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Agriculture at the Edges: Archaeology and History in the Vijayanagara Hinterland

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The Vijayanagara metropolitan survey is a programme of systematic archaeological surface survey in the vicinity of the late pre-colonial South Indian city of Vijayanagara (Lycett, 1994; Morrison, 1995; Morrison and Sinopoli, in press; Sinopoli and Morrison, 1991, 1994). This project consists of three distinct components or phases. Phase I employs detailed and systematic examination of the eight large "blocks" of land, each some 20 square kilometres, immediately surrounding the city of Vijayanagara itself, and has resulted in the documentation of over 500 sites across approximately 90 square kilometres. The newest, third phase of the project involves limited test excavations of selected sites and was initiated only in the 1994 season. Here, however, I discuss a few aspects of Phase II research, that is, the more selective examination of a larger area surrounding the city, the greater metropolitan region of Vijayanagara.

As part of this work, we have documented agricultural features in and near the greater metropolitan region. Many of these features are large, and, far from being "lost", appear on published survey maps. Many more of these features have, however, never been recorded. These agricultural facilities were, in a real sense, the mainstay of the city, located in the semi-arid interior of northern Karnataka, a region where dry farming is possible, but is uncertain and of low productivity.

Agricultural activities are really extensive and often leave rather ephemeral material remains; as such the analysis of past agriculture constitutes a serious methodological challenge to archaeology. One might imagine that this challenge is mitigated for those working in "historical" periods, since textual data may also shed light on the nature of agricultural production in these time periods. To a certain extent this is correct. We know a great deal more about the organization of agricultural production, and its articulation with other aspects of Vijayanagara society than we would without texts. However, historical data have their own biases and limitations and serve, not as substitutes for archaeological information, but as supplements. The text-based view of agricultural production is at best partial and at worst, misleading. Archaeological and palaeobotanical analysis of landscapes and vegetation history suggest that only a restricted range of agricultural strategies and scales of production appear in textual sources (Morrison, 1995). That is, the evidence of the material record points to a greater degree of diversity in forms of production, especially small-scale and marginal strategies. Even larger facilities are not faithfully reflected in the documentary record, and I discuss below one such limited case.

The Daroji Valley

The Daroji valley lies to the south of the city of Vijayanagara and of the intensive survey area. The most striking set of agricultural facilities in the Daroji Valley is a series of linked, or system reservoirs (after Sharma and Sharma, 1990). These reservoirs are supplied by seasonal runoff, and the great majority have been breached and/or silted up and are no longer in use.

The Daroji valley is, in fact, two distinct valleys, one oriented east-west, the "main valley" and one oriented north-south that drains into the main valley (Fig. 1). The latter, the Avinamodugu valley, can be thought of as on extension of the main valley and in the interests of brevity is ignored here. The main valley is c. 40 km long and 1.5 – 6 km wide. On the west, the valley is broad and open, narrowing as its runs gently downhill to the east; it then opens up again to accommodate the Avinamodugu valley. The focal point of the main valley is a massive reservoir, the Daroji reservoir or *kere*, that receives input from features all along the valley floor. The valley ends rather abruptly on the east near the Daroji reservoir, where a line of northwest-southeast trending hills, a fort, and several large fortification walls clearly demarcate this area from the level plains of Bellary. Thus, the Daroji valley can be conceived as both a hydrological unit — almost all of the agricultural facilities in the valley itself tap runoff from the valley or its surrounding hills — and as a unit of defense and territory.

