The shift from foraging to farming and from commonplace practices by multiple groups to greater sociocultural creativity by only a few groups is a complex process that has been approached by scholars in different ways. For instance, in Africa, the first shift has been viewed as a continuum of people-plant interaction based on the resource richness of ecotones (Harris 1989). In contrast, scholars working in regions like Panama, India, Pakistan, and the Near East have modeled the onset of plant cultivation as a result of seasonal food shortages and climate change crisis (Mehra 1999). In Papua New Guinea, scholars believe it was the technological advances of low-risk horticulture that accelerated deforestation and led to agriculture (Golson 1989). In various sectors of the Andes, plant cultivation has been variously viewed as a strategy for reclaiming land following environmental catastrophes like volcanic eruptions and as a result of long-term cultural and ideological processes involving the roles of food in identity and politics (Hastorf 1999). In regions like the eastern United States, the prevailing model is that there was little to no intentionality involved in the development of cultigens and instead there was a process of co-evolution and plant-human interdependence (Rindos 1984; Smith 2001). There is thus a wide variety of models, and a definite sense that each region had distinctive cultural and environmental circumstances, along with concomitant creative social, technological, and ideological changes, that nurtured plant cultivation and ultimately farming. It is in this spirit of the diversity of circumstances and conditions that can contribute to social and cultural change and economic intensification that we present the discussion of our study area. As noted below, the circumstances and changes in our area that led to farming are different in many ways from those discussed in other models, with less emphasis on environmental causes and more on social decisions.
Sites and data patterns in all subareas of this study are interesting in their own right, but they are especially important because of their bearing on the initial adoption of agriculture and on the emergence of social complexity in one area of northwestern Peru. The study poses two questions: Was farming integrated into the economy rapidly in some places and more slowly in others? What was the social impact of this event? The answers depend upon how we model the initial spread and adoption of agriculture and its consequences. Several fundamentally different processes have been proposed to describe the diffusion of agriculture into South America. A long-standing model holds that between 10000 and 7000 BP there was a more or less continuous distribution of pre-agricultural foraging and/or pastoral groups (Bird 1943, 1948; Browman 1974; Sauer 1952; cf. Aldenderfer 2006, Bonavia 1993). It also is thought that the seeds and knowledge of agriculture were transmitted from one foraging, if not farming, group to another, eventually reaching Peru from areas farther north in Colombia and Ecuador and farther east in Amazonia (Pearsall 2008; Piperno 2006b; Piperno and Pearsall 1998). Currently a number of different models suggest reasons that increased reliance on crops occurred, implicating various push and pull factors on the coast and in the highlands (Hastorf 1993; Piperno and Pearsall 1998; Piperno in press a,b). Another approach envisions agriculture, at least in part, spreading by actual migration of agriculturalists (Lathrap 1970; Roosevelt 1980).

The answer probably lies in a combination of these and other approaches and must be studied for each region. These differing points of view parallel discussions surrounding the diffusion and spread of agriculture in other parts of the world. However, the different approaches have different implications for our understanding of early agriculture in the study area. Unfortunately, it is difficult to distinguish between these alternatives on the basis of archaeological evidence alone. Whether cultivation spread by diffusion or migration into the study area, its role in a foraging subsistence regime is a question of congruence of a foraging ecology and the organization of mobility and sedentism, the spatial ecology of natural biotic systems, and the restrictive demands of agriculture. There is a strong implication supporting diffusion of such plants as squash, manioc, peanuts, quinoa, and later maize because of the peculiarities and variable origin hearths within this suite of early cultigens (Dillehay et al. 2007, 2008; Pearsall 1992; Piperno 2007; Piperno and Pearsall 1998). It also is possible that some cultigens came with migrants, but other than plants there are few other cultural indicators supporting this option. On the other hand,
given the tropical to semitropical setting of the study area, it is likely that cotton, coca, and some fruits were diffused from nearby coastal or lower elevated mountain areas or developed locally.

Though the role of plant food intensification figures prominently in several models of Andean prehistory (e.g., Bronson 1977; Martins 1976; Pearsall 2008), only Rossen (1991; cf. Piperno 2006b) has addressed briefly the processes by which this might have occurred in the forested valleys of the study area. He postulates the adoption of cultigens as part of a strategy of low-risk intensification in the moderately to highly productive seasonally dry forest environment of the Nanchoc Valley. In this section, we examine this approach and the possible pathways to plant food intensification for Preceramic people in the study area. As we use the term here, intensification refers to the process of increasing plant food production (i.e., increased output) via various mechanisms that may or may not have involved increased energy costs. We are also aware of Bender’s (1978, 1981) definition of intensification based on social reorganization and intent to produce more. In terms of changes in domestication, architecture, site organization, and ideology, this definition of intensification is also relevant to our analyses. As reviewed later in the chapter, people in the study area may have pursued several different strategies to accomplish this goal, beginning as early as 10200 BP in the Nanchoc area (Dillehay et al. 2003). Some evidence suggests that foragers living in the Q. del Batán, Q. Talambo, and Q. Cupisnique, and others residing along the Pacific shoreline did not achieve this goal until much later, perhaps 7,000 to 4,500 years ago, although prior work in the Cupisnique area by others did not specifically test for cultivars in archaeological sites (e.g., Chauchat 1988).

