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Climate and settlement in Southern Peru: the Northern Río Grande de Nasca drainage between 1500 BCE and 1532 CE

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7 Discussion: Settlement, Migration, and Climate Change

The results presented in Chapter 6 paint a picture of highly dynamic cultural development and frequently changing settlement behavior in the northern Río Grande de Nasca drainage (NGD) between 1500 BCE–1532 CE. Likewise, records from various geoarchives from the study area itself combined with others from remote regions reveal strong evidence for notable fluctuations in climate regimes (Chapter 2.2.3). Causal relations between major shifts in climate and breaks in cultural development have been proposed in many studies on ancient Central Andean societies, but these theses can rarely be proven true unequivocally. The intense multidisciplinary research in the study area over the past 15 years offers the possibility to address the problem for the particular case of the NGD by systematically evaluating a vast amount of data. Were some major changes in settlement behavior in the NGD caused by climate change? If yes, which ones?

In the following, settlement patterns will be discussed in a wider geographic context with a special focus on cultural change, population development, and migration.[123] While doing so, the foothills and the *cabezadas* will be considered individually, due to the cultural differences between both areas observable in several phases. By contrasting the results with the reconstructed climate history, conclusions can be drawn about if and when a causal link existed between climate change and settlement behavior.

For the following discussion of long-term processes and phenomena some phases and subphases defined in Chapter 5.2.2 during which a more or less smooth development can be postulated were joined. The resulting six chronological blocks will each be treated in a separate sub-chapter. These are preceded by another two sections discussing two aspects of importance for the entire cultural sequence: the apparent antagonism between foothills and *cabezadas* dwellers and the impact of migration on population development.

[123] The location of sites and places mentioned in the text is shown on Map 5, Map 6, and Map 7.

7.1 Foothills and *Cabezadas* Dwellers

Throughout the 3000 years of settlement history regarded in this study, there has always been a distinction between the foothills settlements and those located at the *cabezadas*. In order to explain this important point more clearly, starting with the last phase before the Spanish Conquest is best. Since some early colonial documents contain direct or indirect information on the social and political situation during the Late Intermediate Period and the Late Horizon, it is not necessary to rely on archaeological data alone. Such ethnohistoric sources testify that the study area was indeed inhabited by two culturally distinct and politically independent groups.

The Nanasca population at the foothills must have been substantial, though little else is known. These people were culturally closely related to the contemporaneous inhabitants of the Ica valley, although there is no evidence for a political subordination to the Ica polity ruled from Tacaraca. Large quantities of fineware sherds of Ica-style pottery and its local derivatives can be found scattered across the ruins. The Nanasca buried their dead in subterranean pits, built irregularly agglutinating dwellings of angular shape, fortified their more important towns with walls and ditches, and prepared for surprise attacks by piling up sling stones at elevated positions. Settlement patterns suggest a loose confederation of major centers and their surrounding lower-ranking villages (cf. Chapters 3.2.4.4 and 6.7).

Colonial-era documents also record that the *cabezadas* were settled by the Rucanas Laramati who were ethnically and culturally related to the Rucanas Andamarca living across the *puna* in the area around the present-day city of Andamarca (cf. Abraham 2010, Mölders 2010, Schreiber 1993). These people lived in much the same way as their Andamarca relatives. They built round houses, (re)buried some of their dead in *chullpas*, and practiced terrace-farming and camelid herding. They, too, may have formed a loose confederacy without a central capital. In case of the Rucanas it is known for sure that

they were ethnically, culturally, and politically distinct from the foothill people although they also used some Ica-style pottery, at least in addition to local plain wares and perhaps some so-far unrecognized pieces from Andamarca.

When the *corregidor* Luis de Monzón compiled information on the *reducciones* of the Lucanas province in 1586, he was told that in between the Rucanas Laramati settlements there was also one attributed to Rucanas Andamarca. This exception is the village of Uraguaci near present-day Tambo Quemado in the *cabezadas* of the SGD:

> […] [T]here is a small village of indios from the mentioned district of Apcara which is called *Pueblo Quemado*.
> […]
> In the days of yore, *San Cristóval Pueblo Quemado* was called *Uraguaci* which means houses located downhill, and during the unrests that occurred in these lands [the civil war among the *conquistadores*], the Spanish burned this village, and until today it is called *Pueblo Quemado* [the Burned Village] (Monzón 1965a [1881]:240–241 [Chapters 12 and 13], italics original).[124]

Interestingly, Apcara, the place of origin of the people dwelling in Uraguaci, was the capital of the Andamarca region. Accordingly Uraguaci was inhabited by settlers from across the *puna*. Schreiber visited the site in 1986 and found that "[a]bout 10 percent of the surface sherds are styles identified in the Carhuarazo valley [in the Andamarca region] – styles dating also to the LIP" (Schreiber 1992:127). Accordingly, not only the Rucanas Laramati but even those settlers known for sure to have come from Andamarca predominantly used local ceramics (about 90 %) while pots of Andamarca styles only made up for a small portion (10 %). This observation shows that sherds can definitely not be regarded as a reliable cultural or ethnic marker during the LIP and probably not during earlier periods either. In the study area, diagnostic fineware of all phases is much less frequent at the *cabezadas* than at the foothills, but the sherds that can be found are largely identical in both regions.

Apart from the LIP, there were two further time sections during which the *cabezadas* were densely populated by people whose settlements clearly differed from those at the foothills, although the associated diagnostic ceramic sherds are very similar. The first section spans 150–300 years, beginning in the late Middle Paracas phase and lasting until the start of the Initial Nasca phase. The second was a comparatively short but intense intermezzo of probably less than a hundred years during the Middle Nasca phase. In both cases no written records are available, but the archaeological evidence with respect to architecture is very similar to that for the LIP. Constructions at the *cabezadas* tended to be of round shape while those at the foothills were mostly angular. Possibly, the situations are, to a certain degree, comparable in general and the *cabezadas* settlers of the Middle-Late Paracas and Middle Nasca phases also belonged to a different culture group than their respective foothill neighbors.

Katharina Schreiber (1988) observed round dwelling structures built of stone at 27 sites in the Aja and Tierras Blancas valleys (SGD) at altitudes as low as 700 m.a.s.l. Some of these are associated with surface material from the Early Nasca phase, though most seem to date later. One site, Marcaya, had later been excavated by Kevin Vaughn (2000/2009) who could confidently date it to the transition from Early to Middle Nasca. Apparently, this type of settlement occurred earlier and at lower altitudes in the SGD than it did in the NGD. Unfortunately, the limited published information on the results of Schreiber's surveys does not allow a more profound intra-drainage comparison.

During the LIP, there most likely existed a close economic relation between foothills and *cabezadas* groups. The goods offered by the lowlanders, probably in exchange for camelids, wool, dried meat, tubers and pseudo-cereals, apparently included fancy pots. Although the highlanders also fortified some settlements, chose defensive locations, and maintained some distance to the foothill settlers (Map 28) a permanent conflict

[124] My translation. Orginal reads: "[…] está un pueblo pequeño de indios de este dicho repartimiento de Apcara, que se dice Pueblo Quemado.
[…]
San Cristóbal Pueblo Quemado se solía decir antiguamente Uraguaci, que quiere decir casas que están en lo bajo, y en los alborotos que hubo en esta tierra, quemaron los españoles aquel pueblo y hasta hoy se llama Pueblo Quemado."
The original Quechua name was probably (H)urin Wasi. (H)urin means down or below and wasi means house or home. However, (h)urin does not necessarily refer to a geographic location because (h)urin and (h)anan (up or above) were frequently used to distinguish the two moieties many Andean societies, including the Inca, were composed of. Accordingly, the name of the village may simply indicate that its inhabitants belonged to the (h)urin moiety of the Rucanas Andamarca people and not that their houses were located at a low altitude.

between the two groups is unlikely, given the mutual economic dependence. Raiding parties from the northern valleys were possibly a greater concern for both, as can be deduced from Cieza's remark that the Chinchas "did great harm to the Soras and Lucanas […]" (2005 [1553]:202 [Chapter LXXIV]).[125] Nevertheless, small-scale inner-group conflicts were probably not uncommon, either. Monzón's informants told him about the Rucanas that "before the Incas ruled these lands, they brought war and conflict upon each other about cultivable land and pasture for their livestock […], and that after the Inca subdued them, they fought no more wars against each other […]" (2005 [1553]:232 [Chapter XV]).[126] Signs of conflict are also clearly visible in the archaeological record of the Late Paracas phase and, to a lesser degree, of the Middle Paracas and Initial Nasca phases.

There is nevertheless evidence for close economic relations between foothills and *cabezadas* groups since products originating from one zone were found at sites located in the other (e.g., camelids at Jauranga and coastal ceramics at Cutamalla). Finds proving the exchange of goods were also documented in Middle Nasca contexts. For this phase only few traces of defensive measures were identified. Although further evidence (especially from aDNA analyses) is needed to clarify whether foothills and *cabezadas* groups of the Late Paracas and Middle Nasca phases were of different ethnic origin, the archaeological picture seems to suggest that this was the case.

7.2 Population Development and Migration

The challenging question of population development is directly related to the foothills-*cabezadas* duality. Fig. 119 displays the changes in total settlement area following the approach elucidated in Chapter 5.3.2. Since settlement area is regarded as a proxy for population, the curve shows that population levels oscillated significantly.

Settlement patterns were very different between foothills and *cabezadas* during most phases, however, and population levels also differed. For this reason, diagrams have been produced for each of the two areas, in order to show similar and opposing trends (Fig. 120). While the details will be discussed later on, marked differences between foothills and *cabezadas* become apparent already at first sight. In several phases, even completely inverse processes are observable. For example, between Late Paracas and Initial Nasca, population levels at the foothills rose dramatically while the formerly densely settled *cabezadas* were gradually abandoned. In turn, during the Early-Middle Wari phase, the last foothills settlements were given up while new centers emerged at the *cabezadas*.

At first glance, it might be tempting to assume a simple population shift within the study area. This would mean that the same people moved up or down according to the most favorable living conditions which could sometimes be found at the *cabezadas* and sometimes at the foothills, depending on climate regime and political situation. Alternatively, highlanders may have come from and returned to other highland regions while lowlanders exchanged population with neighboring coastal valleys. Given the general cultural differences between both groups and their specialization in different types of economic activities (irrigation farming vs. rain-fed terrace farming plus camelid herding), such a scenario is surely worth being considered seriously.

At times when population trends were similar in both areas, for example during the Middle Nasca and Middle-Late Ica & Inca phases, super-regional migration movements are obvious. Since in these two cases the massive population growth probably occurred within a few decades, it is not explicable by reproduction alone. Due to this fact, immigration from outside the study area must have taken place at a major scale. Likewise, for times of general population decline, for example during Late Nasca, there is no evidence for mass mortality. Apparently, most people did not die before they reproduced but simply moved away.

Although it is important to consider migration to and from neighboring regions when discussing population trends, this undertaking is unfortunately hampered by the paucity and patchiness of published archaeological data. In many valleys of the South Coast, but especially in wide areas of the Central Highlands, research

[125] Garcilaso de la Vega opposes, saying that the stories of the Chincha who claim to have raided as far as to Lake Titicaca are not true (1941 [1609]:168–170 [6th book, Chapter XIX]).

[126] My translation. Original reads: "[…] antes que los Ingas señoreasen esta tierra, traían guerra y diferencias los unos con los otros sobre las tierras de sementeras y pastos de sus ganados […], y que después que el Inga los sujetó, no tuvieron guerra entre sí […]."

