



Eyes of the empire: A viewshed-based exploration of Wari site-placement decisions in the Sondondo Valley, Peru



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ABSTRACT

The Wari empire (AD 600–1000) deployed a variety of strategies to consolidate its provinces in Middle Horizon Peru. One strategy may have been building imperial sites in places with large visual magnitudes, which are attractive to empires because they are more defensible, they are suitably located for direct and implied surveillance, and they project a visually-dominant presence on the landscape. In the Sondondo Valley, Peru, the Wari empire made a significant investment of labor and resources in the construction of terraces, roads, and five imperial sites. The viewsheds of these sites are compared to those of 20 non-imperial sites, 495 randomly-placed individual sites, and 99 randomly-placed groups of five sites each. Parametric and non-parametric comparisons reject the null hypothesis that there is no difference between viewsheds. Imperial sites had significantly larger and better-coordinated viewsheds, as estimated from overlap and coverage indices. These results support the argument that imperial agents' site-placement decisions considered the benefits of locations with large viewsheds. From these sites, the empire's representatives effectively advanced imperial goals for two and half centuries. Similar factors may have been salient in other imperial settings, so this approach may help explore site-placement decisions in other regions.

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1. Introduction

In Middle Horizon Peru, the Wari empire (AD 600–1000) expanded from its eponymous capital in the Andean highlands and incorporated a number of provinces (Fig. 1). Like other successful empires, Wari adapted conquest and consolidation strategies to each region (Schreiber, 1987, 1992). Imperial representatives would have made administrative decisions on behalf of the empire based on their knowledge of imperial goals and the local situation. This approach privileges the decisions of the individuals participating in empire building and eschews top-down perspectives that tend to treat empires as monolithic, faceless entities.

This paper's goal is to clarify site-placement decisions in one of Wari's major provinces, the Sondondo Valley¹ (Fig. 2). The empire made significant investments in the construction of agricultural terraces, a major road, and five imperial sites. The decision of where to build these sites can be explored through viewshed analysis (Whitley, 2004). Viewshed analysis offers a quantitative means of comparing archaeological and randomly-placed sites (e.g., Bongers et al., 2012;

Fisher et al., 1997). Places with large viewsheds are more defensible, offer better opportunities for direct and implied surveillance, and can be used to create a visually-dominating presence on the landscape or even co-opt sacred landmarks (Williams and Nash, 2006). These factors may have been some of the reasons behind Wari's enduring control, established from sites placed in effective locations. These factors may have also been important in other empires, making this a relevant case study for exploring site-placement decisions in other contexts.

1.1. The Wari empire and its provinces

The first great empire of the ancient Andes was centered in the Ayacucho Valley of highland Peru (Bergh, 2012). At its peak it controlled extensive areas along the Pacific coast and Andean highlands (Fig. 1). Expansion probably began sometime in the seventh century AD and by the following century, Wari had begun building imperial-style infrastructure throughout its realm. A few of the better-known provincial centers are Viracochapampa (Topic, 1991), Honcopampa (Isbell, 1989), Pikillaqta (McEwan, 2005), Jincamocco (Schreiber, 1992), and Cerro Baúl (Williams, 2001; Nash and Williams, 2004). These centers share a number of material features such as a distinctive, uniform, rectilinear architectural style (Schreiber, 1978, 2012; Spickard, 1983; McEwan and Williams, 2012) and elaborately-decorated ceramic vessels (Knobloch, 1991; Menzel, 1964). A network of imperial roads connected these sites to the capital and each other (Lumbreras, 1974;

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¹ In previous publications, the Sondondo Valley was referred to as the Carhuarazo Valley, before the Peruvian government officially designated it the Sondondo Valley.

