



ENTRE LOS RÍOS: INTER-VALLEY MOBILITY ON THE FAR SOUTHERN COAST OF PERU (AD 1000-1930)

ENTRE LOS RÍOS: MOVILIDAD INTERVALLE EN LA COSTA DEL EXTREMO SUR DEL PERÚ (1000-1930 DC)

Noa Corcoran-Tadd¹

Recent archaeological field work in Tacna (Peru) has investigated the long-term landscape history of the Sama Valley. Located between the research hotspots of Moquegua and Arica, the valley has long been overlooked. At the same time, it is well positioned to offer new insights into debates about mobility, environment, and the transforming political economies of the Late Prehispanic and historic periods. This article presents an initial analysis of recent data on the long-term patterns of connectivity that articulated the Sama drainage with neighboring valleys and wider networks. Based on a combination of remote sensing and intensive pedestrian survey data, it is possible to trace multiple routes through the inter-valley desert pampas that border the middle and lower Sama Valley. The results highlight the utility of intensive survey methods in marginal intervalley landscapes and reveal a complex palimpsest of routes and ephemeral sites relating to regional and inter-regional mobility during the Late Prehispanic and historical periods.

Key words: South-central Andes, Late Horizon, historical archaeology, marginal landscapes, mobility, remote sensing.

Investigaciones arqueológicas recientes en Tacna (Perú) han examinado la historia de largo plazo de los paisajes del valle de Sama. Ubicado entre los focos de investigación de Moquegua y Arica, el valle ha sido pasado por alto desde hace mucho tiempo. No obstante, está bien posicionado para ofrecer nuevas perspectivas sobre debates importante acerca de la movilidad, el ambiente, y los cambios económicos y políticos de los periodos Prehispánico Tardío e Histórico. Este artículo presenta un análisis inicial de datos arqueológicos sobre los patrones de conectividad a largo plazo que articularon el drenaje de Sama con los valles vecinos y con las redes más amplias. Utilizando una combinación de teledetección y prospección peatonal intensiva, fue posible rastrear múltiples rutas que cruzaban las pampas desérticas intervalles que bordean el valle medio y bajo del Río Sama. Los resultados destacan la utilidad de los métodos de prospección intensiva en paisajes marginales de la zona intervalle y revelan un palimpsesto complejo de rutas y sitios efímeros relacionados con la movilidad regional e interregional durante los periodos Prehispánico Tardío e Histórico.

Palabras claves: Andes centro-sur, Horizonte Tardío, arqueología histórica, paisajes marginales, movilidad, teledetección.

The inter-valley desert landscapes of the central and south-central Andean coast have long tended to be overlooked in archaeological research. Yet understanding the roles that these marginal landscapes played in the past as ‘inter-nodal spaces’ (Berenguer and Pimentel 2017; Nielsen 2006) is potentially vital in understanding larger processes – the formation of exchange networks, imperial incorporation, and market integration – that transcended the scale of the river drainage. Over the past several decades, archaeological scholarship on the Peruvian coast has increasingly highlighted the importance of looking at agricultural landscapes that lay beyond the immediate margins of valley systems (e.g., Canziani and Mujica 1997; Caramanica and Koons 2016; van Gijseghem 2016; Zaro et al. 2010), while research in northern Chile

has looked even further into the desert to examine past patterns of connectivity (e.g., García and Ajata 2016; Méndez-Quirós and García 2018; Núñez and Nielsen 2011; Valenzuela et al. 2019).

This paper draws inspiration from these wider turns to inter-valley spaces to show how recent archaeological survey data on the landscapes between the Locumba, Sama, and Caplina valleys can provide new insights into the pre- and post-conquest histories of settlement and mobility at the valley and regional scales. Located at the northern edges of the hyper-arid Atacama and relatively unaffected by the urbanization of the 20th century, the Sama inter-valley pampas retain particularly visible and well-preserved traces of past mobility that are otherwise difficult to detect in most other regions. Research on these landscapes

¹ Program in Latin American Studies, Princeton University, Aaron Burr Hall, Princeton, USA. corcoran-taddn01@doaks.org, ORCID ID: 0000-0002-4927-3494

was undertaken as part of the ongoing Proyecto de Investigación Arqueológica del Valle de Sama, using a combination of remote sensing and intensive pedestrian survey to document a long, ‘transconquest’ sequence of inter-valley mobility extending from the end of the Middle Horizon (AD500-1000) through to the end of (the) Chilean occupation in the 1920s. The results point to a persistent corridor of movement in the middle valley beginning as early as the Middle Horizon with major discontinuities only appearing in the archaeological record of the tumultuous 19th and early 20th centuries.

The Sama Valley

Located in the far southern department of Tacna (modern-day Peru), the Sama Valley forms part of a series of parallel valleys that drain from the south-central Andean altiplano to the Pacific coastal plain (Figure 1). The Sama River originates in a series of high-altitude basins, cutting through the pre-cordillera via a deeply incised valley and widening as it passes through the coastal plain. This paper focuses on the middle and lower sections of the valley, which is defined here as the course of the Sama drainage between Yarahua (where the river exits the pre-cordillera piedmont) and Boca del Rio (where the river meets the Pacific). The middle valley is a broader alluvial plain where most modern agriculture is focused (350-570 masl; *valle medio* in Baitzel and Rivera Infante (2019)), while the lower valley has two zones: an area of anabranching channels, marshes, and irregular islands (150-350 masl), and a coastal area where the river passes through a narrow gap in the coastal mountain range to the sea (0-150 masl).

Agricultural production in these sections of the valley during late prehispanic periods appears to have focused primarily on maize, *ají* (chili peppers), and cotton, with wheat and alfalfa added during the early colonial period (Cavagnaro 1988; Vázquez de Espinosa 1948:478 [1629]). Sugarcane emerged as a cash crop during the 18th century, with sugar and cotton becoming the two key products of the lower valley during the late 19th and early 20th centuries (García 1907). As in neighboring valleys, production was highly dependent on unpredictable river flow, with occasional droughts sometimes heavily affecting agricultural yields. The long-term trajectory of agriculture in Sama was also shaped by the river’s salinity (Álvarez 2014), which hindered the expansion of (the) grape and olive production

that otherwise shaped the postconquest economies of the neighboring Locumba, Moquegua, and Azapa Valleys (Henríquez 2003; Rice 2011).

The middle valley is bound to the east and west by relatively flat desert pampas. Apart from shallow dry *quebradas*, the pampas have few topographic obstacles to movement and form potentially important transport corridors connecting Sama to the neighboring valleys. To the west, a topographic corridor traverses the Pampa de Sama and Pampa El Arrojadero to reach the Locumba Valley at Sitana over a distance of 35 km. To the east, a corridor extends 32 km to the city of Tacna in the Caplina Valley, with the only obstacle formed by the low hills of the Cerrillos Negros that separate the Pampa de Pedregal and the Pampa de Layagache. Even accounting for the slower movement of camelid-based caravans (e.g., Tripcevich 2016), inhabitants of the middle Sama valley would have been able to move across the pampas to access the Locumba and Caplina drainages with trips of one to two days’ travel.

The Sama Valley is also characterized by particularly expansive zones of seasonal *loma* (fog oasis) vegetation (Baitzel and Rivera Infante 2019). The Lomas de Sama – located on the slopes to the west of the middle valley – form an unusual inland *loma*, while *loma* environments are also found on the coastal mountains of the Morro de Sama and the Cerros de los Pabellones. Below the Morro, the shoreline is rocky with considerable guano deposits between the mouth of the Locumba River and Boca del Rio, while south of Boca del Rio, it shifts to a sandy shoreline environment that extends to the Morro de Arica. As will be seen, both the *lomas* and the guano deposits formed attractive resources that appear to have repeatedly ‘pulled’ inhabitants and visitors out of the valley over the long term.

Previous Research

As Baitzel and Rivera Infante (2019) note, the Sama Valley forms an important yet under-investigated area between the research hotspots of Arica and Moquegua, which have both seen decades of intensive archaeological and historical investigation. Beginning with the pioneering work of Uhle (1922), Bird (1943), and Dauelsberg (1972), Arica has become the major hub for regional archaeological research (e.g., Arriaza 1995; Muñoz and Briones 1996; Santoro and Núñez 1987; Valenzuela et al. 2019). Archaeological investigation in Moquegua has been similarly vibrant,



Figure 1. Map of the Sama Valley in its regional context.

Mapa del Valle de Sama en su contexto regional.

with the enduring influence of the Programa Contisuyú shaping research on the valley's late prehispanic (e.g., Baitzel 2018; Goldstein 1989; Nash and Williams 2004; Owen 2005; Rice et al. 1989; Sharratt 2016) and colonial periods (e.g., Chacaltana 2015; deFrance 1993; Rice 2014; Van Buren 1993).

Although archaeological research in the Tacna valleys has seen some growth in recent decades (Corcoran-Tadd 2017; Gordillo 2000; Gordillo and Bolaños 2013; Sitek 2021; Umire 2012), the region remains poorly understood from an archaeological perspective and the Sama Valley is no exception. The highland drainage basins of the Sama (above 1660 masl) have seen some preliminary work on the Late Intermediate Period (LIP) and Inca occupations (Housse 2021), while only a basic inventory of archaeological sites (Programa Qhapaq Ñan 2005) has been conducted in the upper valley (570-1660 masl). (The) projects in the 1970s led by Trimborn (1975, 1981) form key antecedents for understanding the archaeology of the middle and lower valley.

The details of other early investigations, including the work of Vescelius (see discussion in Barnes and Aricanli 2016; Covey 2000), Flores (1969), and the expeditions from the Universidad Católica de Santa María in Arequipa (Cavagnaro 1986), still remains unpublished. However, more recent investigations by Vela (2004), the Programa Qhapaq Ñan (2005), Lavallée et al. (2011), and Baitzel and Rivera Infante (2019) have again highlighted the rich archaeological potential of the valley and adjacent areas.

The Valley its Historical Context

This relatively limited body of research has outlined an extensive occupational sequence stretching from the Archaic to the Inca Empire (see Baitzel and Rivera Infante 2019; Bolaños 2007 for discussion of the Archaic and Formative periods). With respect to the later preconquest periods, the Middle Horizon-LIP transition (AD 1000-1200) marks an important threshold for the valley with appearance of new

settlement patterns, mortuary traditions, and ceramic styles in the middle and lower valley. A series of new settlements associated with the little-understood Cabuza ceramic style appear during this period in the middle valley including the fortified sites of Los Batanes and Alto Poquera (Baitzel and Rivera Infante 2019; Folk 2020). The recovery of camelid and *Chenopodium* sp. (quinoa) remains at Los Batanes (Folk 2020) are suggestive of these communities' persistent highland links and the increasing importance of the animal-based mobilities underpinning these connections. While much remains to be understood about this period of occupation, it may represent the first example of a pattern of highland 'colonies' that would be intermittently repeated over the next several centuries.¹

Later LIP sites (associated with the so-called Arica tradition of San Miguel and Gentilar ceramic styles found across the Tacna and Arica drainages [AD 1200-1450]) have been recorded throughout the middle and lower Sama valley (Baitzel and Rivera Infante 2019; Trimborn 1975). There are also additional indications of recurrent links to the northern altiplano (as suggested by the Black-on-Red ceramics) recorded particularly toward the northern end of the middle Sama valley. The subsequent incorporation of the valley into the Inca Empire (AD 1450-1535) is most evident at two sites: at the administrative center at Sama la Antigua (Baitzel and Rivera Infante 2019; Trimborn 1981), located where the *qhapaq ñan* (Inca imperial road) crosses the middle valley, and at the funerary site of S-70 (Cerro Los Hornos; Vela 2004), located in the lower valley near the coast. Some ethnohistoric and archaeological evidence – including references to the 'axial del Inca' (Inca chili pepper fields) near Yalata in the lower valley (Cavagnaro 1988; Trimborn 1981:112) – is also suggestive of additional Inca-affiliated sites in other, still unsurveyed areas of the valley.

The Sama Valley first enters the colonial archive in the tumultuous years of the 1530s and 1540s, with communities in the valley initially assigned to the *encomiendas* (labor grants) of Lucas Martínez Vegazo and Pedro Pizarro (Cavagnaro 1988; Hidalgo 2004; Trelles 1982; although see Umire 2020). While the local impacts of these *encomiendas* and of the subsequent efforts of the Lupaqa elite from Chucuito to regain control over the valley remain unclear, the legal documentation from this early period highlights the complexity of the valley's multiethnic landscape with groups identified as *yungas* of local

origin, as *mitimae* 'colonists' with links to highland communities including Chucuito and Pomata, and as coastal *camanchaca* or *chango* communities (Hidalgo 2004). Trimborn's (1981) identification of a possible pre-1600 church in his excavations at Sama la Antigua remains suggestive of the earliest projects of evangelization, with the identification and dating of this structure still needing to be revisited.

The changes in the valley associated with the resettlement of indigenous communities into new planned towns (*reducciones*) in the late 16th century also remain poorly understood, although the *reducción* of San Pablo de Lagias may have been located at the mouth of the Sama River at La Quiaca.² Subsequent transformations to Sama society and economy are more visible in the archive by the early 17th century, including the arrival of a diaspora of Spanish families from Arequipa and Arica following the eruption of Huaynaputina in 1600 and the tsunami of 1604 (Cavagnaro 1994:80-85; Davies 1984:135). The arrival of these and other claimants can be tracked in the *composiciones de tierras* (land title confirmations) in the 17th century that allowed for the formalization of numerous land claims amid growing control by Spanish hacienda owners over much of the middle and lower valleys (Cavagnaro 1994:230). From the early 17th century onwards, much agriculture in these sections of the valley was reliant on enslaved African and Afro-Peruvian labor (Cavagnaro 1994), with intensified production of sugar, cotton, and cattle at haciendas including Angola and Llamolle. With relatively few permanently settled Spanish landowners in the valley, the *lomas* and pampas surrounding the valley also formed spaces for enslaved resilience and resistance, with reports in the mid-18th century of cattle theft, marronage, and flight (Briones 2019).

Sama continued to be a major center for the cultivation of *ají* during this period, with production between the 16th and late 18th centuries primarily oriented towards the highland markets of Potosí, Oruro, and La Paz (Assadourian 1982; Glave 1989; Vázquez de Espinosa 1948 [1629]:478). The mule caravans that helped underpin this market – as well as the substantial inter-regional markets for wine and brandy – were themselves also partly dependent on the Sama Valley's production of alfalfa to supplement the limited agricultural catchments of neighboring coastal valleys (e.g., Rosenblitt 2013:94).

At the regional scale, the valley also remained heavily connected to much more substantial population centers in Tacna and Tarata. Both Spanish and

indigenous landholders often lived in Tacna, while retaining properties across the inter-valley pampas in Sama and Locumba (Cavagnaro 1994). Highland communities in Tarata and Putina also retained stakes in the valley, maintaining agricultural lands in the middle valley as well as the rights to travel unimpeded to the coast to extract guano, a fertilizer vital for the productivity of maize and *aji* in the drainage (Cúneo-Vidal 1977b:398-399).³ These networks of mobility, in turn, shaped the wider landscape of vernacular Catholicism. The regional cult of a miraculous image of Christ (the Señor de Locumba) that emerged in the neighboring valley by the end of the 18th century was strongly connected to Sama, beginning with the image's origin story (on the back of a mule walking unaccompanied towards Sama) and subsequently by the pilgrimage routes that traversed the valley to integrate the wider region of Tacna and Arica (Guadalupe and Tapia 2018).

While Tacna continued to grow during the late colonial and early republican period, Sama remained sparsely populated and continued to serve as an agricultural production zone for the city and an increasingly regionalized commercial network (Álvarez y Ximénez 2018 [1793]:421; Rosenblitt 2014).⁴ A major inflection point in the valley's history came with the Chilean occupation of 1880, with the divided valley becoming the new international border between Peru and Chile as formalized in the 1883 Treaty of Ancon at the conclusion of the War of the Pacific. Although its impacts on the valley's economy have been disputed (Choque 2001; González Miranda and Ovando 2017), the period of Chilean occupation had multiple legacies for Sama. Among these was an increase in the valley's long-standing role as a smuggling route (Dirección General de Aduanas 1887:47-50; Ministerio de Hacienda 1893:159-164), the consolidation of a major sugar-producing hacienda in the middle valley at Tomasiri with its Bolivian and Japanese workforces, and the arrival of a new Afro-descendent diaspora fleeing from the policies of 'chilenización' of the Azapa Valley (Alarcón et al. 2017; Díaz Araya et al. 2019).

The reincorporation of Sama into the Peruvian state in 1929 coincided with wider changes to the valley's demography and connectivity. The upper and lower valleys lost substantial numbers of their inhabitants during the early 20th century, with a growing concentration of inhabitants focused on the middle valley and near the newly formalized highway between Moquegua and Tacna (Dirección de

Estadística 1878; Ministerio de Hacienda y Comercio 1944). The period between 1920 and 1940 also saw a major change across the wider Andean region with the transition from animal to motorized mobilities (Booth 2009; Meza 1999). President Leguía's ambitious national program of road building connected Sama to motorized traffic and the rest of Peru, while the regional role of muleteers fell dramatically over this period (Dirección General de Estadística 1925; Ministerio de Hacienda y Comercio 1944): the long era of animal-based mobility on the coast had finally come to an end.

Research Questions

Looking at this history of settlement and mobility in the Sama Valley from an archaeological perspective that deliberately crosses the traditional periodization dividing the prehispanic from the historic (cf. Núñez et al. 2010; VanValkenburgh 2019), two key research questions were immediately apparent: (a) how did the middle and lower Sama Valley articulate 'horizontally' with the wider region over the long-term? and (b) what do the valley's pampa landscapes reveal about the shifting socio-economic role of Sama in post-conquest periods?

Many of the classic ethnohistoric insights into regional patterns of connectivity in the south-central Andes – such as altiplano-centered systems of ecological complementarity (Murra 1975, 1985) and the resultant patterns of discontinuous territoriality (Platt 2009; Ramírez 1985) and multiethnicity (Hidalgo and Focacci 1986) at lower elevations – emphasized 'vertical' relationships between the highlands and the valleys. Yet several researchers working in the coastal valleys soon found evidence for a more complex human geography (e.g., Bawden 1989; Zaro et al. 2010), with important 'horizontal' connections between the valley oases of the coastal plain. These connections were also visible in the early colonial archive, with members of the indigenous elite such as Diego Caqui (a Tacna *cacique* based in the Caplina Valley) and Pari (a *segunda persona* based in Moquegua) holding lands in the Sama Valley during the late 16th century (Cañedo-Argüelles 1993; Pease 1982).

While such coastal patterns of horizontal connections (following Rostworowski 1977) have sometimes been simplistically opposed to models of verticality, the key to understanding coastal valleys such as Sama lies in recognizing how these two spatial logics articulated together over time (Bawden 1989;

Stanish 1992). Gaining a better grasp on the long-term patterns of horizontal connectivity and movement through the intervalley pampas is therefore vital to understanding historical change within the Sama Valley and in its articulations with wider regions and networks.

The second research question concerns the archaeological record of the Sama Valley following the Spanish invasion in the 1530s. While archaeological research in the Sama Valley has so far focused on the preconquest period, there is considerable potential for archaeological insights into the transformations and continuities of Sama as a rural, multiethnic, and often contested landscape during the colonial and post-independence periods. At the broader regional scale of the south-central Andes, archaeological studies of postconquest occupations in coastal valleys – from the *doctrinas* and *reducciones* of the 16th century (Rice 2014; Urbina 2017) to the bodegas and haciendas of the 18th and 19th centuries (Becerra et al. 2014; Gordillo 2000; Rice 2011; Romero Guevara 2018) – have offered important insights into productive and built landscapes.

Yet these urban and agricultural spaces were, in turn, articulated through terrestrial and marine landscapes of mobility which have seen substantially less research to date (e.g., Rice 2011:211; although see Boza 2021; Corcoran-Tadd 2019b). Following the archival evidence outlined above concerning the economic connections between Sama, the neighboring valleys, and highland markets during the colonial and post-independence periods (Assadourian 1982; Rice 2011; Rosenblitt 2013), the inter-valley pampa landscapes and their routes have the potential to assist in understanding post-conquest transformations in the valley itself.

As recent investigations in neighboring far northern Chile have highlighted (Araneda 2017; Choque 2017; Méndez-Quirós and García 2018; Muñoz 2020), one of the defining landscape features of historical mobility in both the region's altiplano and coastal zones is the so-called *camino tropero* or *huella tropera*. *Caminos troperos* (drovers' roads) are informal trails formed by the passage of animals (camelids, equids, and/or cattle) and often remain highly visible across the landscapes of southern Peru and northern Chile. In some areas, they also continue to be significant features in the taskscapes and social memory of contemporary rural communities (see García and Romero 2015; García and Ajata 2016 for oral historical accounts on the persistence and

abandonment of *caminos troperos*). Such trails often followed much older routes including segments of the Inca *qhapaq ñan* and colonial road networks (e.g., Choque 2017), although such continuities should not be assumed *a priori* and need to be demonstrated on a case-by-case basis (e.g., Corcoran-Tadd et al. 2021).⁵

Beyond this important regional scale, the Sama case study also fits into new directions in research on the archaeology of routes and mobility (Núñez and Nielsen 2011; Snead et al. 2009). Given the region's arid environmental conditions and the Sama Valley's lack of urban expansion (contrast to the Caplina and Azapa valleys), the relatively high visibility of the valley's networks of informal *caminos troperos* enables a clear view of a landscape of historical movement that is far less visible in many other environments in the Andes and beyond.

Remote Sensing and Archaeological Survey

The 2019 survey combined remote sensing and a targeted pedestrian survey to map the inter-valley pampa landscapes to the east and west of the middle and lower Sama Valley. Inspection of satellite imagery on Google Earth and Bing Maps revealed a dense network of *caminos troperos*, similar to those identified using similar methods in highland and coastal Arica (e.g., Corcoran-Tadd 2019a, 2019c; Méndez-Quirós and García 2018). Characterized by low levels of precipitation (and by extension, low erosion rates and vegetational growth), the pampa landscapes between the Locumba and Caplina valleys show a range of different trackway forms as visible in the satellite imagery (Figure 2). Two of the signatures of these trackways include: (a) the removal of a lighter pampa surface to reveal the darker subsurface, and (b) the presence of 'hollow ways' and rilled surfaces (*tipo rastrillo* in Muñoz and Briones 1996) formed by the displacement of surface sediment by human and animal movement.