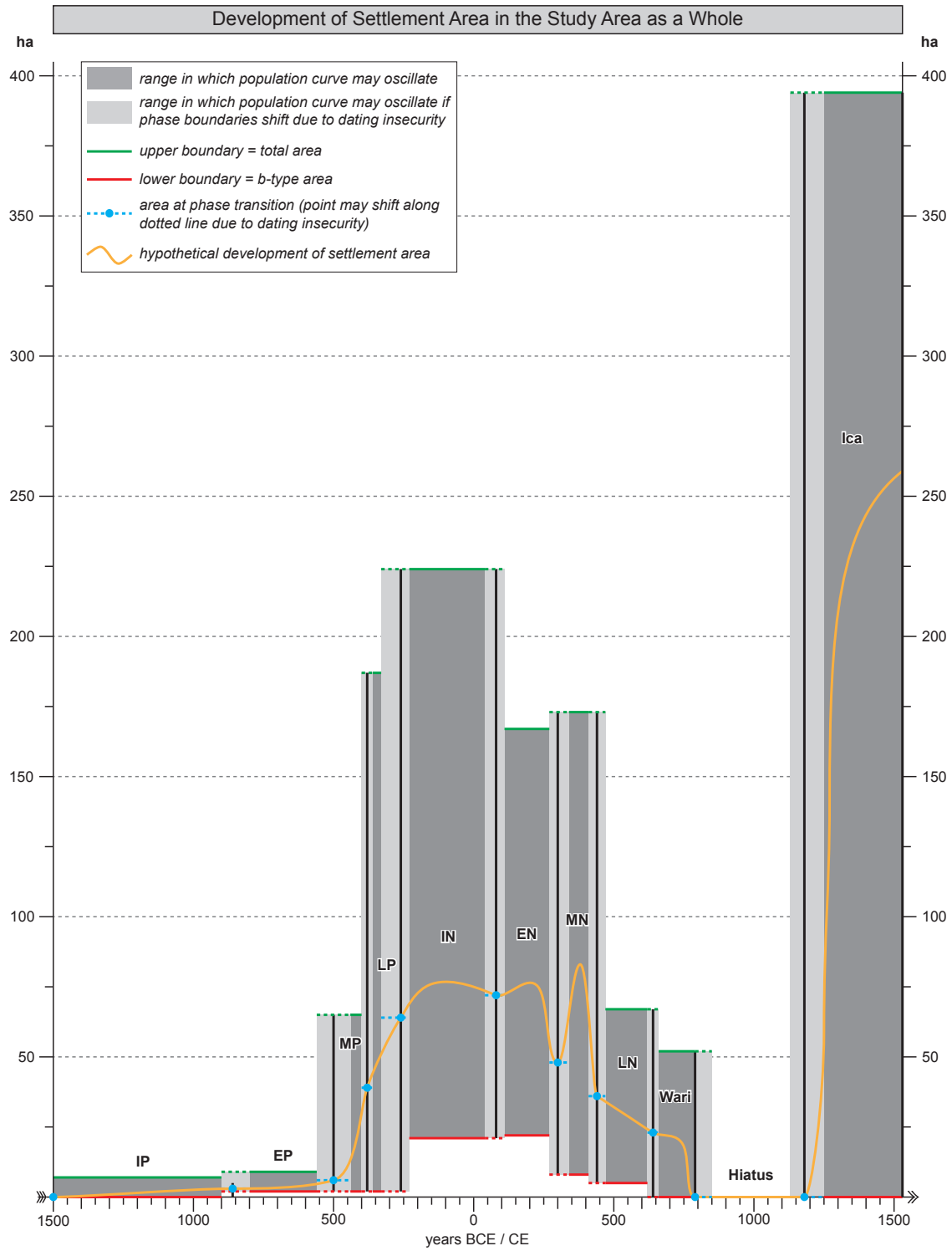

Fig. 119. Hypothetical reconstruction of the development of the simultaneously occupied settlement area between 1500 BCE–1532 CE. It is assumed that the area is roughly proportional to population size. Graphic: VS.

has so far been limited to a few cultures and the periods during which they flourished, or to individual sites of special interest. In other zones, either no archaeological work was carried out at all, or the results of some small-scale projects can only be found in unpublished field reports and theses unavailable to the general public. Many of the statements about population movements made in the following subchapters are hence often vague or hypothetical.

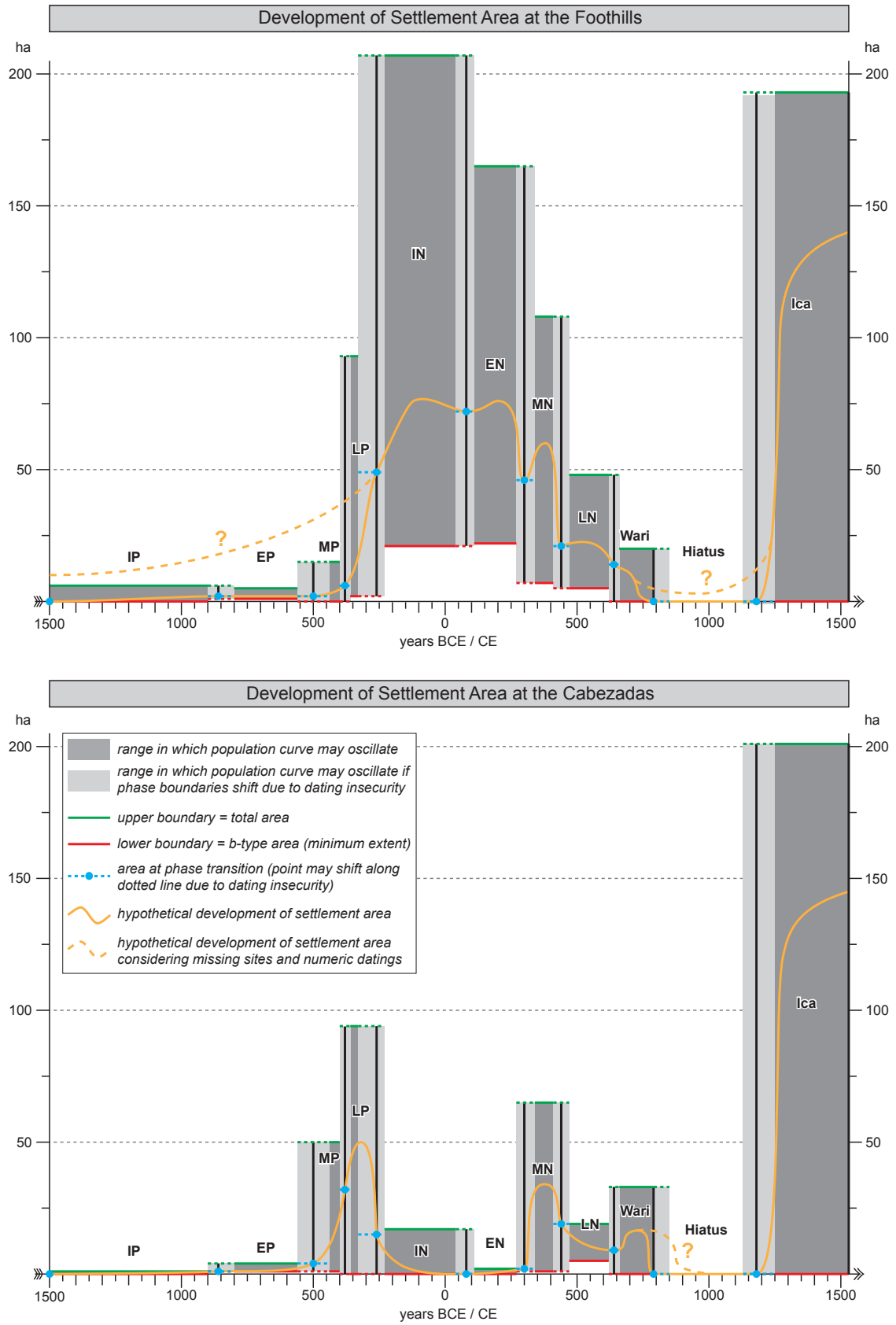

Fig. 120. Comparison of the development of settlement area at the foothills and at the cabezadas. Graphic: VS.

The most detailed information for migration is available for the LIP and the Late Horizon thanks to colonial-era written sources complementing the archaeological data. During the LIP, the study area was resettled very quickly by large numbers of people who must have immigrated from elsewhere. The LIP seems to have been a time of major migration movements throughout the Central Andes. Besides increasing archaeological evidence in some regions, early chroniclers wrote down oral traditions of several people, including the Incas, telling of mythical ancestors who originated from elsewhere.

In case of the Incas, for example, a myth states that the first king parted with his entourage from a cave south of Cusco (cf. Urton 1990). The party then traveled through the lands looking for the most fertile soils. When they came to Cusco, they had reached the perfect place, so they subdued or expelled the locals and established their capital. Though there are many different and sometimes contradicting versions of this tale, Lake Titicaca is often mentioned as the place of origin. Recently, Gordon McEwan (2006:57–68) found archaeological evidence at the site of Chokepukio, south of Cusco, which actually seems to support the presence of people from the northern Titicaca region in the area since approximately 1100 CE. In many other cases as well, origin myths of LIP societies telling of migration may contain a true core and a shadowy distant memory of actual events or longer processes.

It cannot be ruled out that the situation at the beginning of the LIP was unique regarding the factors which may have triggered large-scale population movements, especially with regard to the preceding collapse of the Wari Empire. Nevertheless, displacements of entire peoples are likely to have occurred in the Central Andes throughout prehistory, although the scale and the causes of such movements may have been diverse. In the following, the developments during individual periods will be discussed in detail.

7.3 Beginning Initial Period to the Early Middle Paracas Phase (1500–450 BCE)

The first section comprising the Initial Period, the Early Paracas phase, and the beginning of the Middle Paracas phase is characterized by a relatively smooth development of culture in general and settlement patterns in particular. Even though the archaeological evidence may be especially fragmentary due to preservation issues, population seems to have grown slowly, and there are no indicators of major short-term, inter-phase deviations from this general trend suggesting major migration movements. Two areas seem to have been especially favored for establishing settlements: the middle valleys and the transitions between the upper valleys and the *cabezadas*. Architecturally, however, the villages in both zones are clearly different, comparable to the *cabezadas*-foothills contrast in later phases: angular, agglutinated rooms in the middle valleys and round or semi-circular structures set against terrace walls further upstream. Accordingly, already during the Initial Period, the population of the study area might not have been culturally uniform, although foothills and upper valley groups seem to have used the same kind of pottery.

Hypothetically, the upper valley settlements could have been colonies of highland societies who had their home territories outside the study area, perhaps somewhere east of the water divide. The following points might support this theory:

- The first settlements concentrated in the Collanco area where large sections of the moderate slopes are covered with simple and possibly very old agricultural terraces while the valley floors proper are very narrow. A few kilometers further upstream, the valley floor is much broader and, if cleared, suitable for irrigation farming, but no remains of early villages have been found there. Perhaps the settlers were familiar with rain-fed terraces but not with valley floor irrigation.
- The villages were placed at an altitude at which some *yunga* crops unavailable in the highlands can still be grown. Accordingly, the colonists could have complemented the production of their home communities. Nevertheless, the choice of the location seems to have followed the principle "as low as necessary and as close to the highlands as possible". In turn, settlements might not have been established at the *cabezadas*, because the resources available there were largely identical to those across the *puna* and hence not complementary. Colonies at those altitudes would only have made sense for the provision of an excess population from the suspected home territory, but in these early periods, population pressure is not a likely scenario as population levels were still relatively low in most regions.

There are no signs of conflict anywhere in the study area prior to the Middle Paracas phase. Middle and upper valley settlers seem to have coexisted peacefully. Since both groups profited from exchange relations providing access to goods unavailable in their respective territories, this is not surprising. Furthermore, the low population levels made competition for resources unnecessary because these should still have sufficed for all inhabitants of the study area. The archaeological evidence does not suggest any formal political structure beyond the village level, even though at least the directly contiguous villages in the Collanco area may have formed a single community.

The situation may have been different in the northern South Coast valleys. Though little data is available for the IP, there is evidence that during Early Paracas, a strong cultural influence from the north, associated with the Chavín style, was felt throughout the South Coast. At the temple site of Cerillos in the Ica valley (Wallace 1962) Jeffrey Splitstoser et al. (2009) found a variety of exotic goods, suggesting long-distant trade relations and cultural ties. In the Ica valley the Early Paracas society had possibly already developed an advanced degree of social complexity and differentiation and perhaps even a valley-wide political organization. Similar evidence is not observable in the study area, but the diffusion of the "Chavín" style and the concepts related to it into the Río Grande drainage may well have been mediated by Cerillos and perhaps other, undiscovered temple sites in the northern valleys. The Río Grande drainage would thus have been influenced, but not formally controlled by groups inhabiting the Ica valley.

Climate Impacts

As outlined in Chapter 2.2.3, the climate around Palpa during most of the Initial Period probably oscillated between hyper-arid and arid. Only by 1000 CE, conditions changed to near semi-arid. Aridity increased again after 650 BCE and precipitation and river discharge became more variable. During this early era, when population levels were still low, it is unlikely that climate conditions limited the agricultural potential to a degree that would have seriously threatened food supply. At the foothills, the accumulation of fine-grained sediments at the valley floors suggests that irrigation was possible during the whole time span (Hesse 2008), at least at a small scale. It is not clear, however, whether the water supply would theoretically have sufficed to extend the irrigated area if population levels had been higher or if local farmers had not cleared additional sections because the river discharge was too low or unreliable to irrigate more land.

Most of the agricultural terraces in the Collanco area are clearly linked to the Paracas settlements, but possibly, some of them were already constructed by the inhabitants of the IP villages at the same place. These terraces at an altitude of roughly 1600 m.a.s.l. were probably rain-fed. Under the near semi-arid conditions arguably prevailing between 1000 and 650 BCE (with the exception of the early 9th century BCE) the Collanco area would have been located well within the range of rain-fed agriculture, but under the preceding very variable and, by tendency, much drier climate regime it would not have received sufficient rainfall in most years. Accordingly, the area was probably not occupied before the end of the IP (after approximately 1000 BCE) because it is unlikely that settlements were established without need in a risky area in terms of precipitation amounts while there would have been enough uncultivated land available upstream. Under the variable arid to near-hyper-arid conditions arguably prevailing during the second half of Early Paracas and during most of the Middle Paracas phase, however, Collanco would have been located close to the lower altitudinal limit for this production strategy where the risk of occasional droughts is high, especially if climate is very unstable. Continuing excavations in the area will hopefully clarify, whether domestic occupation was continuous or if there is evidence for major interruptions that could be linked to unfavorable climate.

7.4 Late Middle Paracas Phase to the Earlier Initial Nasca Phase (450–100 BCE)

Towards the end of the Middle Paracas phase, "Chavín" influence gradually decreased while conflict increased and political integration advanced. Substantial population growth was accompanied by notable changes in settlement behavior (Massey 1986/1991, Menzel 1971, Peters 1997, Tinteroff Gil 2008). After several centuries, this lasting process of cultural change finally gave birth to the Nasca culture. The Paracas-Nasca transition was potentially influenced by several, partly subsequent and partly parallel, events and processes, be they of cultural, political or climatic character. In the study area, the massive settlement of the *cabezadas* is an

especially striking phenomenon. The newly established villages were not only located in spatial proximity to the upper valley clusters but also show a similar architecture. Namely, flower structures were not only documented at numerous highland sites but also at Collanco in the uppermost Palpa valley.[127] In contrast, there are clear differences between *cabezadas*/upper valley settlements and those located at the foothills, especially at Jauranga (PAP-150). The architectural differences but also the sheer number of newly founded *cabezadas* villages do certainly not support a scenario of colonists moving from the valley floors to the highlands.

An alternative explanation is immigration from outside the study area. Newcomers may have been culturally, ethnically, or politically related to the upper valley dwellers but probably not to the foothills group. They seem to have been familiar with the *cabezadas* environment and knew how to use these lands efficiently. Many of the simpler rain-fed terraces probably date back to this time and the association of some Middle and Late Paracas highland settlements with pens, e.g., Cabracancha (S-141), point to the introduction of modest-scale camelid herding. The homeland of the new settlers could have been located either in the *cabezadas* of the neighboring drainages of the South Coast or right across the *puna* in the eastern *suni/quechua* region. Regrettably, almost no research with focus on the early phases has taken place in these areas, and therefore a direct comparison of material culture is currently not possible.

By the end of Late Paracas, settlement density at the *cabezadas* began to decrease again while at the same time many new villages were established at the foothills. The initial impression may be that the highlanders simply moved to the valley floors, but then the newly founded foothill settlements should show close architectural and conceptual similarities to those abandoned at the *cabezadas*. This is not the case. As before, foothill villages were still clearly different architecturally. None had flower structures and houses were predominantly of rounded-rectangular shape, but never circular. If the *cabezadas* people did not move to the foothills, it remains to be explained where they went. Most probably, they would have returned to the region they had come from about two or three centuries earlier. In this case, a population rise could be expected in the respective region which was most likely located either in the *cabezadas* of the neighboring drainages or in the trans-*puna* highlands. Unfortunately, insufficient research and data publication currently impede testing the validity of this hypothesis. The motivation for the exodus is hard to explain from the archaeological evidence alone. Overwhelming military pressure from the lowlanders is not likely, since the highlanders were at least as numerous, had the same weapons, and lived in easily defendable places. Furthermore, they controlled the headwaters of the rivers and may well have been able to seriously disturb irrigation further downstream. Accordingly, they were in a stronger position. Other so far unknown economic and social or political factors must have been decisive.

If the *cabezadas* groups moved to another highland region, it also remains to be explained why so many new settlements were established at the foothills. At first glance, natural population growth seems to be an unrealistic explanation, given the fact that settlement area at the foothills increased during Late Paracas from only 6.3 ha at phase start to almost 50 ha at phase end. These numbers, however, refer only to preserved and documented sites. If many settlements of the Early and Middle Paracas phases were located at the valley *floors*, not at the margins, these would have been long covered by sediments and are, by now, almost impossible to detect by visual surface survey. In this case, local foothill dwellers of the earlier phases would have been much more numerous than can be inferred from surface remains. Population may have grown steadily until a point where cultivable land became sparse, and as a consequence, villages were gradually displaced to the agriculturally unproductive valley margins.

Interestingly, Anita Cook (1999), who surveyed the relatively narrow lower Ica valley, found much more Middle Paracas sites than did Sarah Massey in and around the extended floodplain to the north. This fits well with the notion that people moved to the margins as soon as irrigable land became a limiting factor for agricultural production being that this point would have been reached earlier in areas with very restricted valley floors. In the study area, sites like Jauranga (PAP-150) and Yunama (PAP-734) are clear evidence for the existence of villages at the valley floors in the pre-Nasca era, although their number is unknown.

Although population growth may have been quite moderate, it was accompanied by cultural changes possibly stimulated by external influences. For example, new burial customs were

[127] Markus Reindel, personal communication.

gradually introduced, including multiple burials, the use of urns, and the seated flexed position of the body, whereas in former times extended positions and individual tombs were the rule. These cultural changes may be purely autochthonous developments, the result of immigration of foreign groups, the product of indirect influences from the northern valleys, the highlands, or the SGD, or any combination of these. Unfortunately, Middle Paracas burials from the *cabezadas* have yet not been discovered, leaving it unclear whether these customs were already established in the highlands and later adopted by the foothill dwellers.

The stylistic and technical innovations in craft production during the Initial Nasca phase are often attributed to influences from a foreign society associated with the Topará style, which had its origins in the valleys of Pisco, Chincha, and Cañete (cf. discussions in Silverman 1991 and in Tinteroff Gil 2008). In the NGD, but apparently also in Ica, sherds of Topará-like styles occur in association with Ocucaje 10/ Nasca 1 material and hence do not seem to mark a foreign population culturally distinct from the locals. Accordingly, an immigration of groups from the northern valleys is unlikely.

In her PhD thesis, Vanessa Tinteroff (2008) argues that Cahuachi and its surroundings formed the core area where the Nasca culture gradually evolved as a *local* phenomenon, although it was heavily influenced by both, the latest Paracas (Ocucaje 10) and the Topará tradition and perhaps also impacted by currently still poorly researched highland cultures. While I agree with her that the development of the Nasca style was probably not the consequence of immigration from Pisco, Chincha, or Cañete, a population exchange with the culturally similar Ica valley is more likely. The inhabitants of Ica should have been in more direct contact with Topará-related people and perhaps had already adopted some of their cultural traits. Unfortunately, Rowe and Menzel never adequately published the data of their Ica valley surveys. As a consequence, neither the size nor the exact location of many registered sites is known, except for the especially large and important ones mentioned in Menzel 1971 and Rowe 1963. Menzel (1971:47) reports that the Berkeley survey team found a total of seven Early Paracas sites in the upper valley, but she does not give site numbers for later phases. In any case, considerable differences in size would also have to be considered. Such differences can be deduced from the description of some particularly large sites, for example, the Middle Paracas settlement of Cerro Prieto in the upper Ica valley:

> On the southern and eastern slopes there is an ample settlement which consists of alveolate concentrations of foundations corresponding to rectangular habitations made of rough stone, as well as of long and narrow terraces serving as bases for other structures. The dwelling zone is enclosed by an elaborated system of fortification walls which is especially reinforced at the western side which faces the desert. The whole dwelling area and the fortifications measure approximately two kilometers along a straight line (Menzel 1971:77–78).[128]

A large and well-defended Late Paracas settlement was registered at La Peña de Tajahuana in the middle Ica valley where "[m]ultiple fortification walls encompass an area of more or less one kilometer on the front side, provided with a dwelling section densely covered by the foundations of habitations and rectangular compounds measuring approximately 500 by 500 meters […]" (Menzel 1971:80).[129]

Massey (1986/1991) states that during the Late Paracas phase, the Ica valley became more centralized and integrated with the partly fortified site of Animas Altas serving as a capital center, while there was little evidence of earlier phases. The latter point may also be related to the problem of buried or destroyed Early and Middle Paracas settlements at the valley floors. Viewing the limited data from Menzel and Massey comprehensively, it seems that in the Ica valley population grew or remained at least stable between Middle and Late Paracas. Accordingly, people would not have emigrated in significant numbers.

[128] My translation. Original reads: "Sobre las laderas meridionales y orientales se encuentra un amplio poblamiento que consiste en concentraciones alveoladas de cimientos correspondientes a habitaciones rectangulares, hechos de piedra tosca, así como largas y angostas terrazas que sirven de fundamento para otras estructuras. La zona de vivienda se halla circundada por un elaborado sistema de muros fortificados, que resultan especialmente reforzados por el lado occidental que da al desierto. Toda el área de viviendas y fortificaciones mide aproximadamente dos kilómetros en línea recta".

[129] My translation. Original reads: "Múltiples muros de fortificación circundan un área de más o menos un kilómetro de frente, provista de una sección de vivienda densamente cubierta por cimientos de habitaciones y recintos rectangulares, que miden aproximadamente 500 por 500 metros […]."

The situation may have changed at the end of the Late Paracas phase. Massey argues that Animas Altas was probably abandoned as a consequence of armed conflict which she deduces from the numerous obsidian projectiles and spearheads scattered on the surface. Several other contemporaneous settlements were left as well (Massey 1986:299–301). Although systematic studies are lacking, few Late Initial and Early Nasca habitation sites have been reported from the Ica valley. This means that population may have shrunk at the end of the Late Paracas phase, possibly as a consequence of armed conflict. Some displaced groups may have taken refuge in the NGD. If there was such a migration, these people might have introduced the Topará traits that are observable in many Initial Nasca ceramic assemblages from both drainages as well as other cultural changes.

The situation in the NGD, however, was not more peaceful, as fortifications like the great stonewall at Pinchango Viejo (PAP-11) and the frequent occurrence of sling stones suggest. Armed conflict, which is already observable during Middle Paracas, reached its peak during Late Paracas and decreased again towards the end of the Initial Nasca phase. It is tempting to suspect interethnic violence between *cabezadas* and foothill dwellers or between local Paracas people and Topará-associated invaders or raiders. Caution in rushing to such a conclusion is nevertheless highly advisable. Foothill and *cabezadas* people were economically complementary rather than in competition. Constant war would have threatened a crucial economic relationship. A Topará invasion is also unlikely because Topará material is generally found in Initial Nasca contexts, at least in the Ica and Nasca drainages. Accordingly, the Late Paracas descendants in these valleys either adopted some iconographic traits and perhaps also other cultural features from the Topará-associated population of the north or imported their vessels in great quantities. They may not have done this if they regarded the Topará-associated people as enemies.

A more convincing scenario may be competition among neighboring communities, arguably for farmland and irrigation water probably starting centuries before the emergence of the Topará style. If it is true that since the end of the Middle Paracas phase villages were gradually displaced to the valley margins in order to spare as much of the valley floors as possible for cultivation, it is also true that farmland had become a contested resource. Without a central authority managing rights of usage and negotiating conflicts, every community would have tried to defend or extend its share by force, if necessary.[130] The more successful clans may finally have achieved a position of some power and authority that enabled them to control resources and to quell conflicts. As a result, defensive measures gradually became obsolete. If, however, the relations between foothills and *cabezadas* groups were actually not as peaceful as proposed above, then the decreasing emphasis on fortifications during the Initial Nasca phase may also have been a consequence of the depopulation of the highlands. If there were no enemies, there were no concerns.

Climate Impacts

Mächtle and Eitel (2013) propose a generally stable arid climate for most of the time section in question. This is supported by Hesse's (2008:73) observation of widespread formation of irragric anthrosols during the mid-first millennium BCE. The most notable change is the decreased variability of precipitation patterns since approximately 450 BCE. More reliable rainfall surely favored the establishment of many new settlements at the *cabezadas* and arguably also at the foothills, although the latter may have been located at the valley floors where they were later buried under sediments.

During the Initial Nasca phase, short-term dry episodes may have occurred, but apparently these did not discourage the extension of irrigation agriculture at the foothills. Instead, settlement patterns suggest that irrigation water was sufficient throughout the Late Paracas and Initial Nasca phases and that the possible dry periods during IN had no significant negative effect. This observation implies that the rivers carried enough water to irrigate almost all of the valley floors even if climate was near hyper-arid.

The dense colonization of the *cabezadas* during Late Paracas indicates especially favorable conditions at higher altitudes, suggesting not only sufficient rainfall but also comparatively mild temperatures. A number of villages are located at altitudes where the frost risk would have been high if the AMMTGS was more than 2 °C

[130] Very clear evidence for violence between neighboring communities comes from the Acarí valley, where Valdez (2009) found more than 70 slaughtered bodies representing both sexes and all ages at the site of Amato. Some of the dead were still tied with ropes and all had been decapitated.

below the respective value for the 1950s. The fact that the few settlements that stayed occupied at the end of Late Paracas were not those located at relatively low altitudes implies that temperatures were still sufficiently high during at least the earlier half of the Initial Nasca phase.

As temperatures may have remained stable or even rose, and as precipitation also sufficed, climate can be ruled out as a major driving force behind the abandonment of the *cabezadas*. This means that independent cultural, social, and political processes would have been the cause. At the moment, these processes are not well understood because detailed archaeological data from regions neighboring the study area are sparse, especially regarding the highlands of Ayacucho and Andamarca, and the *cabezadas* of the other South Coast drainages. The present study may nevertheless serve as a cornerstone for a detailed reconstruction of supra-regional developments. This will be possible as soon as new field data from outside the Río Grande drainage becomes available.

7.5 Later Initial Nasca Phase to the End of the Early Nasca Phase (100 BCE–300 CE)

The time between the later Initial Nasca phase and the end of the Early Nasca phase seems to have been stable and prosperous in terms of cultural development. Craftsmanship flourished and the exceptionally high quality of polychrome fine ware ceramic vessels and colorful bordered textiles requiring substantial labor investment argue for the emergence of full-time specialists. In the SGD, Cahuachi grew into the most important center of the Nasca culture and the only center with truly monumental temple mound architecture. Some scholars, namely Helaine Silverman, maintain that the site was mainly a pilgrimage center. In contrast, the general archaeological evidence, not only at Cahuachi itself but at much of the South Coast, seems to argue for a center of political power and even for a formal status of the capital of an integrated, centralized polity (see Chapter 3.2.4.2). With the rise of Cahuachi, the SGD became the focus of power and prestige at least for the Grande and Ica drainages which continued to maintain close cultural ties. In addition to the formation of a multi-tier settlement hierarchy, burial patterns also point to the emergence of a new ruling class. Contrary to Carmichael's (1995) conclusions, a number of clearly outstanding (unfortunately looted) Early Nasca elite tombs do exist in the Río Grande drainage, particularly at Cahuachi (Hecht 2004). Although they were still smaller than the Middle Nasca graves of La Muña (Isla Cuadrado & Reindel 2006), their existence indicates an increase in social differentiation.

In the study area, the last *cabezadas* settlements seem to have been abandoned before the end of the Initial Nasca phase. Only at Suito Orqo (PAP-873) and at PAP-1090, Early Nasca occupations (S-1709 and S-1304, respectively) might have been present, although the major part of the visible structures in both cases probably date to later phases, mostly to Middle Nasca. Settlements concentrated in the middle valleys and around the great floodplain. It would be highly interesting to compare this situation to the SGD, but the published data available to date does not permit to assess whether the upper valleys and the *cabezadas* of the SGD in general might have been densely populated during Early Nasca.

Population levels at the foothills apparently remained stable at best, or had slightly decreased. This is a surprising find for a time of cultural florescence and political stability but it may indicate that the land and water resources at the foothills were already fully in use, thereby preventing any further extension of agricultural production. Consequently, it was not possible to feed a still larger population, which may have forced emigration. These emigrants did not move to the *cabezadas*, which remained largely uninhabited. This observation once again shows that, although people were mobile when necessary, they did not easily occupy an environment with which they were not familiar. Some groups may have moved to the Ingenio valley and the SGD where settlement numbers rose, according to data from Silverman and Schreiber, respectively, which I discussed elsewhere (Soßna 2012). Others could have gone to the Ica valley, although the very limited published data suggests a relatively low population density there as well.[131] Accordingly, the immigration of larger groups from the NGD is unlikely. The Early Nasca influence on the Huarato culture in Acarí (Valdez Cárdenas 2006/2009) and on the Car-

[131] Massey (1986/1991) and Cook (1999) both concentrate on the Paracas Period and the Initial Nasca phase. Menzel's (1971) information on settlements is limited to the Paracas period and the Late Nasca phase. Rowe (1963:11) mentions the two large sites of Cordero Alto and Cerro Soldado which is not enough to get a general idea of the population density of the whole valley.

men culture in Pisco and Chincha (Velarde 1993, Wallace 1972) could perhaps be related to smaller groups of emigrants from the NGD who merged with the respective local populations.

No Early Nasca settlement in the study area shows any kind of defensive walls or caches of sling stones. The finding of trophy heads in archaeological contexts and their iconographic representation on vessels and textiles (but also as parts of some geoglyphs) is sometimes interpreted as an indicator of warfare (e.g., Proulx 2001) but, as Proulx rightly noted:

> This theory of inter-valley secular warfare needs to be further tested in the future by examining the settlement patterns revealed by the various, but yet unpublished, surveys which have recently been undertaken in the Nasca drainage (e.g. Schreiber's work in the Taruga, Las Trancas, Tierras Blancas and Aja tributaries, Silverman's work in the Ingenio Valley, Browne's survey of the Palpa region, and Carmichael's work in the lower Río Grande). The presence of fortifications or strategically positioned sites in critical locations could add to our understanding of the nature of Nasca warfare (2001:129).

To judge from the study area, if battles did take place, they apparently did *not* affect the settlements, since villages were neither fortified nor located in defensive positions. Some kind of "war," not aiming on conquest or booty, may nevertheless have taken place in a ritual context. Perhaps parties drawn from a specific warrior class met on a determined field to fight a ritual battle which ended in the decapitation of the captives. Ritual battles are well known in the Central Andes from ethnographic and ethnohistoric parallels. This holds especially true for the so-called *tinku*. During a *tinku*, two parties, often two moieties of the same society, engage in a fight during which serious and sometimes deadly injuries can occur. *Tinkus* are known to have been practiced at least since the Late Horizon in many highland regions but its roots may well reach far more back in time. It may have been much bloodier in its origins.[132] Ritual or not, anthropological analyses show that the trophy heads were of local origin, thereby providing good evidence against a scenario of conflicts between Nasca people and foreign groups (Knudson et al. 2009).

The lack of evidence for warfare, other than perhaps a regulated intra-society variety, is consistent with a scenario of a unified polity not seriously threatened by external forces. If Cahuachi was indeed the capital of such a polity, settlements like Los Molinos and especially Llipata, San Antonio, and La Falda would have served as subordinate centers for the administration of certain drainage sections. The same could be said for Silverman's site 165 (Ventilla) in the Ingenio valley (Silverman 2002:50–57), and probably, comparable installations also existed in the valleys of the SGD. Monte Grande/Pedregal close to the mouth of the Río Grande also seems to have been an important Early Nasca center, arguably for its proximity to both the coast, with its marine resources, and to the lowermost Ica valley. The settlement therefore combined economic importance with a strategic location regarding the control of traffic between the Ica and Río Grande drainages but also between the coast and the foothills. In Ica itself, the settlements at Cordero Alto and the slightly later one at Cerro Soldado (Rowe 1963:11) might also have fulfilled the function of local centers, possibly related to Cahuachi.

Altogether, the archaeological evidence of the Early Nasca phase fits best into a scenario of relative peace guaranteed by a central authority ruling from Cahuachi with the help of local governors in the different valleys. This political stability allowed a prosperous development of craftsmanship, stable agricultural production, and an increase in social differentiation and complexity. Stability and unity may also have helped to manage temporal crises caused by occasional local-level crop failures, because a central authority could have organized storage and redistribution of food on a regional level.