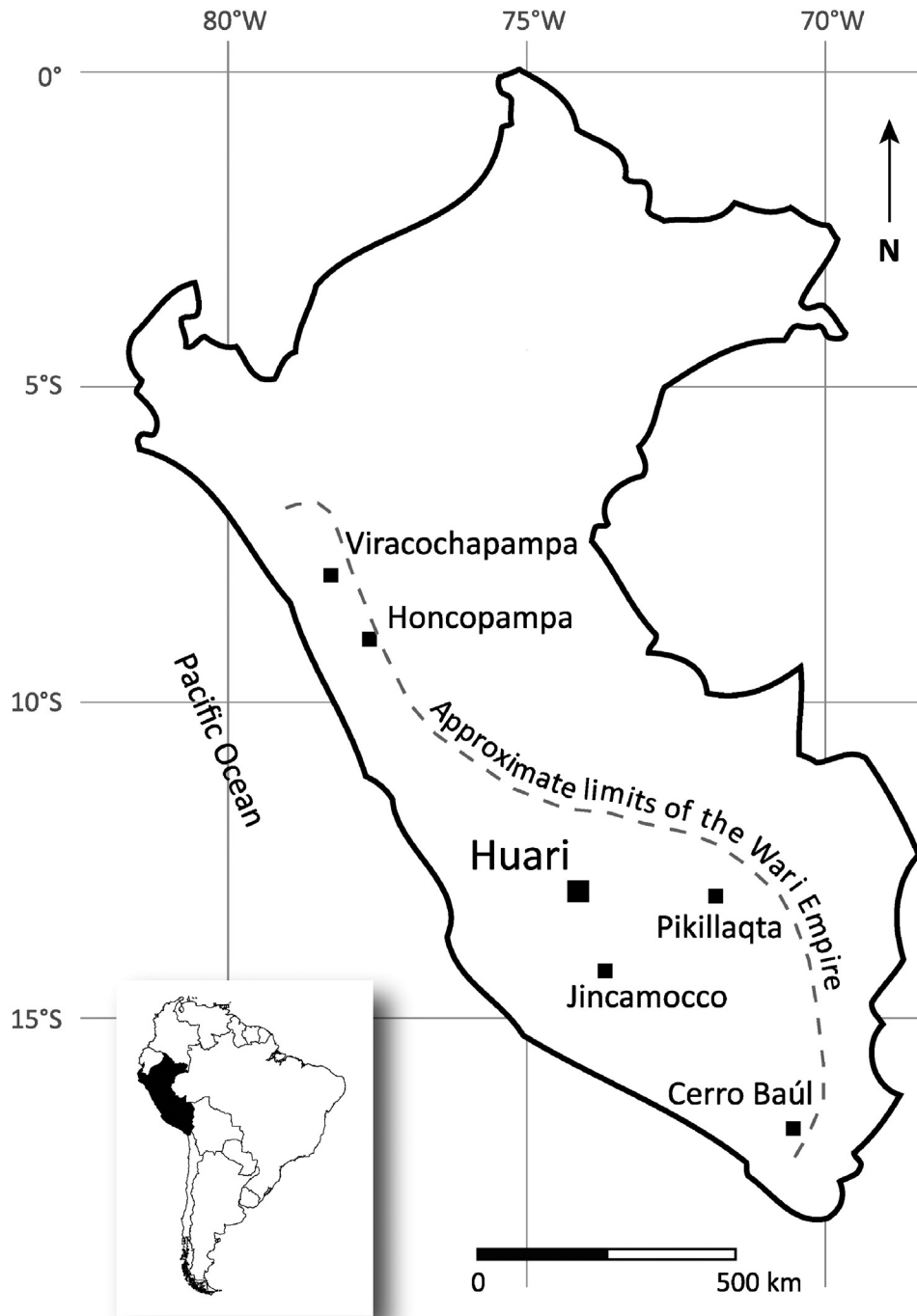


Fig. 1. Major Wari sites, including the capital Huari, and the approximate limits of the Wari empire, shown within the outline of modern Peru. The limit does not imply continuous spatial control, which seems unlikely. Inset map indicates the location of modern Peru, shaded, within South America. Adapted from Schreiber (2004, figure 8.1).

Schreiber, 1984, 1991). Overall, the evidence suggests that Wari was a unified polity that modified its relationship with each conquered province according to local conditions, such as population density, degree of political organization, available resources, and strategic location (Schreiber, 1992, 2012; Jennings and Craig, 2001).

1.2. The Wari empire and militarism

Militarism was a substantive feature of the Wari empire. Subsidiary centers near the capital were fortified (Pérez Calderón and Cabrera, 1999). The 2-km² walled complex at Pikillaqta may have maintained a

military garrison (McEwan, 1991: 117) and was surrounded by smaller sites and walls positioned to withstand a military threat and control access (Arkush, 2006: 292). Wari iconography features soldiers carrying shields, axes, bows, arrows, and trophy heads, suggesting the potential of violent conflict in Wari society (Ochatoma Paravicino and Cabrera, 2002). Actual violence is documented from decapitated heads and skeletal trauma at multiple sites (Verano, 1995; Tung, 2007, 2008).

Wari seems to have relied on force or the threat of force to conquer and consolidate geographically large territories (Arkush, 2006: 294; Isbell and McEwan, 1991: 301; Lumbreras, 1974: 165, 177), perhaps not unlike dynasties in China (Waley-Cohen, 2006), the Roman Empire

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