The north and south sides of the valley are quite different in character and, consequently, in their runoff and vegetation characteristics. The north side is made up of low, dissected hills of granite boulders, part of the Hampi-Daroji hills. On the south, the valley is bounded by the higher and, at one time, forested Sandur hills, composed of metamorphic rocks. The Sandur hills constitute an excellent watershed for the collection of runoff; they are higher and receive slightly more rainfall than the northern hills. They also support a denser vegetation and are less subject to slope wash and erosion. The rocky northern slopes, on the other hand, encourage faster and potentially more damaging runoff, and are liable to severe erosion. These physical characteristics of the valley powerfully structured the placement of agricultural features. For example, few reservoirs are placed against the southern side of the valley. Here, although the runoff from the Sandur Hills was a more secure and reliable water source than the runoff from the northern hills, the velocity and volume of that runoff may have endangered smaller reservoirs and in fact only the very large reservoirs in the valley directly tap Sandur runoff. Further, the folded northern hills provided many opportunities for tucking small facilities into valleys; this smaller scale of production may have been more appropriate to those farming this area and with access to these lands. There do exist, however, several massive reservoirs, thousands of metres in length, spanning the valley. The valley is, then, a study in contrasts; huge, elaborate features side by side with tiny, ephemeral features. None of the reservoirs in the valley save the Daroji reservoir itself were likely to have consistently held water year-round and in this sense all of the valley was agriculturally marginal. Water was scanty, settlements were small, and the capital city lay off to the north beyond a dry rocky upland.

Reservoirs: General Construction

South Asian reservoirs have been described by a number of authors and those from South India and Sri Lanka are particularly well known (e.g. Brohier, 1934; Leach, 1971; Myrdal Runebjer, 1994; Seneveratne, 1989). Vijayanagara farmers used both canal-fed and runoff-fed reservoirs, but all of the Daroji reservoirs rely on seasonal runoff. Vijayanagara