Sometime around 300 CE, the Early Nasca polity apparently collapsed for reasons still not well understood. Cahuachi was abandoned and its temple mounds were ritually buried. Subordinate local centers, including Llipata and Los Molinos, were also given up. The breakdown of socio-political organization was accompanied by a sudden and severe decrease in population as suggested by the drop of total settlement area in the NGD from 72 ha to 46 ha by end of the Early Nasca phase. This development does not seem to have been limited to the Río Grande drainage and the Ica valley but is also observable in Acarí. Valdez notes that "[i]t is important to underline that around that phase [Nasca 4 (early Middle Nasca)] the Acarí sites were depopu-

[132] See Arkush & Stanish 2005 and Arkush & Tung 2013 for a discussion on Andean warfare and its archaeological traces. The authors also prominently treat the aspect of ritual battles.

lated or even abandoned while the major part of the population of this valley concentrated in Chaviña (PV 74–22), a site located close to the ocean" (Valdez Cárdenas 2000:21).[133]

For the northern valleys, the published information is very limited. Wallace notes that in Chincha during the Carmen phase, which is contemporary to Early Nasca, "construction of pyramids continued, though fewer in number and smaller in size, and without the specific shape of the earlier ones" and that "[u]rban centers occur in both valleys [Chincha and Pisco]" which are "compact and irregular aggregations of habitations with plazas but without pyramids or other special constructions" (1972:2).[134] One of the latter is located in Chincha and two in Pisco. For the following Estrella phase, contemporaneous with Middle and Late Nasca, Wallace states that:

> [t]here are some small mounds associated with ESTRELLA ceramic at the floor of the Chincha valley, constructed with semicylindric adobes, at the end of the period with concave sides or half-reel. The largest one is site PV57–5 in the middle of the valley. It is the only one which could be interpreted as pyramid with some certainty. Habitation sites occur with regular frequency at the valley floor, some further upstream than before. None is large so that evidence of the urban center of Chincha is missing. In contrast, in Pisco, sites with ESTRELLA ceramic or adobes half-cylindric adobes are located at the margins of the upper and lower valley. Some of those in the upper valley are extended in area, suggesting [to have formed] the urban center, but lacking the well-defined fringes of the previous centers. Photographs of Shi[p]pee and Johnson taken 40 years ago show very extended terraces which should belong to the period (1972:3).[135]

Canziani (2009:292–297) merges both phases, making it impossible to notice developments from his data. Altogether, it appears that settlements were becoming simpler and, at least in Chincha, more dispersed, although population remained basically stable, or even increased. Accordingly, Pisco and Chincha could perhaps have absorbed some smaller groups of refugees who fled the Nasca-Palpa region. Future field work at all of the South Coast but especially a complete and adequate publication of old survey data may shed more light on the issue of what happened at the end of the Early Nasca phase.

Climate Impacts

The cultural heyday, the formation of an at least drainage-wide integrated polity, and a still relatively high population level do clearly not suggest an agricultural crisis caused by very unfavorable hyper-arid and volatile climate conditions. Indeed, the geomorphological evidence presented by Mächtle and Eitel argues against major violent fluvial events (Eitel & Mächtle 2009, Mächtle 2007, Mächtle & Eitel 2013) while the valley floor sediments analyzed by Hesse and Baade (Hesse 2008, Hesse & Baade 2009) indicate stable and large-scale irrigation over several centuries, which implies a regular river runoff. The settlement density in the middle valleys and around the great floodplain also suggests prosperous irrigation agriculture made possible by a stable and sufficient supply with river water. Although such climatic conditions surely favored a cultural bloom, they cannot be seen as a trigger for this development because the advantageous conditions were already prevailing since the end of the Middle Paracas phase. Likewise, the apparent collapse of the Early Nasca polity and the emigration of a significant part of the population of the NGD and arguably also the neighboring regions was almost certainly not caused by worsening climate conditions. A relatively stable and arid

[133] My translation. Original reads: "Es importante subrayar que alrededor de esta fase los sitios de Acarí fueron despoblados o, incluso, abandonados, al concentrarse gran parte de la poblacíon de este valle en Chaviña (PV 74–22), sitio ubicado en las cercanías del mar."

[134] My translation. Original reads: "[…] la construcción de pirámides continua, aunque menos en número y tamaño, y sin la forma espicífica de los anteriores. […] Centros urbanos ocurren en los dos valles; son agregaciones compactos e irregulares de habitaciones, con plazas pero sin pirámides o otras construcciones especiales."

[135] My translation. Original reads: "Se encuentra en el piso del valle de Chincha unos montículos associados [sic] con la cerámica ESTRELLA, construidos de adobes medios cilíndricos, al final del período con lados concavos o medio carrete. El más grande es el sitio PV57–5 en medio valle; es el único que se pueda interpretar como pirámide con alguna seguridad. Sitios de habitación ocurren con frecuencia ordinaria en el piso del valle, algunos más río arriba que antes; ningunos son grandes de modo que se falta evidencia del centro urbano de Chincha. En contraste, sitios con cerámica ESTRELLA o adobes medios cilíndricos en Pisco quedan en los bordes del valle abajo y valle arriba. Algunos del valle arriba son extensivos en área, sugiriendo el centro urbano, pero sin los bordes bien definidos de los centros anteriores. Fotografías de Ship[p]ee y Johnson tomado hace 40 años muestran terrazas muy extensivas que deben pertenecer al período."

climate can be assumed to have persisted until at least the beginning of the Late Nasca phase. Although minor short-term events can never be excluded (given the limited resolution of the geo-archives) these would probably have been dealt with effectively since the locals should have been used to occasional droughts and floods.

As soon as complementing data is available, especially from pollen analyses, the question can be addressed, whether perhaps the *cabezadas* remained largely un-colonized during Early Nasca due to very low temperatures. For the harvests in the settled sections of the study area, temperature was insignificant because there was surely no frost risk at those altitudes. Even the Early Nasca village at the highest altitude, S-1709 (Suito Orqo), if it had indeed been occupied at that time, is located below the -4 °C frost margin.

7.6 Beginning Middle Nasca Phase to the Beginning Early Wari Phase (300–700 CE)

At the dawn of the Middle Nasca phase, notable changes in socio-political organization occurred. The drainage-wide or even multi-valley polity dissolved and its capital at Cahuachi was largely abandoned. Shortly thereafter, new local centers of power emerged in different valleys and valley sections, including La Muña (S-41) in the Río Grande valley and Viscas (S-47) in the Viscas valley. There seems to have been a growing desire for individual prestige and representation in the social elites, judging from the extraordinarily large and rich tombs at La Muña and Puente Gentil (Isla Cuadrado 2001a, Isla Cuadrado & Reindel 2006). These finds suggest that the political fragmentation was accompanied by an increase in social differentiation.

Despite the considerable social and political changes, the culture in general developed smoothly. No major innovations, such as markedly different burial customs or ceramic styles, are observable prior to the Early Wari phase. There are, however, signs of an increasing interaction and mutual influence between the South Coast and the Ayacucho highlands, especially during the Late Nasca phase. In addition to obvious Nasca traits being incorporated into the Late Huarpa and Early Wari styles (Knobloch 2005, Menzel 1964), the increase of stone built special architecture at the expense of *adobe* buildings at the foothills of the Río Grande drainage might also reflect a highland influence in the Río Grande drainage. Especially interesting is the Late Nasca/Early Wari settlement at Huaca del Loro (Paulsen 1983, Schreiber 1988, Strong 1957) in the SGD whose round structure is reminiscent of the East Plaza at Ñawinpukyo near Ayacucho (Leoni 2009).

The intensification of relations between the Río Grande drainage and the Ayacucho region may initially have been catalyzed by the massive resettlement of the *cabezadas* during the Middle Nasca phase. In these highland sections of the study area, Middle Nasca architectural patterns and settlement layout are similar to those of Late Paracas times, except that there are no flower structures. In several cases, stratigraphically discrete occupations of both phases can even be found at the same site. The typical village consisted of circular stone houses mostly with double walls, built on terraces which were arranged concentrically around a hilltop. In turn, these villages are markedly different from their foothills counterparts, which were predominantly composed of angular structures in flat terrain or on modest slopes along the valley margins.

The total settlement area at the foothills is significantly lower than in the preceding Early Nasca phase, but the comparatively short duration of the Middle Nasca phase (some 140 years) increases the probability of contemporaneity, especially of the many d-type settlements comprising 44 % of the overall dwelling area. Consequently, it is very possible that the population shrank rapidly at the end of Early Nasca but then recovered to a certain degree during Middle Nasca, before diminishing once again.

Comparable to the situation during the Late Paracas phase, a population shift inside the study area from the foothills to the *cabezadas* can be assumed at first glance. At closer look, however, some doubts arise, considering the differences in architectural design and settlement layout which suggest general cultural and probably also ethnic differences between foothills and *cabezadas* groups. Furthermore, since no highland village seems to have a direct Early Nasca precursor, most were probably not established during the transition between Early and Middle Nasca but at least several decades later when many Early Nasca settlements had already been abandoned. Accordingly, the two processes – population decline at the foothills and repopulation of the *cabezadas* – may have run subsequently rather than simultaneously. This would mean that the establishment of villages in the highlands occurred at a time when the population around Palpa was already recovering.

Interestingly, the settlement at Marcaya, located in the SGD at a comparatively low altitude of only 1000 m.a.s.l. (Vaughn 2000/2009) shows close architectural similarities to the Middle Nasca *cabezadas* villages of the NGD, but is associated with material attributable to the styles Nasca 3 and Nasca 4. While Nasca 3 undoubtedly belongs to the Early Nasca phase, Nasca 4 marks the beginning of the Middle Nasca phase in the chronological scheme employed in the present study. According to Schreiber's (1988) brief comments, there seem to have been a few other Early Nasca villages of this type in the area but the majority of the domestic sites date to Middle and Late Nasca or even later. Foreign highlanders possibly occupied the upper and middle valleys of the SGD first and went on to the NGD some decades later. In this case, Marcaya and its neighbors would have been non-Nasca settlements and their close relation to Cahuachi assumed by Vaughn would be in doubt. At Marcaya, however, pure Nasca fineware sherds were found in large quantities. This contrasts with the comparatively few sherds of this type found in Middle Nasca *cabezadas* settlements of the NGD. More field work at different types of ordinary Nasca habitation and burial sites would be necessary to clarify whether the population in all of the drainage was culturally and ethnically uniform. Currently, I consider a scenario of cultural and ethnical distinction between foothill and *cabezadas*/upper valley dwellers more likely, at least with regard to the NGD.

The population dropped again by the end of the Middle Nasca phase at both the foothills and the *cabezadas*. This process seems to have continued throughout the Late Nasca and the Early Wari phases. Despite the significant population decline and the abandonment of the most important local centers, which can be seen as an indicator for a crisis of the socio-political system, there is no widespread evidence for conflict. Defensive walls and sling stone deposits are absent and no effort had been made to move settlements to defensive locations. While many *cabezadas* villages were located at elevated but unfortified locations, foothills settlements remained easily accessible. There are no obvious destruction layers, nor evidence for mass executions, nor clear indicators for any kind of catastrophic event killing thousands of people. Since there are no signs of a drastically increased mortality rate, the only logical explanation for this population drop is emigration.

This provokes the question where people went to. Foothill and *cabezadas* dwellers possibly took refuge in different regions. At the foothills, the simultaneously occupied dwelling area at the start of the Late Nasca phase amounted to some 21 ha. Of these, 14 ha were still occupied at the phase's end but were finally abandoned during the Early Wari phase. Accordingly, if all emigrants went to the same region, settlement area there should have increased in a similar dimension. Decreasing settlement numbers have also been observed in the Ingenio valley (Silverman 2002), while in the SGD lower numbers may have been compensated by larger size. Judging from the maps and some general comments published by Schreiber and Lancho (2003:142–148), the number of settlements dropped drastically between Early and Middle Nasca and slightly between Middle and Late Nasca. At the same time, however, settlement size grew, particularly during Late Nasca. Accordingly, population did not shrink in proportion to the number of villages. It may even have increased.[136] Even a slight population increase in the SGD would nevertheless not have fully compensated for the decline in the NGD.

