valley in northern Zimbabwe, and presents a model showing how mining could have operated during pre-colonial times. From their reading of Portuguese written sources, both Beach 1980 and Mudenge 1988 note the environmental consequences, including outbreak of disease, social disruption and forced relocations of people, of 17th-century over-exploitation of gold in the Mutapa state.

[75] Joao de Barros 1552, in Theal 1898–1902, vol. 6, 267–68.

[76] The term zimbabwe literally means 'houses of stone' in reference to the royal settlements or courts of the Karanga rulers of the northern parts of the Zimbabwe plateau. The word 'Symbaoe' comes from the account of the early 16th-century Portuguese historian, Joao de Barros, who was writing about stone buildings in e Mutapa state.

[77] Beach 1980; Pikirayi 1993, 2001a.

[78] Diogo de Alcacova 1506, in da Silva Rego and Baxter 1962–75.

[79] Beach 1980.

[80] Portuguese accounts also mention civil wars in the areas of Uteve and Danda in central Mozambique. These two regions were strategically placed to take advantage of the gold from the hinterland, which was being exported to Kilwa through the port of Sofala. See Bhila 1983.
[81] Abraham 1962; Beach 1994.
[82] Political power in the Mutapa state was also demonstrated by the ability to store in reserve agricultural produce which would then be used in times of scarcity to feed the population.
[83] Pikirayi 1993.
[84] Robertshaw 1994; Robertshaw & Taylor 2000.
[85] Cordell 1983; Vansina 1983.
[86] Reefe 1983.
[87] Birmingham 1983.
[88] Ibid.

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