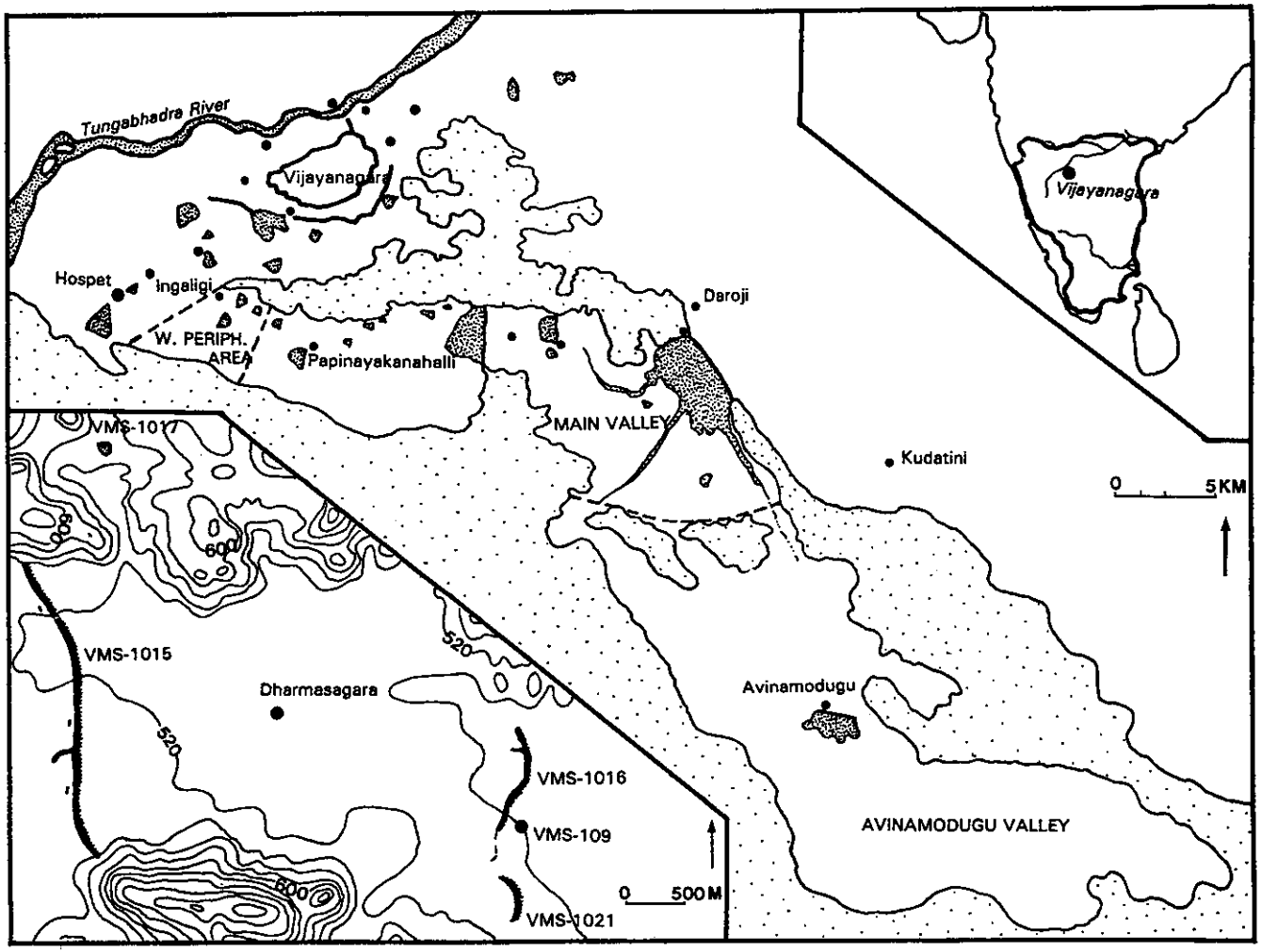

Figure 1. The Daroji Valley. Small circles indicate settlements. Left inset map, close-up of portion of the main valley. Right inset map, maximal extent of the Vijayanagara empire.

reservoirs vary a great deal in size and degree of elaboration, but most conform to a typical pattern in which a masonry-faced eastern embankment placed across a valley or between two hills creates a seasonal pool that supports crops downstream (Morrison, 1993). Water flows to the fields through slab-lined tunnels constructed through the embankment; this flow is controlled by sluices. Sluice lintels in this area are often capped by moulding sequence and may also be ornamented with carvings of deities or donors. Sluice morphology is not purely functional, instead it appears to deliberately evoke forms and icons of temples and of temple doorways. Many of the images found on sluices, particularly Lakshmi but also Ganesha and others, are also found over the doorways of Vijayanagara temples. The more elaborate structures may also have stairways or at least diagonal lines of protruding slabs leading down to the water, shrines, rooms and settling basins.

The Daroji System

The Daroji system, too extensive to describe in detail here, contains a number of different kinds and scales of agricultural features that are closely interconnected. The main valley can be divided into three groups of reservoirs, keeping aside consideration of other kinds of facilities. These three groups include the western peripheral system of three reservoirs, the central system of twelve reservoirs, and an independent group of two isolated reservoirs.

The Western Peripheral System

The western peripheral system consists of three reservoirs, all of which drain to the west-northwest. Only two of these reservoirs (VMS-1002 and 1004) are directly linked; the third (VMS-1003) is isolated although it waters ground adjacent to that watered by VMS-1002. The latter is the largest and most ornate facility in this area. Although its original size is difficult to determine because of the destructive effect of recent construction, it is estimated to have been ca. 650 m long. Its two remaining sluice gates are quite elaborate; each is associated with a staircase. Further upstream from this large reservoir is a smaller one (VMS-1004). This smaller (ca. 210 m long) facility blocks off an area between two high outcrops, creating an enclosed area that not only impounded water, but may have also been used for planting. The ground surface to the south of, or "downstream" from, the reservoir is actually level with, or slightly higher than, the bed of the reservoir and water was only able to flow out through a long and deeply incised channel that runs toward VMS-1002. Although the sole sluice gate of VMS-1004 is in poor condition, it is clear that it was considerably less elaborate than VMS-1002. A small iron-processing facility lies on the edge of VMS-1004.