Last, despite our efforts to compile the archaeological evidence of plant use, our ability to evaluate the overall utility and intensification potential of plant foods is restricted by the limitations of the archaeobotanical record. In the case of overall cultural utility, the limited archaeobotanical data can be used to suggest only that peanuts, manioc, quinoa, squash, and later maize were probably adopted from transient foragers/farmers passing through the area and/or more likely diffused into the area via down-the-line exchange with distant farmers (Dillehay et al. 2007). Plants such as squash, peanuts, manioc, and quinoa carry a strong implication of diffusion or down-the-line exchange because their origin hearths are so distant from Nanchoc in opposite directions. For other plants and plant food groups, such as cotton, coca, beans, *pacay*, and fruits, however, the data are too sparse for us to evaluate domestication or adoption processes, although these appear to be
local or regional (see Chapters 9 and 14). Most likely, this process occurred in stages, as later maize varieties and farming techniques were adapted to new climatic and edaphic conditions.

**PATHWAYS TO FARMING**

We envision four possible pathways that Nanchoc peoples could have taken to intensify plant resources: cognitive, social, technological, and ecological. These strategies are not mutually exclusive (for example, technological and ecological solutions may allow for increased harvests) nor are they necessarily hierarchical in the order in which they might be adopted. Cognitive approaches refer to decisions concerning the kinds and quantities of plant foods selected and utilized. As one strategy, people can choose to intensify and expand diet breadth by collecting a wider variety of plants or by hunting smaller animals. Alternatively, or additionally, people can increase the harvest of resources already being used. Social pathways, such as the expansion of kinship networks and exchange relations, provide another means of increasing access to foods and other resources. Technological innovations represent a third set of strategies to enhance plant food production. Included in this category is a variety of plant harvesting/processing, a unifacial lithic industry, ground stone, storage technologies, and irrigation ditches and canals (Dillehay et al. 2005; Rossen 1991, 1998). Finally, an ecological approach includes various strategies used to maintain and enhance key plant resources, ranging from the maintenance of habitats using fire to practices affecting only specific resources. Ideological change in the form of intensification ritual is a companion process that is also involved in the development of early plant cultivation systems (cf. Bellwood 2004; Bender 1978; Hodder 1990; Wilson 1988).

Survey in the Nanchoc basin has identified late Pleistocene to late Holocene residential sites in several landscape settings. During and after the terminal Preceramic period, floodplains located 10 to 15 km farther downvalley in the more expansive middle Zaña Valley (e.g., Oyotun and Cayalti areas; see Fig. 1.1) were more intensively occupied probably to produce more agricultural crops for a growing population. However, these middle valley groups continued to exploit upper and lateral quebrada and foothill resources in Nanchoc and surrounding areas through either regular expeditions or seasonal occupations. In this regard, we think that there was a site pattern that may represent three coterminous and interdependent settlement systems based on foraging and on irrigation agriculture. One system consisted of long-term settlements of sedentary farmers practicing...
canal-directed floodwater farming on floodplains and along the borders of adjacent alluvial fans of the Nanchoc area. Another consisted of more frequently shifting Tierra Blanca and later terminal Preclassic and Initial Period settlements of groups focused on limited farming at lower elevations in the Za˜na and Jequetepeque valleys, with some floodwater and canal farming at the mouths of enlarged mountain canyons (i.e., Oyotun, Q. Talambo; Stackelbeck 2008), a pattern initiated during the late Las Pircas phase in the Nanchoc area. There also is the possibility of opportunistic farming in low areas of the coastal plains after El Ni˜no events. Evidence indicates that a third system was foragers subsisting on a variety of nondomesticated faunal and floral resources that continued living in the Q. del Bat´an, Q. Cupisnique, and other subareas in the lower foothills of the Andes, as well as on the coastal plains and along the littoral. Several scales of socioeconomic organization were present at the same time, possibly with nested heterarchies filled by different types of foragers and farmers.

Perhaps the most difficult factor to grasp in the development of Las Pircas phase households in the Nanchoc basin is the ritual processes that occurred. Careful cutting and placement of male human bone, perhaps a form of ritual cannibalism (Dillehay et al. 2000a,b; Rossen 1991; see Chapters 5 and 8), and the deposition of quartz crystals in furrowed areas possibly indicate that garden magic was part of a local ideology and occurred in coordination with early house gardening. This suggests that ideological factors also played a role in the development of plant cultivation, or that they were a consequence of intense human-plant relations resulting from their adoptions.