The northern South Coast valleys, where stylistic influences from Nasca are clearly observable in local ceramics, come to mind as the possibly main destination for emigrants from the NGD (e.g., Menzel 1971126–131, Santa Cruz Gamarra 2007:104–105). In her 2001 article, Schreiber states that "there is no evidence that a drastic population increase took place neither in Ica nor in the southern valleys [of the Río Grande drainage]" (2001:440).[137] In case of Ica, however, she might be wrong. Unfortunately, neither a map nor a catalog of the sites registered by Menzel in the Ica valley has ever been published. For this reason it is impossible to make more precise statements about changes in the size and number of settlements there, but in general terms, Menzel states that "it is surprising that to date no Monumental [Early-Middle] Nasca settlement of a similar extent [compared to the large ones of the Middle and Late Paracas phase] is known in the Ica valley" (1971:83). Later on, she assumes that "the occupations of late periods buried or destroyed some of the

[136] The comparability of Silverman's and Schreiber's data to that gathered by the Palpa Project is limited due to differing methods in documentation and analysis, but general trends can be deduced (cf. Soßna 2012).

[137] My translation. Original reads: "Sin embargo, no hay evidencia de que se diera un aumento drastico de poblacion ni en Ica ni en los valles del sur."

older [Nasca] settlements on the plain, possibly even an extended Monumental Nasca center, comparable to those of Pisco, Nasca, and Acarí […] [because] there is relatively little information about settlements of the Early Intermediate Period, principally with regard to [Middle Nasca] phases 5 and 6 […]. Without doubt, more settlements corresponding to these phases must have existed, but to date we have not discovered their kinds of occupation" (1971:92–93).[138]

Although Menzel might be correct in that some Early and Middle Nasca settlements were located at the valley floor and had been destroyed or covered before her survey in 1958, Late Nasca villages and centers were apparently larger and more numerous. She reports "14 large settlements […] in the upper and middle parts of the valley, as well as several further places […] where some Nasca 7 ceramic sherds were found together with other refuse" (Menzel 1971:86).[139] If each of the 14 large settlements only comprised 3 ha on the average, their overall area would sum up to 42 ha, which is twice the area abandoned in the NGD since the end of Middle Nasca. Accordingly, the upper and middle Ica valley could indeed have been a destination for Late Nasca emigrants from the study area.

For the Pisco and Chincha valleys, Wallace (1971) reports 19 sites for his phases Estrella 1–3 (contemporaneous to Middle Nasca) versus 11 for Estrella 4 (corresponding to Late Nasca), but the information given in his catalog is limited. The area estimates are very rough, and even in the Late 1950s, when fieldwork was carried out, large parts of many sites had already been destroyed. In a later supplement to the catalog, Wallace gives some information on his Estrella phase in general without distinguishing subphases (quoted on p. 139). Despite the patchiness of the data, in the Pisco and Chincha valleys too, a decrease in settlement area is more likely than a significant increase. Consequently, the Ica valley is the only place on the South Coast where emigrants from the NGD might have moved to during the Late Nasca phase and perhaps also during the Early Wari phase.

In addition, some groups might also have crossed the *puna*. In her 2001 article, Schreiber remarks:

> If [the Late Nasca inhabitants of the NGD] moved all together to another place, one would expect finding evidence of this movement in the form of changes of style in the artifacts in the new region, including both, the design and the technology of the Nasca-style pottery. The only culture of the Early Intermediate Period exhibiting this kind of change is the Huarpa culture of Huamanga [Ayacucho], which makes it a promising object for future research (440–441).[140]

While she was wrong in that strong stylistic influences from Nasca were limited to the Ayacucho region, (they are also observable in the northern South Coast valleys), Ayacucho and its hinterland may at least have absorbed part of the population of the NGD. Apart from the strong Nasca influence in the Late Huarpa and Early Wari ceramic styles (Knobloch 2005, Menzel 1964), Valdes et al. note that burial practices may have been influenced, too:

> Carmichael (1995) observed that a common Nasca burial position was seated, with the lower limbs flexed toward the chest. Likewise, Massey (1986: 323) reported stone-lined pits covered by stone slabs that date to the Early Intermediate Period (AD 1–600) in the upper Ica Valley. Since similar cists and similar body positioning were unknown in the Ayacucho Valley before the Middle Horizon, it is worth pursuing the possibility that perhaps the Nasca introduced cist tombs to the Ayacucho Valley. Certainly, we

[138] My translation. Original reads: "[…] es sorprendente que hasta ahora no se conozca ningún establecimiento similarmente amplio del Nasca Monumental en el valle de Ica."
"[…] que las ocupaciones de los periodos tardíos sepultaron o destruyeron algunos de los más antiguos asientos de la planicie, hasta posiblemente un amplio centro de Nasca Monumental, tal como aquellos de Pisco, Nasca, y Acarí […]"
"[…] hay información relativamente escasa sobre los asientos del Periodo Intermedio Temprano, principalmente en lo que se refiere a las Fases 5 y 6 de Nasca […]. Es indudable que deben existir más asientos correspondientes a estas fases, pero hasta ahora no hemos descubierto sus formas de ocupación."

[139] My translation. Original reads: "[…] 14 gran des asientos así como varios otros lugares adicionales […] en los cuales se hallaron algo de cerámica de Nasca 7 junto con otros residuos."

[140] My translation. Original reads: "Si se hubieran trasladado conjuntamente a otro lugar, se esperaría encontrar evidencias de este movimiento en forma de cambios en el estilo de los artefactos en la nueva región, incorporando tanto los diseños como la tecnología de la cerámica de estilo Nasca. También se esperaría encontrar cambios en los estilos arquitectónicos y en los patrones de asentamiento, reflejando la presencia de recién llegados. La unica cultura del Periodo Intermedio Temprano que exhibe este tipo de cambios es la cultura Huarpa, de Huamanga, lo que le convierte en objeto prometedor para estudios en el futuro."

> are not arguing that is the case, but it is a possibility that simply cannot be bypassed particularly considering that for long time scholars have argued about the Nasca influence in the Ayacucho Valley […] (2006:684).

Emigration across the *puna* possibly offered an effective outlet for population pressure. For some reason, this option may not have been available during Late Paracas, when serious fighting is easily recognizable in the archaeological record and settlement behavior clearly shows defensive considerations. Archaeological data from both Ica *and* Ayacucho so far could at best explain where the inhabitants of the NGD might have moved to during the Late Nasca and Early Wari phases. The destiny of the people who left the study area at the end of the Middle Nasca phase, in turn, still remains in the dark. Foothills and *cabezadas* dwellers were possibly slowly assimilating during Middle Nasca, and already before the start of the Late Nasca phase larger groups of the lowlanders left together with the highlanders for the wider Ayacucho region. This hypothetical scenario will have to be checked with data from ongoing and future projects in the Ayacucho region.

Climate Impacts

Without widespread evidence for destructive wars or plagues, the principal reasons for the decline in population towards the end of the Nasca Period were most likely economic in nature. The dissolution of the pan-Nasca polity and the loss of a central authority managing to a certain degree the storage and distribution of staple goods may have reduced the society's resilience buffer against crop failures. If either agricultural yield significantly declined on the average or bad harvests repeatedly occurred during several subsequent years, the impact would have been more severe. Declining yields can be caused by a variety of factors. These include

- insufficient maintenance or deliberate destruction of irrigation networks due to political instability
- soil degradation
- reduced or irregular precipitation

The absence of evidence for widespread war and the apparently well-founded power of the Middle and Late Nasca lords in their respective territories are evidence against the first point, and the intensive and long-lasting cultivation of the valley floors in later periods negates the second. A comparison of settlement patterns at the start and at the end of the Late Nasca phase, in turn, clearly shows that the largely abandoned areas were those with the most critical water supply: the lower sections of the rivers, the valleys of the smaller rivers with the lowest discharge volume (Palpa and Viscas), and the lower reaches of the *cabezadas* where local precipitation is lower than at greater elevations.

The dislocation of settlements would be logical if the climate had suddenly turned much drier causing shortages of irrigation water downstream at the lowermost reaches of the Palpa and Viscas rivers. In this case, people would have concentrated on cultivating the valley sections where the most reliable harvests could be expected. For the first time, the limiting factor for agricultural production would not have been the availability of cleared land but of irrigation water. For the SGD, Schreiber and Lancho conclude that the *puquios* were built in Middle Nasca times as a response to drier conditions (Schreiber & Lancho Rojas 2003). Accordingly, a scenario of increasing aridification would go well with the archaeological record. The question is whether it is also supported by independent evidence from geoarchives.

Unfortunately, no geoarchives were found around Palpa that could show the development between 300–650 CE in detail. The valley floor sediments analyzed by Hesse and Baade (Hesse 2008, Hesse & Baade 2009) seem to signal steady, long-term irrigation and occasional riverine flooding as a general trend. Data from remote geoarchives also suggest relatively favorable conditions in the Río Grande drainage during the Middle Nasca phase and the beginning of the Late Nasca phase (300–500 CE), allowing for a recovery of population levels, but there is no evidence for worsening climatic conditions at the end of the Middle Nasca phase. Accordingly, there were either other reasons for the gradual abandonment of the great floodplain, or the resolution and accuracy of the current climate model do not allow identifying short-term fluctuations that lasted for less than a few decades.

A short-term return to near hyper-arid conditions may have occurred in the Late Nasca phase during the early 6th century CE. This is suggested by the chlorin curve, though the respective peaks in the other curves are much less pronounced. Such a multi-decadal drought may have intensified migration from the NGD to the Ica valley. If this is true, it would have had a greater impact than those of the two short-term droughts which probably occurred during the

Initial Nasca phase and which do not seem to have affected settlement behavior and population levels significantly. The general socio-political situation was possibly much more fragile during Late Nasca.

In the Ica valley, Late Nasca settlements were located in the upper Ica valley where water was available more reliably than further downstream. If population density was very low during Middle Nasca, as suggested by the paucity of settlements from that phase, the Ica valley might still have had the potential to feed more people, even under dry conditions if adaptive measures were applied. Menzel laid out a test pit in a Late Nasca settlement at the site of La Tinguiña (PV62–70) in which she observed a superposition of several layers containing domestic architecture and refuse, pointing to a long occupation span. Interestingly, the well preserved botanic remains of crop plants argue for a change in agricultural strategies in the course of the Late Nasca phase with an increasing emphasis on crops with a shorter vegetation period (less corn, more gourd) which "would definitely suggest a shortage in water supply during the epoch when the upper layers formed" (Menzel 1971:90).[141]

At the *cabezadas* of the NGD, only three or four settlements were still occupied at the beginning of the Early-Middle Wari phase. These were all located at high altitudes around 3000 m.a.s.l. where precipitation should still have been sufficient even under comparatively dry conditions while the frost risk would have been low, even if the AMMTGS had been up to 4°C lower than in the 1950s. The inhabitants of the few smaller villages that were abandoned might have moved to the Ayacucho region. Since they will have been few in numbers they would have easily been absorbed by the locals. Furthermore, the Ayacucho and Andamarca regions east of the *puna* may have been less affected by a dry period. Since they receive more precipitation in absolute amounts, a modest decrease is less dramatic than in the study area. Additionally, the expansion of terrace construction may have increased the agricultural potential. In effect, not only the autochthonous population but also smaller groups of immigrants could be fed.

After 550 CE, at the height of the Late Nasca phase, average rainfall in the NGD seems to have increased again, but population did not recover noticeably and the people who had left some decades before did not return. For the period from 650–770 CE (largely corresponding to the Early-Middle Wari phase) several geologic profiles laid out around Palpa support a scenario of an increasing variability of precipitation with frequent droughts but also occasional flash floods (Mächtle 2007, Unkel & Kadereit et al. 2007). By 750 CE almost all local and remote geoarchives suggest a sudden and drastic reduction in precipitation in the Río Grande drainage for at least half a century. This phase was probably the driest since the early 9th century BCE and will have seriously affected both rain-fed and irrigation agriculture. It very likely caused the final abandonment of the last Nasca-related (Loro) settlements at the foothills while the few remaining *cabezadas* dwellers managed to survive, possibly thanks to improved agricultural terraces allowing for a more effective water storage and distribution.

7.7 Middle of the Early Wari Phase to the End of the Middle Wari Phase (700–850 CE) and Hiatus (850–1180 CE)

During the Early and Middle Wari phases the Nasca culture finally faded and the Nasca heartland was firmly incorporated into the Wari Empire. The roots of this process might reach as far back as into Middle Nasca, but it clearly gained momentum during the 7th century CE and culminated into a complete acculturation by about 800 CE. At the foothills, some Late Nasca settlements stayed occupied for a while. These were apparently inhabited by locals who had incorporated cultural treats from Ayacucho, particularly with regard to their pottery design (Loro) and their burial customs. These burial customs were manifold and also included at least one variant probably derived from older Nasca customs: so-called *barbacoa* elite tombs like the graves at Parasmarca and Huaraco/Lucriche (Isla Cuadrado 2001b/2009). Wari-influenced elites may have adopted this Nasca tomb form but modified it according to highland customs, in that they constructed the chambers in a way that allowed re-entry. *Barbacoa* tombs dating to the Nasca Period showed no sign of reopening and their chambers were often intentionally filled. Other Middle Horizon grave types, especially the stone *kuntis* at the *cabezadas*, had no local precursor and were clearly introduced from somewhere across the *puna*.

[141] My translation. Original reads: "[…] sugería muy definidamente la escasez de abastecimientos de aguas por la época en que se produjo la ocupación de los niveles superiores."

Only few descendants of the Late Nasca population remained at the *cabezadas*. The people who settled the area in greater numbers were predominantly immigrants from the Ayacucho region, but most of them did probably not arrive before the end of the Early Wari phase when the foothills were already largely depopulated. Due to the lack of numeric dates from *cabezadas* sites, a more accurate temporal fixation of the beginning and the duration of the Wari occupation of the highlands is not possible at the moment.[142] The immigrants from Ayacucho erected orthogonal administrative complexes, ceremonial D-shaped buildings, and *kuntis*. While orthogonal complexes were already known locally (at the foothills) the other two types of architecture had no precursors in the Nasca tradition.[143] The newcomers also expanded camelid herding, though agriculture still seems to have formed the economic backbone.

Although there is a general agreement that mutual cultural influences between the Nasca and Ayacucho regions were very strong at the end of the Early Intermediate Period and the beginning of the Middle Horizon, the nature of this relation is still not well understood. A scenario of military conquest is not supported by the archaeological evidence. As in the previous phases, there are no obvious signs of defensive measures. Neither the Loro-associated foothill villages nor the Wari centers at the *cabezadas* were protected by walls. The Wari did also not erect buildings which could be interpreted as military garrisons established in order to control a local population by force. Wari elites and local commoners lived together peacefully in several settlements, at least in the *cabezadas* sections of the study area (e.g., at Huayuncalla), a fact contrasting Conlee's and Schreiber's hypothesis of a resisting Nasca community in the Las Trancas valley (Conlee & Schreiber 2006). The lack of any indication of threats by hostile war parties and the deliberate mutual adoption of cultural traits better support the idea of some degree of mutual appreciation and respect. While we cannot know for sure if locals actually welcomed the highlanders, they apparently did not try to repulse them, either. Given the low population density at the *cabezadas* during Late Nasca and the probably already advanced depopulation of the foothills before the main wave of Wari people arrived, the local population would also not have had the manpower to successfully ward off an invasion.

The Wari established several administrative centers in the Río Grande drainage, which clearly indicates that they formally incorporated the area into their realm during the Middle Wari phase. In the NGD, all of these centers are located at the *cabezadas*, the most important being Ayapampa (S-1682), Pacapacarí (S-1740), Huayuncalla (S-161), and Mauca Llaqta (S-121). In the SGD, Pacheco might have functioned as a center, but due to the almost complete destruction of the site, a clear determination of its status has become impossible (Schreiber 2001). Another small Wari center existed at Pataraya in the upper Tierras Blancas valley (Edwards 2010).

After the Middle Wari phase, the settlements at the *cabezadas* of the NGD were also abandoned. To date, no domestic occupation dating later than 850 CE and earlier than 1180 CE could be documented at any site. In the future, additional excavations and numeric dating may perhaps reveal that smaller groups of people actually continued to inhabit some villages, but even if this was the case, population density must have been extremely low.

At the foothills the existence of dwellings also cannot be excluded. The few remaining farmers might have moved to the valley floors proper to be as close as possible to their fields. Since population levels were low, there was no need any more to spare land for cultivation. Their houses, probably built of light, perishable material, would long have decayed or been buried. Accordingly, Hesse's assumption that irrigation had never ceased completely could be correct, although the scale of agricultural activity will have been reduced significantly. Of the 43 ^{14}C samples taken from sediment profiles and published in Hesse & Baade 2009, four fall within the time span between 660 and 1200 CE but only two of these represent layers interpreted as irragric anthrosols.[144]

[142] Most MH styles were defined via the seriation of pots from museum collections (Menzel 1964). A relative sequence is not always firmly established and confirmed by stratigraphic evidence from excavations. Numeric dates are still sparse and not always reliable. See discussion in Chapter 5.2.2.

[143] There was a tendency towards the erection of strictly rectangular administrative structures at the foothills since Early Nasca, e.g., at Los Molinos (Early Nasca, Fig. 86), Viscas (Middle Nasca, Fig. 93), and Parasmarca (Late Nasca, cf. Fig. 98). The replacement of adobe by stone since the Middle Nasca phase, in turn, may not be a local development but may point to cultural influence from the highlands already under way.

[144] The two samples are Poz-16820 from profile SF2, 870–1020 cal CE and Poz-13547 from profile Fl, 890–1030 cal CE. Both profiles were laid out between the Palpa and Viscas rivers, south of the town of Palpa.

Late Wari tombs were excavated at several locations in the SGD and in the Monte Grande area (Menzel 1964:63). Furthermore, a map published by Conlee and Schreiber (2006:103) shows numerous cemetery sites and 16 settlements attributed to "Middle Horizon 3 and 4" (Late Wari), though no additional information is given. Numerous Late Wari pots originating from tombs in the Ica valley are known from private collections but no habitation sites were so far reported from that valley (Menzel 1964:62–66).

The abandonment of the study area coincides with the apparent fall of the Wari Empire which is detectable in the archaeological records for most of its former provinces at the end of the Middle Wari phase. Contrary to other regions, however, – for example Moquegua (Sutter & Sharratt 2010), Chicha-Soras (Meddens & Branch 2010), Sondondo (Schreiber 1992:160–163), Huamachuco (Topic 2009), or Cusco (McEwan 1987:79–83) – the study area was not only left by the Wari immigrants from Ayacucho or their direct descendants but also by most of the last remaining natives. This fact raises the question of where the population of the NGD went. Since Late Middle Horizon evidence from the northern South Coast valleys is also sparse the Wari homeland in the wider Ayacucho region may have been the principal destination. Research focusing on the *Late* Wari phase is still too limited to test the validity of this hypothesis, since detailed, systematic settlement pattern studies at a regional scale in the Ayacucho basin were either not carried out or have not been published properly.[145]

It must be kept in mind that population levels in the study area had already been low at the beginning of the Early-Middle Wari phase. Accordingly, there will not have been masses of emigrants but perhaps a few thousand people leaving in small groups over the course of several decades. Such numbers could have been absorbed easily by local populations in regions with generally more abundant resources than the NGD.

Climate Impacts

Geoarchives point to sudden and extreme aridity between 700–900 CE followed by a phase of about 150 years (ending around 1050 CE) during which more favorable conditions prevailed. The archaeological record supports an ongoing depopulation of the foothills during the Early Wari phase leaving the area almost completely uninhabited by around 800 CE. This depopulation of the foothills may well have been related to a breakdown of irrigation agriculture due to a multi-decadal period of insufficient and unreliable river discharge. In turn, the *cabezadas* seem to have been populated by immigrants from the Ayacucho region who joined the few remaining locals at the end of the Early and the start of the Middle Wari phase. Apart from the surface sherds of predominantly Middle Wari styles, a relatively late establishment of most Wari centers at the *cabezadas*, after the height of the hyper-arid phase around 750 CE, would also make better sense if considering climate conditions. During Middle Wari, the whole study area formed part of the Wari Empire and was administered by foreign officials. But already at the end of the Middle Wari phase, probably around 850 CE, the Wari left the study area and hardly anyone remained.

The Wari rulers clearly had little interest in directly controlling irrigation agriculture at the foothills. Instead they focused on the *cabezadas*. The indifference towards the fertile floodplains would be logical if irrigation agriculture was little productive at that time, due to a shortage in reliably running irrigation water. Rainfall at the *cabezadas*, however, would also have been very sparse and consequently, rain-dependent highland farming should have been affected as well. If rain-fed farming was nevertheless extended, compared to the Late Nasca phase (as settlement patterns suggest) the phenomenon could be explained with the introduction of more sophisticated terrace-building techniques. These had been developed in the Ayacucho region by people associated with the Huarpa culture (Lumbreras 1974a:96–109) and were introduced in other areas during the expansion of the Wari realm. In the Chicha-Soras, Sondondo, and Negromayo (Andamarca) valleys, a boost in the construction of *andenes* is attributed to Wari rule (Aguirre-Morales Prouve 2009, Branch et al. 2007, Meddens & Branch 2010, Schreiber 1987/1992:149–151) and the same holds true for the case of Moquegua (Williams 2006).[146] The introduction of advanced terrace building tech-

[145] The survey by Lumbreras carried out during the Ayacucho Archaeological-Botanical Project (McNeish et al. 1981) may still be the most universal effort, although it remains poorly published.

[146] Andenes are composed of multiple layers of pebble, gravel, and soil and can store moisture for a long time while also effectively draining excess water. In consequence, they can compensate for irregular precipitation patterns to a certain degree. Though most andenes still in use today are irrigated, many may originally have been rain-fed only.

niques in the *cabezadas* of the NGD could also explain why Wari administrative facilities like S-1682 (Ayapampa), S-121 (Mauka Llaqta), and S-1723 (Santa María) were placed amidst such agricultural complexes. This explanation will nevertheless remain hypothetical unless more fieldwork focusing on terraces is carried out. The increase in pens associated with camelid herding could also point to an adaptation to dry conditions. Animals could be moved to less affected regions in case of droughts, whereas crops would wither on the fields.

The retreat of the Wari and the abandonment of the study area do not seem to have been directly related to worsening climate conditions which actually tended to improve at least slightly since the precipitation minimum around 750 CE. The Wari Empire was a complex, supra-regional phenomenon controlling territories in different parts of the Central Andes under highly diverse climate regimes. It also incorporated or interacted with many culturally and ethnically different peoples, each with its own particular interests, which were probably not always compatible with those of the empire. Accordingly, a variety of socio-political factors, including, rebellions and succession struggles, might have led to the breakdown of the Wari realm. Unfavorable climate possibly also was a factor, at least in some regions, but judging from the study area it was neither the single nor the principal one.