The inter-valley pampa landscapes have seen a boom in anthropogenic transformations over the past two decades, with agricultural and avicultural expansion, quarrying, and dumping beginning to erase significant segments of the historical trackways. In this context, the availability of high-resolution satellite imagery dating back to the early 2000s has proven an invaluable record of now-disappeared landscape features. Here it is worth noting the comparison with the pioneering research on hollow ways in northern Mesopotamia (Lawrence et al. 2020; Ur 2003;

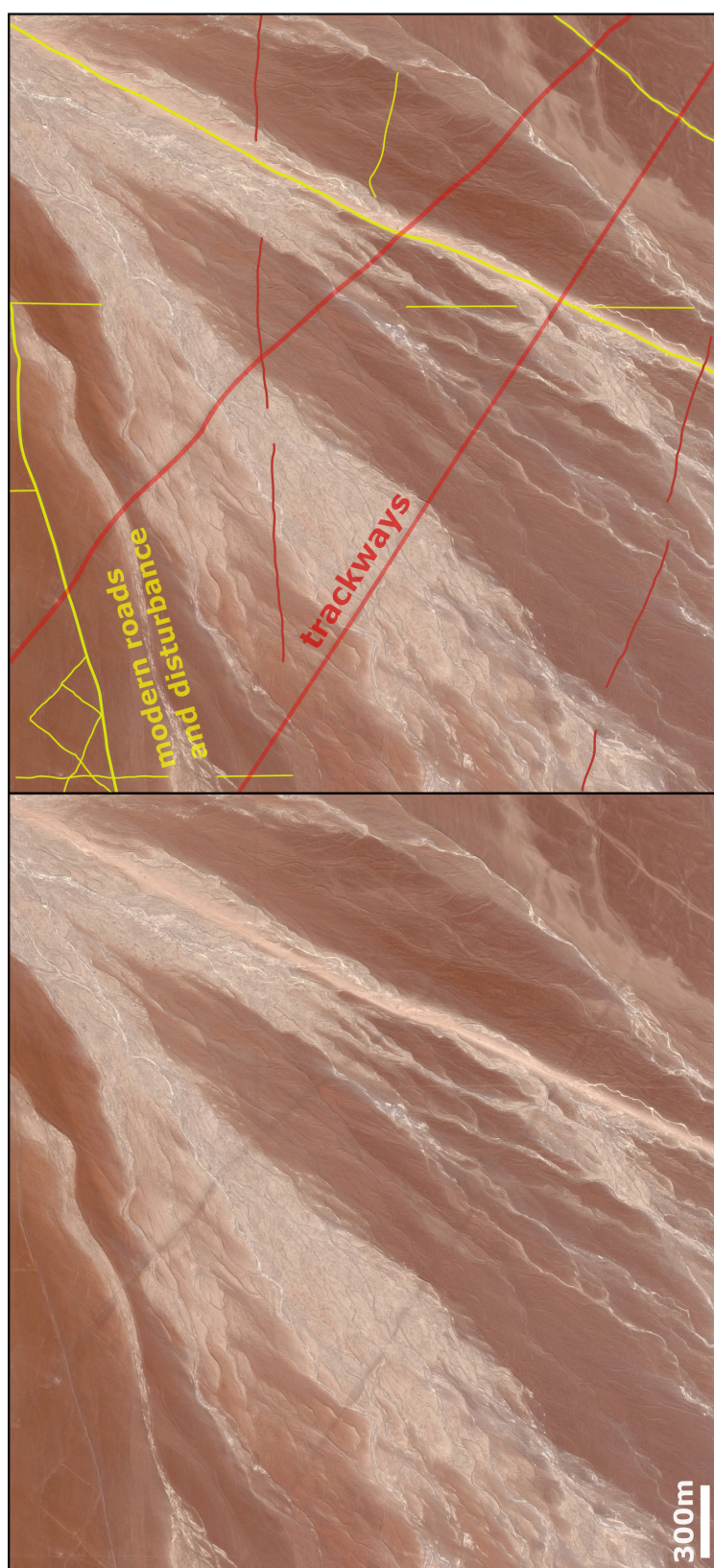


Figure 2. Example of the historical trackways (caminos troperos) as visible in Google Earth satellite imagery.
Ejemplo de los caminos troperos visibles en las imágenes de satélite de Google Earth.

Wilkinson 1993), an analogy that underlines both the enduring value of historical remote sensing data but also the importance of careful contextual interpretation and ground-truthing to understand the chronology and formation processes of these landscapes.

The working assumptions in the Sama Valley case are that while (a) most of the inter-valley trackways date back to the 19th and 20th centuries, (b) some of these represent re-used routes that substantially predate the post-independence period. As such, they form important traces of the longer-term patterns of animal-based mobility whose periods of use may be determined by targeted ground-truthing via pedestrian archaeological survey.

Based on the remote sensing results, 11 survey blocks were defined where the trackways articulated with the valley margin or where the trackways crossed a significant topographic feature (Figure 3). Several of the survey blocks also targeted routes noted by Baitzel and Rivera Infante (2019) and the Programa Qhapaq Ñan (SIGDA 2021) to test previous identifications as potential qhapaq ñan segments. Each block was surveyed systematically (10m spacing between pedestrian transects), enabling 60m of survey coverage on each side of the trackway centerline identified in the satellite imagery. The survey methodology was determinedly ‘off-site’, with all isolated finds, scatters, and features from the Archaic through to the mid-20th century plotted with GPS. Field and lab-based identification of temporally diagnostic artifacts and features aimed at identifying both continuities and transformations in route use over the long term.

Evidence from the Inter-Valley Pampas

The *caminos troperos* visible in the remote sensing imagery constitute a complex palimpsest of trackways that connect the middle and lower Sama Valley with neighboring valleys. The forms of the trackways are diverse (including the two major types noted above), while the dimensions of the trackways are also highly variable with a median width of 20 m.⁶ Although areas of dune formation and recent anthropogenic transformation obscure several sections of the research area, the overall network of trackways is generally clear.

Typically, the network shows a strong bias for east-west movement across the inter-valley pampas; there are also some north-south segments that parallel the edges of the valley although these are more frequently disturbed by modern occupation. One

pattern that can be immediately grasped in Figure 3 is the pull exerted by the Caplina Valley, with numerous convergent tracks leading to the population centers of the middle Caplina Valley (Pachía, Tacna, and Para) contrasting with the divergent connections with locations along the Locumba Valley (including Ite, Sitana, Locumba, and Mirave). A secondary focus for the trackways is the Morro de Sama, which attracted movement from both the Sama and Locumba valleys. With numerous corrals visible in satellite imagery located in the *lomas* pastures between 250 and 620 masl, the trackways point towards the (potentially long-term) role played by the Morro de Sama in pasturing livestock at a regional scale.

Targeted ground-truthing of the trackway segments showed clear evidence of long-term route usage in some cases, while also highlighting moments of significant transformation. 15 archaeological sites associated with the trackways were recorded (Table 1), as well as extensive off-site isolated finds and low-density scatters. While reliant on artefact typologies that need considerable future refinement (particularly with respect to domestic ceramic types), the survey results provide an important baseline for understanding regional mobility over the past millennium.