In further considering the adoption of agriculture, a potentially important other factor is climate change. By 8500 BP, optimal conditions existed for more of the region’s middle Holocene foragers to take up agriculture. Netherly’s analysis of the regional and local paleoenvironment (see Chapter 3) suggests that slight increases in summer temperatures at this time created different vegetation patterns in the forested areas of the Nanchoc basin, with the results that streams probably went from occupying incised channels to meandering across fertile, aggrading alluvial fans. As such, this climatic intensive agriculture correlates with a documented shift from a dry climatic regime during the early Holocene period to a cool-wet one after ∼6000 BP. Yet the change was a contributing factor but not necessarily a primary causal one in the adoption and spread of agriculture. Similarly, the changes in settlement and subsistence that occurred between 6500–6000 BP in the Nanchoc area appear to have been in a relative...
stable environment within the scenario of climate change across the study area.

Last, in the Nanchoc basin and other parts of the study area the high productivity of the seasonally dry forest, the close accessibility of other biotic communities, the cultivation of both food and industrial crops, and the storability of wild plant resources supported the development of sedentary communities prior to the arrival of maize and other food crops (e.g., potatoes, avocado, and other fruits, tomatoes; Dillehay et al. 1999; Rossen 1991). In support of this pattern are the house structures, storage pits, waisted hoes and grinding stones, canals, and thick floors and trash middens documented at several Las Pircas and Tierra Blanca phase domestic sites in Nanchoc Valley and Q. Talambo.

**EARLY WATER CONTROL**

We found evidence of water control for agriculture and probably domestic use by early farmers in the study area (Dillehay et al. 2007; Stackelbeck 2008). Garden furrows found at the Las Pircas sites of CA-09–27 and CA-09–52, dated between 9000 and 8000 BP, suggest that water was distributed to garden plots from small unidentified ditches stemming from streams in the higher areas of the quebrada fans and the humid montane forest located above 1,500 m in the valley. At several sites in the Nanchoc Valley, excavated in 1989, 1992, and 2003, a sequence of canals constructed between possibly as early as 6800 but certainly by 5600 BP conveyed water ∼2 km in the Nanchoc River to irrigate fields near the edge of the floodplain and below a series of alluvial fans on the south side of the river, indicating that they diverted runoff from higher terraces to lower benches. This canal system has a possible affiliate and perhaps a longer history of development of ditch or canal technology at sites JE-393 and JE-901 in the Q. Talambo and Q. del Batán areas, respectively. At these sites the presence of domestic ditches (Dillehay et al. 2007; Stackelbeck 2008) suggests possible exploitation of both surface bowls and high water tables in alluvial fans of the lower valley. Not known in these two cases is whether seasonal runoff water or perennial water was used.

The garden furrows, canal systems, and agricultural fields of the late Las Pircas and Tierra Blanca phases, respectively, represent reduced mobility and increased sedentism, and the development of communal organization and labor. It can be argued that the mounds at CA-09–04, house groups, and canals and fields in the Nanchoc areas represent the development of
Foraging to Farming and Community Development

Currently, there are no known precedents in the Andes for early canal systems in the Nanchoc and Talambo areas. Only through systematic subsurface explorations of floodplains and lower quebrada fans of both coastal and highland valleys will we learn whether irrigation technology was part of a wider agricultural complex that arrived from the outside or from an indigenous innovation in the study area. If the latter, then the early canal culture must be viewed as an important source of cultural and social change rather than just a secondary community that adopted agriculture and was on the fringe of Andean civilization. Regardless of the technological source, one issue is clear: the spatial aggregation of and population increase in multi-household communities during the Tierra Blanca phase occurred with the appearance of irrigation canals.

THE NANCHOC TRADITION: COMMUNITY LAND USE, EXCHANGE, AND INTERACTION SYSTEMS

To reiterate briefly, in focusing on people’s interaction with the natural system of the study area, most environmental zones were patchy, and early mobile foragers of the El Palto and early Las Pircas phases exploited the diversity of resources inherent to the patches. With the exception of inland seasonal algarrobo forests and cactus stands and year-round marine lower-valley estuarine and wetland resources along the coast, foraging probably resulted in low return rates of caloric energy because of such factors as small animal size and widely dispersed plants yielding low calories. In some resource zones, particularly the forested Nanchoc area, foragers of the late Paiján and early Las Pircas phases were able to experiment with cultivation to increase ranked resources. The adoption of agriculture in this area was early and somewhat gradual, given that at least 2,000 years of mixed foraging and low-level cultivation preceded the adoption of strategies focused primarily on irrigating agriculture during the Tierra Blanca phase in the Nanchoc area. The eventual primary reliance on agriculture appears to be directly linked to advances in landscape management – specifically the downward migration of Las Pircas gardeners out of the side quebradas and canyons toward the main valley floor, and especially water management by Tierra Blanca farmers – and not to storage technologies (e.g., underground pits, containers), although they also exist. Water management with irrigation techniques created artificial moisture pockets in the Nanchoc Valley.
(and perhaps elsewhere) that were used to grow or enhance the growth of plant food resources (Dillehay et al. 2003). With this development, a variety of crops was eventually added to an established foraging resource package. