2. SMALL-SCALE AGRICULTURAL FEATURES THREE VIJAYANAGARA EMBANKMENTS

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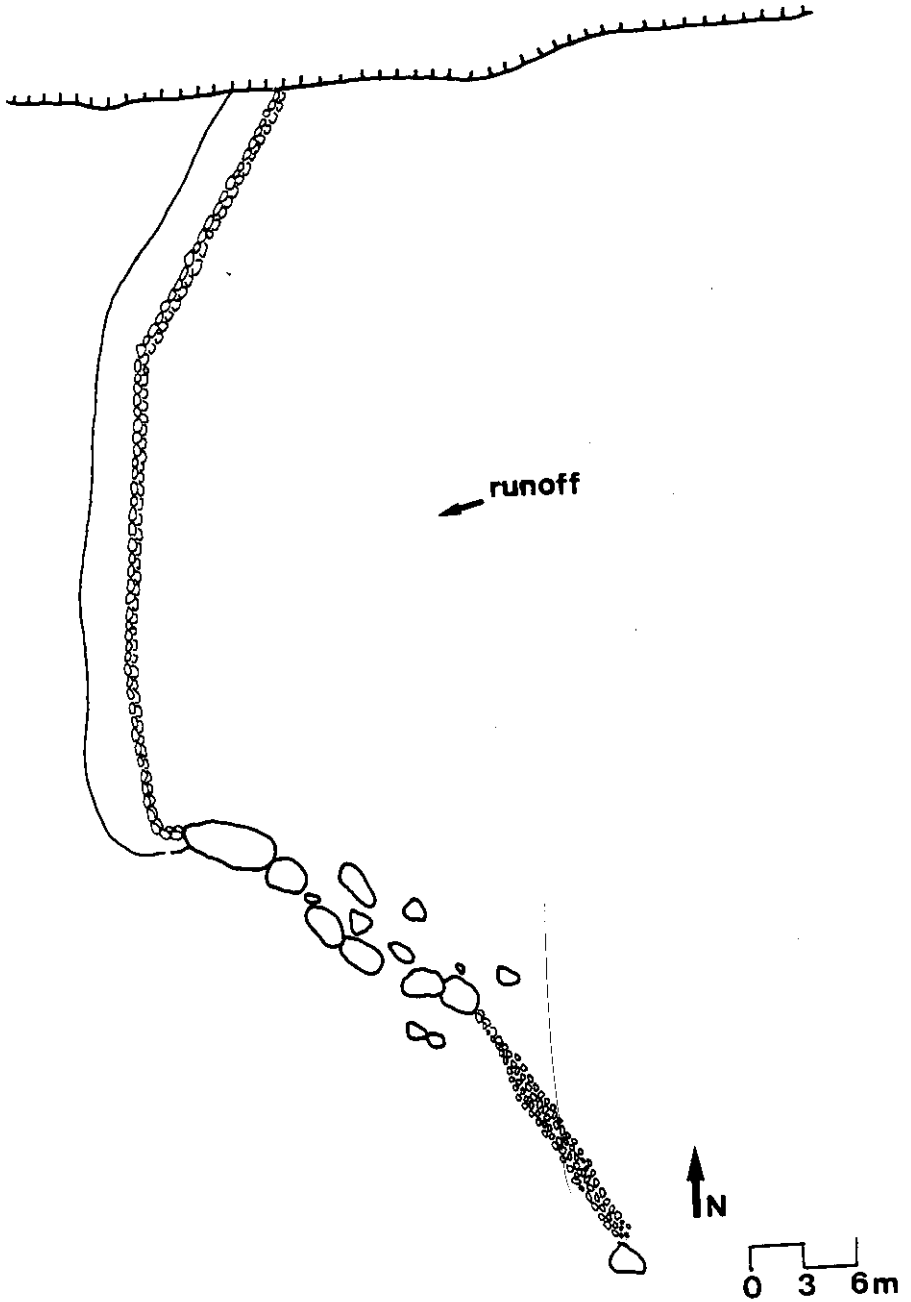
One of the most striking and characteristic features of the Vijayanagara landscape, the vast reservoirs or tanks, enabled large population centres such as the Vijayanagara capital city to subsist in the dry northern Karnataka. Highly productive canal irrigated agriculture was only one component of the Vijayanagara agricultural economy; an extensive and intricate dry farming component also played an important role in food production. The nature of the subsistence demands placed on arable lands in the region immediately surrounding the capital city were such that irrigated fields were most likely devoted almost exclusively to those crops which responded well to productive intensification, such as paddy rice. Thus, areas of dry farming were important resources for the production of basic food grains such as sorghum and millets, as well as raw materials such as cotton.