The western peripheral system waters, in addition to smaller, more isolated patches of arable land, an extensive plain at the northwestern end of the Daroji valley. This plain provides access from the south to the city and the valuable canal-irrigated land west of the city. The contemporary village of Ingaligi is watered by the western peripheral system; Ingaligi contains yet-unstudied Vijayanagara structures. To the north, a large fort (VMS-6) with associated structures guards a hilltop along a road leading to the city (Morrison, 1991).

The Central System

The central system consists of at least 12 reservoirs, all linked and flowing to the east-southeast. This system is the most variable in terms of scale and elaboration of the reservoirs and although, as always, chronological resolution is difficult, the central system appears to

have undergone two major episodes of construction. Seven small reservoirs form the upper part of the system. Moving downstream, these seven reservoirs flow into the large embankment of VMS-1015, dated to 1519 A.D. (Morrison, 1995). Even though it is breached and has fallen out of use, this reservoir still dominates the valley, extending all of the way across it, here ca. 2.5 km. The embankment is faced by up to 18 courses of stepped masonry and contained four or more sluice gates. The sluices differ from one another and may not all be contemporaneous. The northernmost sluice is associated with a staircase and contains a carving of Sita with Hanuman and Sugriva (?) on a simple moulding sequence of a type common on structures in the city.

The second sluice is a huge double sluice, capped not by mouldings but by brackets carrying a stone roof. A curved breakwater, apparently contemporaneous, extends out from the reservoir embankment south of this large sluice which is complemented by another similar, although less massive double sluice to the south. The southern end of the reservoir was deliberately dismantled.

In the 5 km downstream (east) from VMS-1015, the valley maintains its narrow configuration, creating a prime location for valley-wide reservoirs. Near the eastern end of this corridor are the remains of VMS-1016, a badly silted up and partially dismantled reservoir that may have preceded VMS-1015 as the primary cross-valley reservoir in the central part of the Daroji system. This reservoir was apparently shorter than VMS-1015, c. 200 m long, but its poor condition makes an accurate size assessment difficult. Like its larger counterpart, VMS-1016 also includes a short breakwater built into the embankment; the velocity of runoff in a cross-valley facility may have required such devices to protect the main dam. The sluices of VMS-1016 are no longer extant, and only fragmentary tunnel remains indicate sluice locations. Near the southern end of the reservoir, a dense scatter of ceramics and other artefacts (VMS-109) may indicate a small settlement.

A second reservoir that captures runoff from the Sandur hills lies close to the settlement and, like its larger neighbour, this facility is in a state of disrepair. It has silted up to the top of its sluices, 2–4 m deep. This siltation may have precipitated the abandonment of the reservoir. After both reservoirs fell out of use they may have been replaced by the Late Vijayanagara reservoir VMS-1015 upstream. The settlement found near the silted and abandoned reservoirs is likely to have been associated with them and to have been abandoned when they no longer functioned.

As impressive as the two cross-valley reservoirs are, however, they are dwarfed by the massive Daroji reservoir, which is still in use. It is nearly 4 km long and 12 m high, damming up a large expanse of water year-round. Although substantial post-Vijayanagara construction and maintenance of the reservoir is evident, the village of old Daroji appears to date from at least the Early Vijayanagara period, and the large double sluices of the Daroji reservoir may date to the Late Vijayanagara period. These clues, together with consideration of its position and function, suggest that the Daroji reservoir itself has a long history and may have been a part of the valley system for most if not all of the Vijayanagara period and beyond that into the present.

In a real sense, the Daroji reservoir is the culmination of the entire system. Not only is it the largest and most elaborate of all the reservoirs in the valley, with multiple sluices and a large waste weir, but it is also the physical endpoint of the system, gathering overflow from all the reservoirs upstream in the main valley as well as from reservoirs in the Avinamodugu valley and from three seasonal streams originating in the Sandur Hills. All of these large drainages carried runoff that was either too swift to be contained in a smaller

reservoir and/or ran over substrates and through topography unsuitable for the construction of reservoirs. Thus, it is to these three major drainages that the Daroji reservoir owes both its persistence and its year-round supply of water, in an area where other reservoirs are only seasonally supplied or where they may dry up in years of low rainfall.