Recorded as isolated finds and in small scatters, low numbers of Cabuza (n=73) ceramic sherds from the Terminal Middle Horizon/early Late Intermediate Period (AD 1000-1200) were identified on two of the eastern pampa routes that connected the middle Sama valley with the Caplina (Figure 4). Characterized by kero and tazon serving vessel forms and located at topographical transitions at the base of the pre-cordillera foothills, these ceramic finds are suggestive of ritual behavior associated with marginal landscapes and/or inter-valley mobility along the routes that would later become the east-west axis of the Inca-period *qhapaq ñan* road network. It is worth noting that no ceramics from these traditions were recorded in the survey blocks associated with the lower valley, although the finds of narrow, tanged projectile points in both the middle and lower valley remain to be better understood with respect to their chronology.⁷

The later Late Intermediate Period (AD 1300-1450) saw the establishment of a new western foothill route as well as indications of emerging routes connecting major settlements in the lower valley with adjacent pampas (Figure 5). Ceramics from the Arica tradition (primarily jars in the San Miguel and Gentilar styles) were recorded in substantial numbers on the middle valley routes as well as in lower numbers along routes

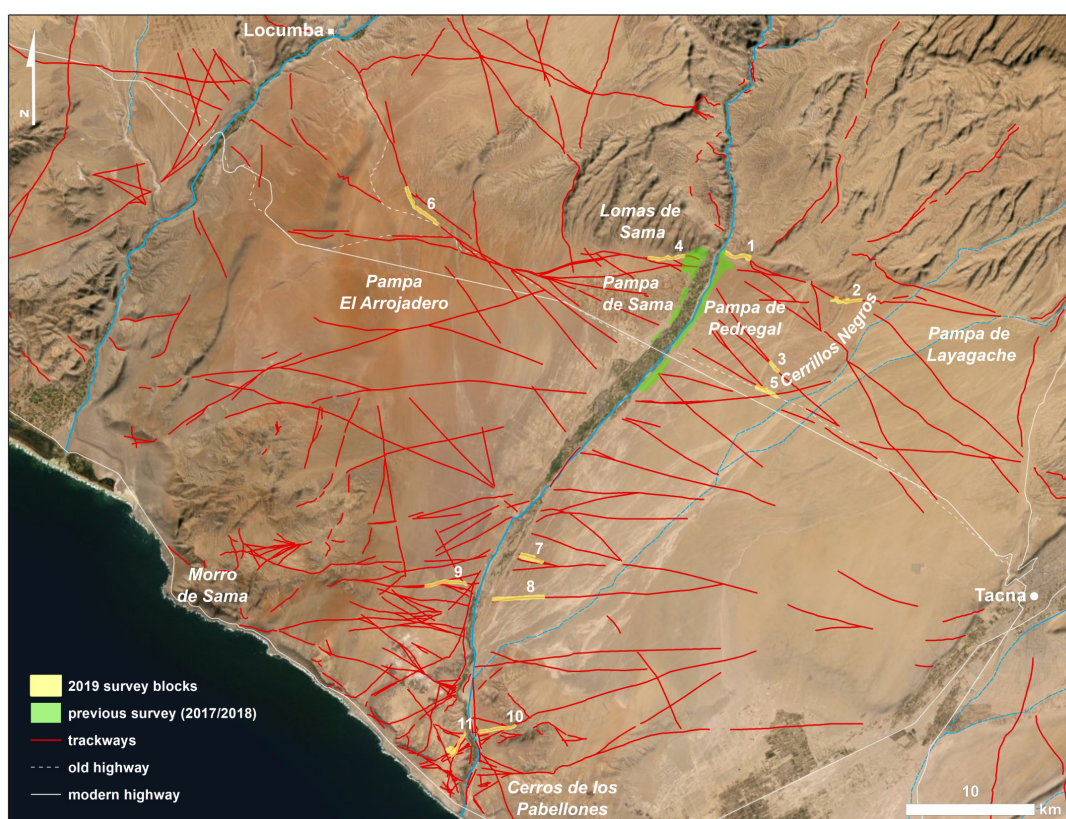


Figure 3. Caminos troperos and survey blocks in the middle and lower Sama Valley.

Caminos troperos y bloques de prospección en el valle medio y bajo de Sama.

likely associated with the key lower valley sites of Amapaya and Gentilar ($n=167$).⁸ Much lower quantities of Black-on-Red ceramics, primarily plates and bowls ($n=17$), were also recorded along the foothill route on both sides of the valley. The presence of both ceramic traditions – the Arica tradition associated with middle valley and coastal communities and the highland Black-on-Red tradition – points to the interplay between both vertical and horizontal axes of mobility during this period.

Evidence from the Inca incorporation of the valley (AD 1450-1535) was concentrated in two locations: on the east-west routes connecting the middle valley and at the major Cerro Los Hornos site in the lower valley ($n=182$). Several of the survey blocks explicitly targeted suspected segments of the Inca *qhapaq ñan* network radiating from Sama la Antigua into the inter-valley pampas. Survey results showed that Inca-period movement was focused on the increasingly established foothill route, although the multiple routes through the Cerrillos Negros suggest of a more reticulated network than sometimes assumed (Figure 6). As in other parts

of the Peruvian south coast (Bernabé 2021), there was no clear infrastructural investment on the Inca routes through Sama, with only a series of *apachetas* (cairns) standing as the built features possibly dating to the Inca period. Beyond offsite scatters, the survey also recorded several potential campsites (S-59, S-65, S-66, S-67, and S-68) characterized by scatters of domestic wares as well as diagnostic plate and *aribalo* forms associated with the Inca state and its allies.

While it should be noted the middle third of the lower valley between Las Yaras and Yalata (including the ethnohistorically important area of Cuilona (Cavagnaro 1994)) remains entirely unexplored by systematic archaeological survey, the Inca presence across the lower valley appears to be selectively intensive. This is exemplified by the large yet isolated site of S-70 (Cerro Los Hornos), located on a strategic route connecting the western edge of the lower valley with the shoreline. The site has a clear, primary occupation with a broad range of Inca-affiliated ceramic styles (including Inca polychrome, Inca bicolor, Inca Pacajes, and Inca Chucuito). Although

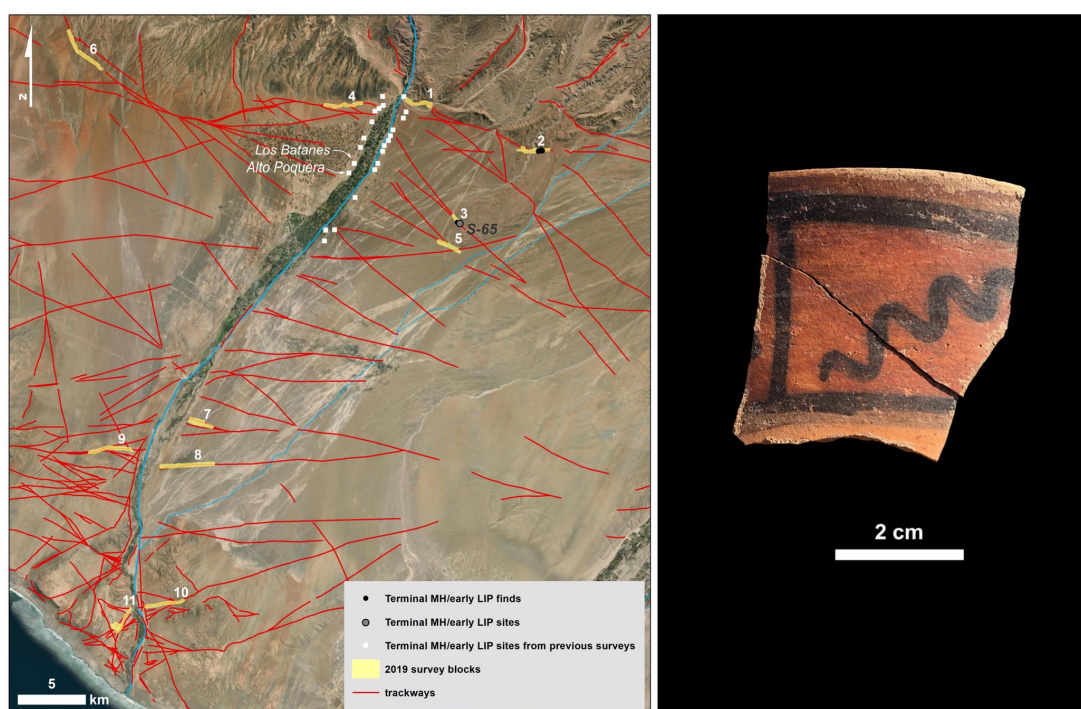


Figure 4. (a) Map of routes with Terminal Middle Horizon/early LIP finds; (b) fragment of a Cabuza-style tazon (photo by author).

(a) Mapa de rutas con hallazgos del Horizonte Medio terminal/Intermedio Tardío inicial; (b) fragmento de un tazón del estilo Cabuza (foto del autor).

the site demands more research, the surface scatter (dominated by fine ceramics, marine food remains, and heavily disturbed human remains) and the lack of built features raise questions about previous interpretations of significant settlement (cf. Vela 2004). Instead, it seems more likely the site served as a key location for communities based further up the valley to temporarily visit while exploiting marine resources and burying their dead during the Inca and early Colonial periods.

The Colonial/early Republican period (ca. AD 1540-1860) saw the persistence of the previously established foothill routes connecting Sama with the neighboring Locumba and Caplina drainages (Figure 7). The main route recorded in the survey connected Sama Grande with Locumba to the west and with Tacna to the east, hugging the boundary between the pampas and the foothills. The presence of this route contrasts with the absence of similar routes through the pampas to the south, where surveyed *caminos troperos* found only later Republican materials.

Characterized by high-density offsite *botija* ('olive jar') scatters, numerous isolated finds of horse and mule shoes, and a chain of major caravan campsites (from S-68 in the east to S-69 in the west), the colonial

route bears a clear comparison with analogous routes recorded in highland Tacna (Corcoran-Tadd 2017), highland Arica (Corcoran-Tadd 2019c), and the central Atacama (García-Albarido 2017). Most of the ceramics recovered ($n=89$) were associated with food preparation and consumption (jars, cooking pots, and glazed plates).⁹ Given the relatively low levels of grape and olive production in the Sama Valley, the *boijta* scatters form a key index of inter-valley trade originating in the major viticultural centers of Moquegua and Locumba and oriented towards the market centers of Tacna, Arica, and the Bolivian highlands.

The late Republican period (ca. AD 1860-1920) seems to have seen an important discontinuity in patterns of mobility, with shifts away from the traditional foothills route and towards multiple inter-valley routes leading to the market centers of Tacna and Arica (Figure 8). One of the trackways with increased evidence for traffic passed to the south of the Cerrillos Negros and crossed the Sama River at the newly constructed Tomasiri bridge (Anonymous 1905), a new route that was likely favored for wheeled transportation and which would come to be the dominant transport corridor over the coming

likely driven by a combination of a declining regional production of wine and *aguardiente* (brandy), the rise of sugar-based alcohols, and the shift towards new container technologies. The tensions between transformation and continuity during this period are

Sitios arqueológicos registrados en la prospección de 2019 (gris oscuro: > 40% de la dispersión registrada; gris medio; <40% de la dispersión registrada; gris claro: fecha posible).

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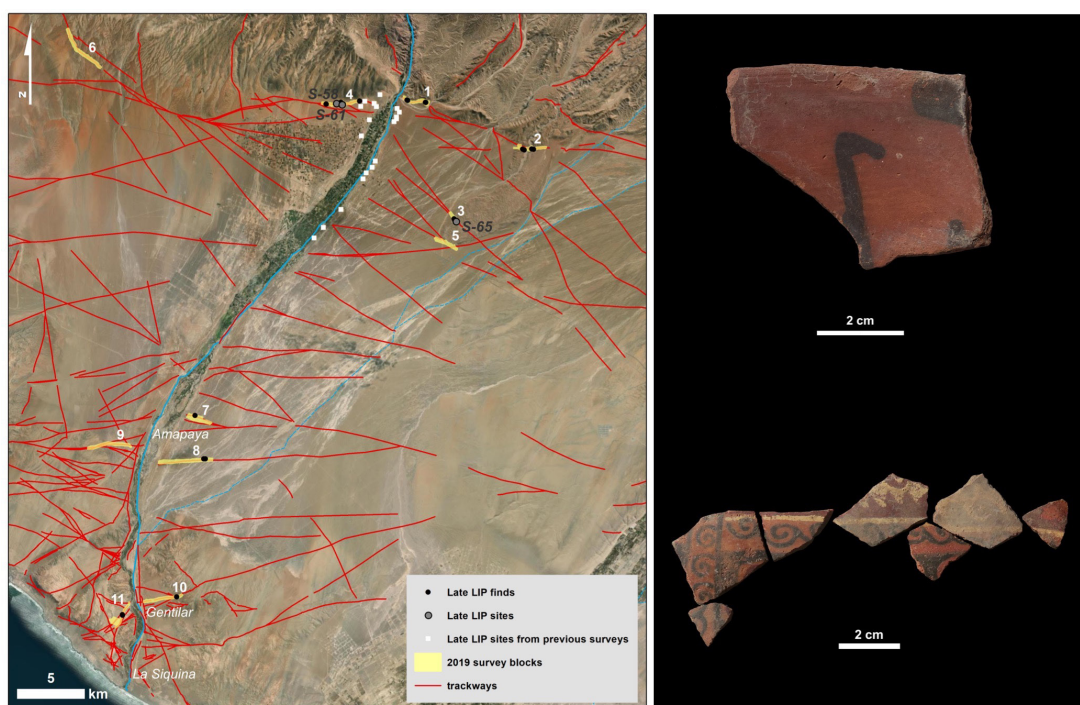


Figure 5. (a) Map of routes with later LIP finds; (b) associated ceramics in the Black-on-Red (upper) and Gentilar (lower) styles (photos by author).

(a) Mapa de rutas con hallazgos del Intermedio Tardío; (b) cerámica de los estilos Negro sobre Rojo (superior) y Gentilar (inferior) (fotos del autor).

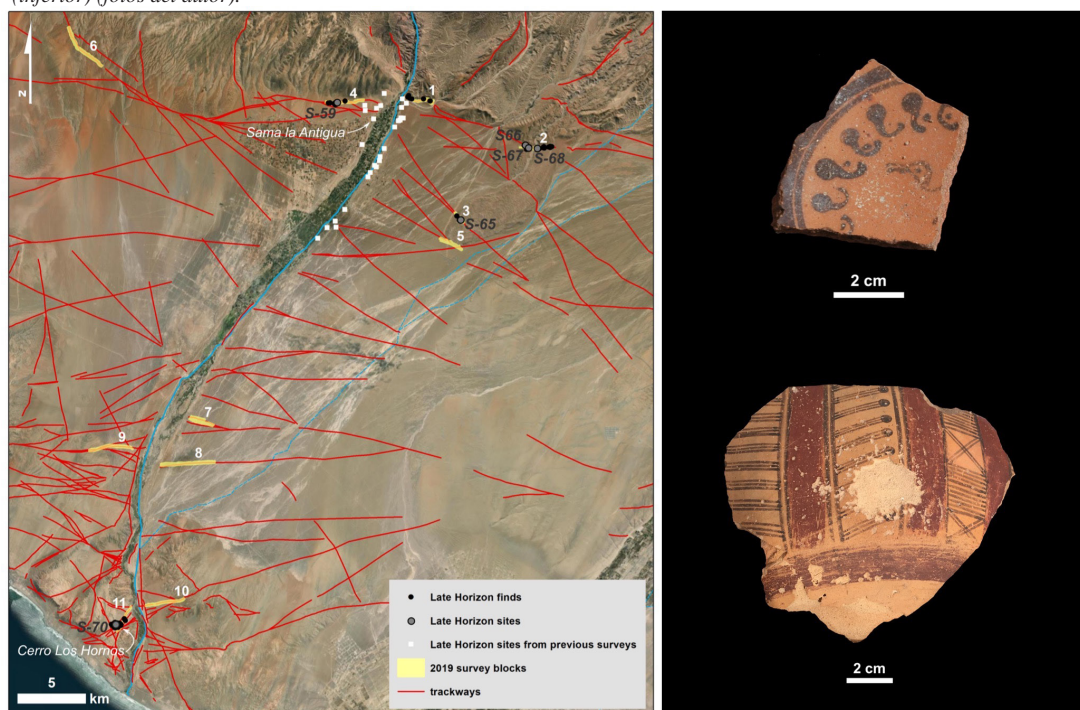


Figure 6. (a) Map of routes with Inca-period finds; (b) associated ceramics (Inca Collao plate and polychrome aribalo) (photos by author).