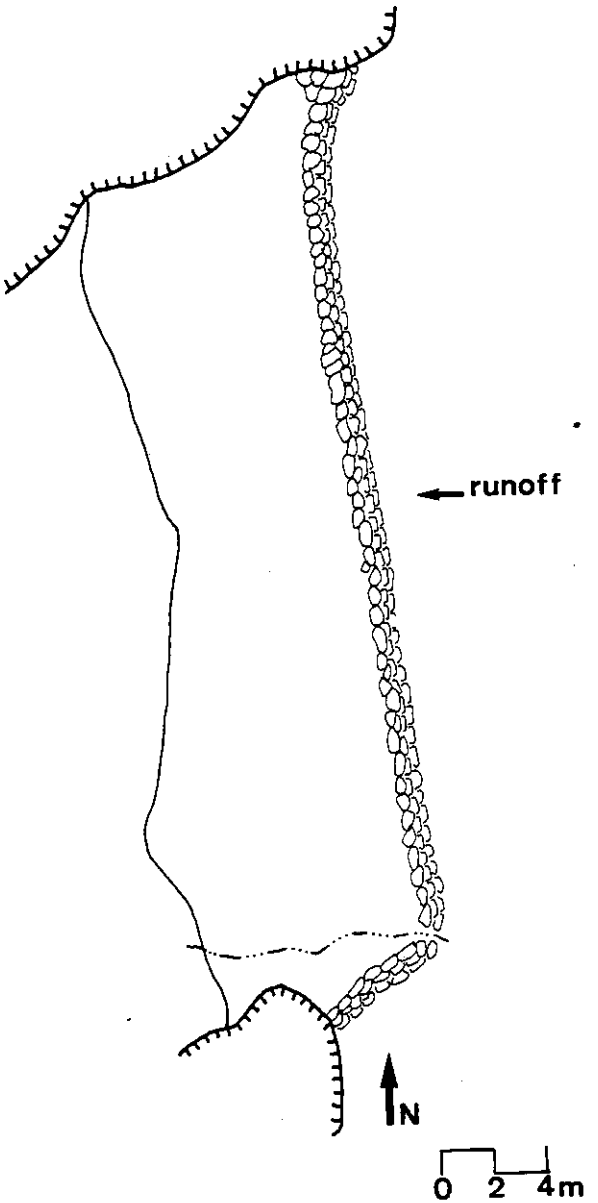
In a sense, fields watered by tanks bridge the gap between "dry" and "wet" farming, in that the water stored in the tank allows crops with fairly high water requirements (vegetables, rice, etc.) to be cultivated, this crop often rotating seasonally with a "dry" crop. Tank irrigation is, however, not as secure as canal irrigation in that tanks supplied solely by runoff, as many are, are ultimately dependent on rainfall. Cultivation of crops with high water requirements may be only seasonally successful, and a succession of low rainfall years may make even this impossible. Not all tanks are subject to an equal amount of uncertainty; much depends on the placement of the tank vis-a-vis topographic and geologic features. In general, those features with smaller watersheds have a much more uncertain water supply than those drawing water from a large area. The proliferation of tanks can be viewed as an intensification of both dry and wet cropping components of an agricultural system, an intensification which involves a considerable investment of labour for both construction and maintenance.

That the degree of investment in tank construction increased dramatically during the Vijayanagara period is well known. What is striking, however, is the extent and nature of that increase. Not only was there an increase in the number and possibly the scale of irrigation works in the Vijayanagara region, but also the diversity of soil and water control facilities, and consequently of techniques, seems to have increased as well during this period. Large scale reservoirs, such as the tank at Kamalapur, or the massive dam constructed by Krishnadevaraya near Hospet are justifiably celebrated. Not as well studied, however, are the innumerable small tanks and tank-like soil reservoirs I have called "embankments" (Sinopoli and Morrison, this volume). At least nine of these small-scale features are located in the circa twenty square kilometre area east of the city surveyed in 1988.