7.8 Beginning Middle Ica Phase to the Spanish Conquest (1180–1532 CE)

The Late Intermediate Period was a restless time characterized by widespread warfare and the displacement of peoples in much of the Central Andes. Since the late 12th century CE, major waves of immigrants reoccupied the almost uninhabited study area. While at the *cabezadas* Rucanas settlers established new villages, the foothills were populated by groups culturally and probably ethnically related to the northern valleys of Ica, Pisco, and Chincha (see Chapter 7.1). The repopulation of the northern Río Grande drainage has to be seen in the context of a general situation of widespread and large-scale migration movements. When regarding the cultural differences, it appears unlikely that the Rucanas and the Nanasca shared the same geographic origin. Accordingly, the developments at the foothills and those at the *cabezadas* should be regarded separately.

It is still unclear where the Rucanas Laramati originally came from. Since their heartland lay in the headwaters of the Acarí river around the present-day town of Puquio (Abraham 2010, Schreiber 1993) the first guess would be that the settlers who populated the upper Río Grande drainage during the 13th and 14th century stemmed from that region. The area is located further inland than the *cabezadas* of the Río Grande drainage and receives greater amounts of rainfall. Accordingly, agriculture would have been less affected in times of drought. This reduced the probability that here as well depopulation occurred at the end of the Middle Horizon (Chapter 4.3.4).

Since archaeological studies are scarce in the Puquio area, it cannot be said with certainty if the Rucanas are the direct descendants of the local Middle Horizon population or if they came from elsewhere.[147] In any case, the Puquio district alone is much too small to explain a migration wave large enough to populate an area of at least twice its own size. It is more likely that the Rucanas people as a whole came from elsewhere, most probably from either further north (Ayacucho) or further south (Titicaca), sometime during the 12th century and then split into the Andamarcas and Laramati moieties which maintained close ties. In this scenario, the Andamarcas would have occupied the eastern *quechua*, namely the Sondondo valley and its tributaries, while the Laramati moved into the western *quechua*, but both branches may have merged with smaller groups of the respective local populations. The Andamarca colony of Uraguaci as well as three others in the Yauca valley (Julien 1993:199–203, Schreiber 1993) may be relatively late foundations, postdating the initial settlement, and were probably "established outside the Carhuarazo [Sondondo] Valley in order to gain access to goods not available locally" (Schreiber 1992:127). In this scenario, their founding would have followed the logic of the Andean ideal of complementarity.[148]

[147] At Pulapuco, a settlement arguably identical with the Rucanas Laramati capital of Hatun Rucanas mentioned in colonial documents, Abraham (2010) found some disturbed Middle Horizon and Early Intermediate Period material below the LIP layers. Even if the site had been occupied continuously since the EIP, this does not necessarily mean that its successive inhabitants were direct descendants of the local population of the preceding period. Furthermore, a single site cannot be regarded as representative for a whole region.

[148] In Chapter 4.2 I pointed to the importance of assuring access to products from different ecozones. One possible strategy is sending out colonists to distant regions (Murra 1975c).

Where the Nanasca, who reoccupied the foothills, came from is also unclear. A small local population may have managed to survive in the area itself during the Late Wari and Early Ica phases without leaving many traces. Additionally, the also small late Middle Horizon population of the SGD might have sent some settlers to the NGD. The large overall number of newcomers, however, could surely not have been recruited from the locals of the Río Grande drainage alone. Given the close cultural ties, the northern South Coast valleys of Chincha, Pisco, and especially Ica are the most likely places of origin, but the inhabitants of these valleys would probably not have left their homes without population pressure. Accordingly, there should be evidence for a substantial population at the end of the Middle Horizon and during the earliest phase of the LIP. Wallace, however, did not find "any 'pure' MIDDLE HORIZON site nor associated architecture" during his surveys (1972:3). In turn, later research revealed that several Wari-related settlements actually did exist in Pisco and Chincha (Alcalde Gonzales et al. 2001, Anders 1990, Santa Cruz Gamarra 2007), but these date to the Early and Middle Wari phases while no settlement is known (or has not yet been recognized or reported) that was definitely occupied during the *Late* Middle Horizon.

It would also be of great interest to know whether the *cabezadas* of the northern South Coast valleys were also abandoned at the end of the Middle Wari phase or if they remained occupied, but no data is available from this area. Given the high population density during the LIP, it can nevertheless be assumed that the northern valleys themselves experienced a major immigration wave, perhaps departing from the Central Coast or the Central Highlands, early in the LIP. The origin myth of the inhabitants of the Chincha valley, mentioned by Cieza de León, may support this assumption:

> If one wants to know the origin of these indios of Chincha and from where they came to populate this valley, they say that, in past times, they set out in large numbers under the flag of a leader chosen by them, who dedicated himself very much to the service of their religions and who, with the good skills he possessed, was able to rally all of his folk in this valley of Chincha where they encountered many people. All of them had bodies so short that the tallest was a little taller than two cubits [ca. 84 cm (*codos comunes*) or 115 cm (*codos reales*)]. And, showing themselves reinforced while the natives were coward and timid, they vanquished them and won their realm. And they also affirmed that the surviving natives perished soon after, and that the grandparents of the parents who live today saw their bones in some tombs and these were as small as said. And as these indios had become the lords of the valley and as it was so fresh and offering abundance, they tell that they founded their villages at once (2005 [1553]:201 [Chapter LXXIV]).[149]

There are obvious fantastic elements in this myth, particularly the statement that Chincha was inhabited by dwarfs, and the allegedly large numbers of these locals is also doubtful. Regardless, the story may represent a distant memory of a major migration movement and violent conquest that actually took place at the end of the Middle Horizon or the beginning of the LIP. After this event, a combination of ongoing immigration and natural population growth may soon have led to population pressure and the sending of colonists to more marginal valleys, namely to the Río Grande drainage. As the ecological conditions of the Río Grande drainage are basically the same as in the northern valleys, the foothills colonization was probably not so much motivated by the desire to gain access to different resources but by the need to supply an excess population with arable land. This would also explain why there seems to have been little obvious effort by the rulers of Ica and Chincha to control the Río Grande drainage politically: it had comparatively little economic value apart from subsistence production for its own population.

Unfortunately, the current state of research does not allow a reliable chronological subdivi-

[149] My translation. Original reads: "Queriendo saber el origen de estos indios de Chincha, y de donde vinieron a poblar en este valle, dicen que cantidad de ellos salieron en los tiempos pasados debajo de la bandera de un capitán esforzado de ellos mismos, el cual era muy dado al servicio de sus religiones y que con buena maña que tuvo pudo allegar con toda su gente a este valle de Chincha, adonde hallaron mucha gente y todos tan pequeños cuerpos que el mayor tenía poco más de dos codos, y que mostrándose esforzados, y estos naturales cobardes y tímidos, les tomaron y ganaron su señorío. Y afirmaron más, que todos los naturales que quedaron se fueron consumiendo, y que los abuelos de los padres que hoy son vivos vieron en algunas sepulturas los huesos suyos, y ser tan pequeños como está dicho. Y como estos indios así quedasen por señores del valle, y fuese tan fresco y abundante, cuentan que hicieron sus pueblos concertados."

sion of the LIP. As a consequence, it is impossible to identify changes in population density and settlement distribution and location between the time of the initial immigration and the Spanish Conquest. It is nevertheless obvious that at the height of the LIP, population levels reached an all-time high, even when considering the long duration of the Middle-Late Ica & Inca phase. To date, there is no evidence for a significant population decrease before the Spanish Conquest and especially before the civil war between the Pizarro and Almagro factions (1537–1542), which both recruited large numbers of indigenous fighters for their armies and devastated vast territories.

Contrary to the Ica and Chincha valleys, no integrated polity with an easily identifiable capital existed in the Río Grande drainage, neither at the foothills nor at the *cabezadas*. Apparently, the larger settlements were autonomous in both areas. Perhaps, the Nanasca as well as the Rucanas formed a confederation in case of external threats but they were also competing among themselves. Numerous examples of fortifications, sling stone caches, and the often clearly defensive locations of settlements leave no doubt that warfare and violence occurred frequently, though it is not known who fought whom, nor when, nor why. Political fragmentation and warfare between neighboring communities ended with the incorporation of the South Coast into the Inca Empire.

Climate Impacts

The extremely high population density in the study area during the height of the Middle-Late Ica & Inca phase required an optimum of agricultural production, which in turn suggests abundant and reliable rainfall feeding the highland terraces and providing irrigation water in quantities sufficient for the cultivation of practically the complete area of the valley floors plus some small lateral quebradas. Geoarchives, however, indicate that climate was not that favorable throughout the approximately 500 years of the LIP. Immigration to the NGD may have started at least several decades before the late 12th century CE, when climate was still relatively dry. As already stated for the Initial Nasca phase, it appears that even under hyper-arid to arid conditions, irrigation water was nevertheless available in sufficient quantities for the cultivation of at least a larger part of the valley floors.

Later on, a climate optimum from approximately 1250–1450 CE enabled the highest population density of all times. The improved conditions for both rain-fed and irrigation agriculture may have motivated the immigration of the Rucanas Laramati into the *cabezadas* and the occupation of the foothills by the Nanasca, a different group of foreigners probably stemming from the northern South Coast valleys. Since the Pisco and Chincha rivers carry significantly more water than the Río Grande and its tributaries, shortages in irrigation water were probably much less common there, even under hyper-arid conditions. Accordingly, it is very possible that the respective valleys were the destination of a major wave of immigrants – perhaps coming from the Central Highlands – already early in the LIP, when conditions in the Río Grande drainage were still relatively hostile. In Ica, the hydrological resources are lower than in the Río Grande drainage as a whole but higher than in any of the individual tributaries. The population density there may have exceeded that of the NGD during the early part of the LIP, but a major population boost did probably not occur before the mid-13th century CE. Unfortunately, the published data available from the Ica valley is still too incomplete to either support or reject this hypothesis.

Most geoarchives from the Palpa area itself, as well as from distant regions, suggest a return to near hyper-arid conditions by the mid-15th century. Surprisingly, however, the archaeological record does not seem to imply notable depopulation before the Spanish Conquest. Some caution is advisable, though, due to the paucity of numeric dates from LIP settlements and the difficulties in distinguishing sub-phases in style development. It is possible that many of the villages without Inca or Inca-influenced ceramics or constructions were indeed already abandoned before the incorporation of the South Coast into the empire either around 1440 or in the early 1470s CE (see Chapter 3.2.4.5). If the assumption is correct that most major settlements were not established or significantly enlarged before approximately 1250 CE, than the relatively short occupation span of only some 200 years would explain why almost no major stylistic changes can be observed in the ceramic assemblages. On the other hand, there is no indication of a dramatic climate change in colonial documents, although a severe crisis caused by permanently decreased precipitation would surely still have been present in the collective memory of the affected peoples a hundred years later. Instead, Cieza states that the valleys of the Río Grande drainage were "densely populated"

("muy poblados") before the Pizarro-Almagro wars of the late 1530s (Cieza de León & Pease 2005 [1553]:204 (Chapter LXXV). Since he did not know how the situation was prior to the Incaic expansion, it is nevertheless possible that population density had already decreased, compared to the early 15th century.

Further archaeological and paleo-climatological research concentrating on the time span from 1000–1550 CE is necessary for a better understanding of what happened during that period culturally and climatically before statements about causal links between both phenomena can be made with greater confidence. The LIP is a key period not only because archaeological remains are preserved more completely than in case of previous periods but also and especially because these can be complemented with ethnohistoric sources. Accordingly, the chance of being able to move away from weighing patchy evidence to actually either proving or disproving a direct causal linkage between population density and climate change is highest for the centuries before the arrival of the *conquistadores*. If it turns out that population levels remained very high although geoarchives point to near hyper-arid and highly variable climatic conditions, then it becomes questionable if climate ever triggered major changes in settlement behavior in the NGD during the time span addressed in this study. But if a close correlation between population development and precipitation levels can be demonstrated, there is every reason to assume that a causal link existed in the more distant past as well.