(a) Mapa de rutas con hallazgos del Horizonte Tardío; (b) cerámica asociada (plato Inca Collao y aribalo policromo) (fotos del autor).

perhaps best exemplified on the old route to Locumba: here, wooden poles and ceramic insulators from the early telegraph line (established in 1879 (Paz Soldán 1886)) are paralleled by a series of rusting wayside crosses marking one of the Señor de Locumba pilgrimage routes, itself following an earlier caravan trail associated with the valley's wine production during the Colonial period.

Conclusions and Further Directions

As Trimborn and colleagues (1975, 1981) first recognized, the unique location of the Sama Valley allows for the reexamination of key questions about mobility, environmental change, and political economy in the south-central Andes. The results presented here specifically highlight the value of looking at the marginal spaces on the edges of the Sama Valley using a targeted, high-intensity survey methodology. Data from this approach offer initial answers to the two central research questions concerning (a) the long-term patterns of horizontal inter-valley connectivity

in the region and (b) the archaeological signature of the Sama Valley's post-Inca occupations.

One of the initial conclusions that can be developed concerning the history of inter-valley movement is the long-term emergence of the foothills route, which is suggestive of a pattern of 'horizontality' that connected Sama with neighboring valleys and that substantially predated the formalized network of the Late Horizon. Ceramic and lithic finds from the Middle Horizon-LIP transition located far into the inter-valley pampas are best interpreted as evidence for trails that connected settlements in the middle valleys of the Sama and neighboring drainages. As such, the middle Sama valley formed part of an extended 'archipelago' of settlement connected by vertical but also horizontal links across a broad, likely multi-ethnic landscape.

Without lapsing into an overly reductive ecological approach, it is tempting to consider the hypothesis of horizontal ecological complementarity as a driver behind these inter-valley links. While levels of salinity often differ substantially across neighboring drainages (Álvarez 2014), there are also

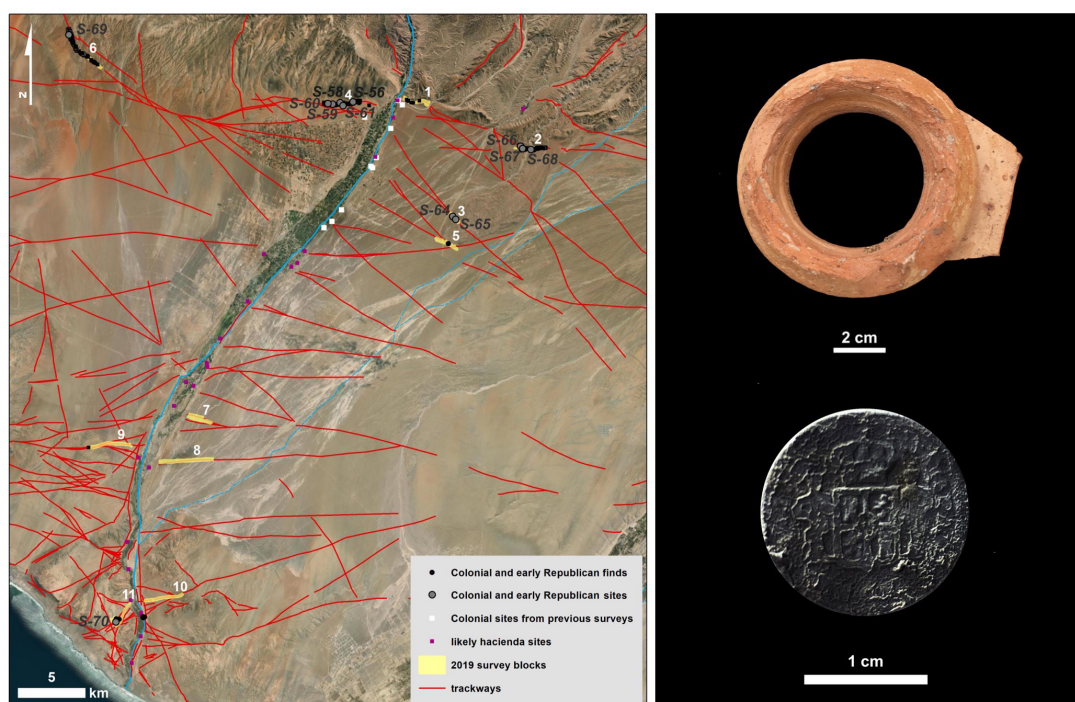


Figure 7. (a) Map of routes with Colonial/early Republican finds; (b) associated botija rim and silver half real coin (Carlos IV, 1791-1808) (photos by author).

(a) Mapa de rutas con hallazgos de los periodos colonial y republicano temprano; (b) borde de botija y moneda de plata de medio real (Carlos IV, 1791-1808) (fotos del autor).

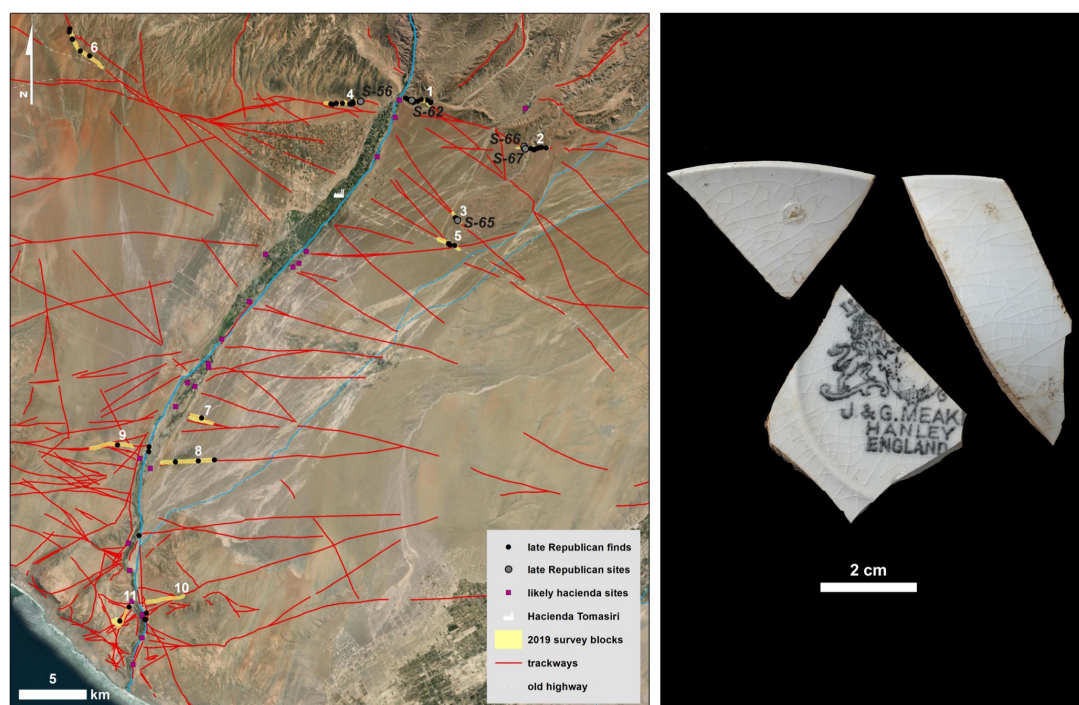


Figure 8. (a) Map of routes with late Republican finds; (b) associated British whiteware sherds with 'J. & G. Meakin, Hanley, England' trade mark (photo by author).

(a) Mapa de rutas con hallazgos del periodo Republicano Tardío; (b) loza blanca inglesa con la marca de fábrica 'J. & G. Meakin, Hanley, England' (foto del autor).

other important inter-valley differences including high variability in river discharge (see e.g., ONERN 1976). In this context, the higher salinity and higher water availability that affected agricultural potential in the middle and lower Sama valley in comparison with the Locumba and Caplina valleys may have formed important push and pull factors shaping the patterns of inter-valley mobility and settlement.

These long-term patterns of connectivity, in turn, appear to have shaped the structure of Inca-period networks with widespread evidence for Inca use of routes established during the LIP or even earlier. In the Sama pampas, this reliance on earlier trails was combined with the minimal level of investment in road infrastructure (e.g., pavements and walls) that characterizes the wider coastal road network south of Arequipa (Bernabé 2021).¹¹ The resulting pattern of low formalization in the local *qhapaq ñan* network – as in the case of the multiple routes that cross the Cerrillos Negros – shows a significant degree of reticulation as older trails were likely incorporated into the new route.

Sama is well-known to historians of the Colonial period both as an agricultural oasis targeted by early

Spanish colonists and as a key node on the inter-regional axis of movement between Arica, Arequipa, and the markets of the altiplano. The archaeological data testifies to the enduring role played by the inter-valley corridor in integrating colonial market networks in the south-central Andes, with the material signature of this pattern of mobility – the east-west chain of caravan campsites and dense off-site *botija* scatters – strikingly clear in the survey results. The results also point towards a more complex vision of mobility over the long term: while preconquest routes clearly shaped emergent colonial transport corridors along the coast and into the highlands, the simple assumption that *caminos reales* and *caminos troperos* always followed the route of the *qhapaq ñan* (cf. Choque 2017) clearly needs to be questioned as suggested by several survey blocks (e.g., blocks 5 and 6).

The historical moments of greatest change in inter-valley mobility appear during the late Republican period, with the relative impacts of multiple transformative processes (the valley's division after the War of the Pacific, the arrival of new communities, the sugar boom, and an increasingly formalized road network) still to be fully determined. Nevertheless,

the survey data show that, by the end of the 1880s, the pampas of Sama formed a borderland landscape characterized by a decentralized pattern combining formal and informal mobilities.

During each these periods, the Sama valley was both an inhabited place with a complex, multi-ethnic landscape of settlement and an inter-nodal corridor that connected larger networks over wider spatial scales. An attention to the inter-valley pampas and the routes that traversed them helps to highlight the important multiscalar tension between nodal places and inter-nodal spaces that is otherwise lost if analytical focus is placed primarily on the site or the macro-regional scales. By tracing the evidence for both connectivity to and connectivity through the valley, it becomes possible to better understand the Sama Valley's role in wider processes of incorporation and marginalization from late prehistoric periods to the present.

Thanks to their particular historical trajectory, the inter-valley pampas bordering the Sama Valley have retained archaeological signatures of settlement and mobility that have otherwise been substantially erased by urbanization and agricultural expansion in neighboring valleys. Yet, as the desert pampas of Sama continue their historically unprecedented transformation into spaces for intensified agriculture, the ephemeral traces of the region's history of mobility are increasingly under threat. Future research on these vulnerable archaeological landscapes will need to focus on the multiple forms of horizontal

mobility that connected the Sama Valley over the long-term as well as on the roles played by sites in the uninvestigated upper valley that likely formed links in the vertical axis of movement connecting the middle valley with Tarata and the Titicaca Basin. More broadly, further attention to high-resolution cases like the Sama Valley pampas will continue to be vital as Andean archaeology looks to build new understandings of historical processes that transcend the traditional focus on 'the community' and 'the (hydrological) region'.

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Notes

- ¹ The relationships between Cabuza-using communities both with the altiplano and with the wider emergence of other coastal styles (e.g., Ilo-Tumilaca, Magollo) in the wake of the Tiwanaku disintegration (Baitzel and Rivera 2021; Korpisaari et al. 2014; Owen 2005) remain a key research focus for the Proyecto de Investigación Arqueológica del Valle de Sama.
- ² La Quiaca remains an important yet ambiguous toponym in the history of the Sama Valley. Maritime maps and rutters often refer to a *punta* (point) or a *caleta* (beach) with this name, located immediately to the north or (more usually) to the south of the mouth of the Sama: García y García (1863:40) names a long sandy spit as ‘punta de Quiaca’, while De la Puente (1977:74) notes the persistent confusion of a location variously referred to as Laquiaca, Gentila, and Gentilar. The name also appears in numerous 16th- and 17th-century references to a ‘port’ and to agricultural lands in the lower Sama Valley (Cavagnaro 1994:231; Cúneo-Vidal 1977b:334), as well as in the name of a *hacienda* destroyed by flooding in 1791 (García 1907:349). The late 16th-century *reducción* of San Pablo de Lagias may be yet another, earlier version of the toponym (Cúneo-Vidal 1977a:103-04), suggestive of a possible resettlement of the indigenous population living on the coast between the Morro de Sama and the mouth of the Caplina (cf. discussion of these fishing communities in Hidalgo 2004).
- ³ Highland communities from Tarata and Candarave continued to access the Morro de Sama coastal guano deposits and fishing grounds into the late 20th century (Anonymous 1902; Cuadros 2012:35).
- ⁴ By analogy with the hydrological histories of the Osmore and Quebrada Tacahuay drainages immediately to the north (Moseley et al. 2017; Zaro et al. 2010), a secular drying trend may have helped drive the depopulation of the lower Sama valley from the 18th century onwards.
- ⁵ The drovers’ roads and *cañadas* associated with the movement of cattle and sheep in medieval and early modern Britain and Iberia (Aitken 1945; Hindle 1998; López-Sáez et al. 2018) provide relevant comparative cases, particularly given the debates over the antiquity and historical transformations of these routes.
- ⁶ Based on measurements from a subset of the trackways identified in satellite imagery, trackway widths can vary from 1.7 to 81m depending on local topographic and other variables.
- ⁷ Following Goldstein (1989) and Klink and Aldenderfer (2005), these ‘Tiwanaku’ projectile points have often been understood to be important chronological indicators of the Middle Horizon. However, it seems that similar forms persisted at least into the early LIP (see e.g. discussion in Owen 1993:109 concerning the lithic traditions of Tumilaca, Chiribaya, and Cabuza communities in the Osmore drainage).

- ⁸ As always, it is worth recalling the important yet still often ignored caveats concerning the overlap between LIP and Late Horizon ceramic sequences when considering survey data dating to these periods.
- ⁹ Given their ubiquity in some of the survey blocks, most *botija* fragments were recorded but not collected; hence the number of diagnostic ceramics presented here should not be read as the total count of recorded colonial finds in the survey.
- ¹⁰ This new bridge appears to have replaced earlier bridges at Sama Grande and Las Yaras that dated back at least to the late 18th century (Álvarez y Ximénez 2018 [1793]:455).
- ¹¹ A coastal section of stone-paved road below the Morro de Sama, originally identified as Inca by the Programa Qhapaq Ñan (2005), is likely to be historical in date (M. Cabrera Arana, pers. comm. 2021).