The Independent Reservoirs

There are at least two independent reservoirs in the main valley, facilities not physically linked to other reservoirs. Both are associated with small drainages along the northern edge of the main valley and capture runoff that does not contribute to the supply of the main valley. Both of these reservoirs are small and relatively simple; future research in the valley is likely to locate additional reservoirs in this category.

Daroji Reservoirs in Context

This brief consideration of reservoirs in the Daroji valley necessarily excludes a great deal of material germane to understanding the organization of land use in the region. First of all, it has not been possible to discuss the range of other kinds of facilities associated with agricultural production. The latter are almost all small scale and include wells, small terraces, walls, gravel mulched fields, and field borders. Further, nonagricultural features—the placement, size, and nature of settlement, of roads, temples, and fortifications — structure land use in the valley in significant ways. Interestingly, we see a pattern of settlement distribution that differs in some ways from that closer to the city. Unlike some of the "suburban" settlements (Fritz, et al., 1985) that occasionally cluster together (Sinopoli, this volume), Daroji settlements are almost evenly spaced. In fact, the two closest settlements are those associated with the cross-valley reservoirs suggested above to be temporally distinct. If that is indeed correct, and keeping in mind that there may well be additional settlements not yet recorded, then it seems that villages in the Daroji valley were widely and evenly spaced, with none closer than 4 or 5 km. Reservoirs show a slight tendency to cluster near settlements (or vice versa) so that even within the extensive central system there are recognizable nodes of settlement and irrigation. The three forts in the main valley are all located near passes and along recognizable roads.

The Historical Record

Aspects of the Vijayanagara period are described by an historical record that includes inscriptions in copper and stone, religious and literary works, and accounts written by foreign visitors. Indeed, one might assume from the volume and detail of the historical literature on Vijayanagara production and agrarian organization that the richness of this textual record would preclude any need for archaeological investigation. This is not the case. First of all, the confident tone of much of the historical literature belies the paucity of data on which it rests. The treatment of textual sources, particularly inscriptions, in historical scholarship has often been less than systematic, with single inscriptions stripped of their temporal and spatial context used anecdotally to support a favourite position. Secondly, the written record presents a biased view of the organization of agricultural production. No matter how cleverly historical data are manipulated, it remains clear that in the Vijayanagara countryside there were agricultural strategies, facilities, and presumably people, who are all but invisible historically. Only archaeology can inform on these "people without history".

At least 10 inscriptions have been found in the Daroji and Avinamodugu valleys; five from the main valley. Several more will undoubtedly be located and recorded as the work progresses. Starting upstream, the first two are located in the village of Papinayakanahalli. Papinayakanahalli has a Vijayanagara-period temple and a small fort. It is close to five reservoirs and lies at the foot of a low pass through the outcrops toward the city of Vijayanagara. One of the inscriptions here, dated to 1532 A.D., describes a sale of land near a settlement of unknown location, for the service of the goddess of the local temple (Gopal, 1985, p. 189). The second inscription is dated 1742 A.D. and describes the grant of a village (again, of an unknown location) as a tax free gift to an individual (Gopal, 1985, p. 190).

The third (unpublished) inscription found in the main valley is built into the embankment of VMS-1015, the larger and perhaps later cross-valley reservoir. Dating to 1519 A.D., this inscription describes a grant of irrigated land near the settlement of Dharmasagara, located just downstream from the reservoir.