Site VMS-97 is located in a long, narrow valley between two granitic outcrops southeast of the village of Venkatapuram and its medieval counterpart, site VMS-2. This embankment serves as a soil and water control device and consists of a long, curving bund 46 metres long, 3 metres wide, and only 60



15. Site VMS-97



16. Site VMS-108

centimetres high. The bund is constructed of mounded earth faced with three stepped masonry courses on the east (upstream) side. In this respect, construction is similar to a tank. However, there are no sluices or drainage outlets and, more significantly, the ground levels on either side of the feature indicate that water could not flow from the feature to the west. The direction of runoff in this valley is from east to west; an entrenched channel running through the centre of the valley carries most of the water. VMS-97 does not take advantage of this primary flow. Rather, it is placed on the northern edge of the valley at the base of a sheetrock outcrop. Its configuration and position suggests that it trapped runoff directly from the northern outcrop and not from the watershed of the entire valley. The curved walls, which incorporate a small naturally-occurring outcrop, also prevented soil erosion toward the somewhat lower valley centre. The area enclosed by this feature is quite small, on the order of 45 by 150 metres.

Site VMS-48 is similar to VMS-97 in that it functioned principally as an embankment rather than as a tank. It is, however, larger and more complex. Rather than trapping the peripheral runoff of a large valley, VMS-48 completely encloses a small valley, also nestled between granitic ridges. The bund is 78 metres long, 10 to 12 metres wide, and 1.5 metres high. It is constructed of mounded earth, but unlike VMS-97 (and most tanks), there is no stepped masonry facing on the upstream (east) side. Instead, a single line of boulders has been placed at the base of the west side of the bund, possibly for stabilization. The slope of this small valley is also much steeper than that containing VMS-97, and the ground surface falls off to the west. This western area is clearly unsuitable for cultivation, however, as it consists largely of exposed sheetrock. Thus, cultivation would have been carried out primarily in the enclosed bed of the feature.

Drainage of embankments must have been a matter of concern during the rainy season, particularly where the flow of water was relatively large and/or rapid. VMS-48 is equipped with an informal sluice, little more than a narrow (60 cm.) passage between boulders at the southern end of the feature, where it joins the ridge. The flow of water through this channel may have been controlled by simply filling it in with rubble, a technique still employed today. Like VMS-97, the area enclosed by this embankment is quite small, only 80 by 60 metres. Some additional area below the embankment could have been watered by the drainage sluice, but as noted, there is little arable soil available in this area.

Site VMS-108 is a wide (6 metres) earthen embankment strategically placed in a runoff channel atop a high granitic outcrop. This feature is 36 metres long, and is stabilized with six stepped masonry courses on the (east) upstream side. Like VMS-48, the ends of the bund abut outcropping rock, thus enclosing the narrow upland valley. Because of its placement in a steeply sloping channel, the area to the west of VMS-108 is lower than that to the east, but only in the latter is there arable soil. Runoff through this steep and narrow passage must attain considerable velocity in the wet season; the force of this flow would require a wide and stable embankment. Even so, the embankment has been breached at the south end. VMS-108 served to slow and spread runoff to the area above (east of) the embankment, as well as to prevent loss by erosion of the small amount of soil available on the rocky outcrop. The area farmed was again quite small, about 60 by 60 metres.

Consideration of these small-scale soil and

water control features highlights the diversity of Vijayanagara agricultural strategies, and the intensity of land use in the Vijayanagara metropolitan region. There appears to be an almost continuous gradation in scale and complexity of agricultural features, from walls placed across erosion channels to massive masonry tanks, from simple wells to the intricate network of canals. Appreciation of the enormous task of food production for the city and its surrounding towns and villages requires that we see not only the large scale irrigation facilities patronized by king and court, but also the many smaller facilities, perhaps the products of the efforts of single households or hamlets. The operation of such a complex, internally differentiated agricultural economy is surely no less impressive than the architectural monuments of the Vijayanagara empire.