Lying on the top of embankment of the Daroji reservoir is a slab with an undated, but certainly post-Vijayanagara, Persian inscription instructing that water from the reservoir should be distributed to thirsty travellers in the name of the prophet Muhammad (ARSIE [Annual Report of South Indian Epigraphy] 1922-23, No. 726 of 1922). Finally, the settlement of Kudatini, just outside the main valley adds a Vijayanagara-period inscription to a long string of earlier inscriptions of the Chalukyas and Rashtrakutas. This brief note, dating to the early sixteenth century, mentions a land grant (Gopal, 1985, p. 132).

Several valuable facts emerge from this small corpus of material, even in light of the truncated versions of the texts reported here. First of all, these inscriptions show an active exchange of land such as we see elsewhere in the region and in the empire. Notably, none of the inscriptions, including those from the Avinamodugu valley not reported here, date to the Early or Middle Vijayanagara period. They all fall late in the occupation of the city, generally in the early sixteenth century or, in a few cases, after the abandonment of the city itself, in and after A.D. 1565. This pattern suggests a late occupation for the valley. However, the archaeological evidence should make us slightly wary of this conclusion. The evidence for siltation, abandonment, and perhaps replacement of an initial cross-valley reservoir, (VMS-1016), by another, later one (VMS-1015) suggests a certain amount of time depth to the valley sequence. That the settlement associated with VMS-1016 is abandoned but the one associated with VMS-1015 (also silted, breached and abandoned) is not, might also suggest something about the historical trajectory of settlement in this area.

Conclusion: Lessons from Texts

Textual sources provide valuable information about the tempo of change in the Vijayanagara region, and also provide a form of social and political context that otherwise is very difficult, if not impossible, for archaeologists to reconstruct. Not only do inscriptions relate the disposition of land and rights in produce to the structure of polity and society, they also often name specific boundaries and thus inform more obliquely on land distribution and the nature of landholding (cf. Heitzman, 1987). Kings and political leaders may be identified and structures of power and authority inferred to some degree. One of the inscriptions from the Avinamodugu valley, for example, discusses a nearby grant of land but refers to the area as being in a district of the empire other than that of the capital city. Thus, it is hoped that ongoing systematic analysis of inscriptions will allow the reconstruction of territorial boundaries.

Textual data may also allow the construction of archaeological chronologies. The elaborate sluice gates of Vijayanagara reservoirs appear to follow a definite stylistic sequence, based on knowledge of specific dated reservoirs. This association needs to be further developed, but at least the more elaborate reservoirs may be able to be roughly dated using stylistic criteria in the near future.

Conclusion: Lessons from Material Culture

The archaeological record indicates, first of all, that the information provided by texts is only partial. This lack cannot be addressed solely by finding and translating more inscriptions. Texts are by their nature selective in their representation, showing a bias toward objects and people deemed more important. Smaller facilities and the people who made and used them may have merited no such memorial. Unlike the more democratic archaeological record, the historical record spreads its favours thinly. None of the smaller reservoirs in the Daroji valley or indeed anywhere in the survey area is associated with its own inscription, nor are any of the smaller agricultural facilities. Inscriptions provide virtually no data on consumption or the specific practices and organization of production, topics amenable to archaeological investigation. Texts describe modes of finance for construction and maintenance; the partiality and bias of the textual record should warn against overgeneralizing that mode of finance to all aspects of agricultural organization.

Archaeological research reveals a greater diversity of form and of scale in strategies of production — agricultural and nonagricultural — than texts lead us to expect. There were a variety of small scale and even marginal strategies of agricultural production in the Vijayanagara region, farmers growing dry crops and making a rather precarious living, herders, landless labourers, all those who made trash if not history. As archaeologists, we are aware that in all complex societies, not just Vijayanagara, not just South Asia, there are strategies, there are scales of production, there are people who are historically invisible but who leave us some trace of their actions in the material record. Texts are no panacea to the uncertainties of our discipline; the potential of archaeological research is not extinguished once words are written down. Instead, we may consider moving toward a greater coordination of these data and integration of the diverse perspectives they afford.

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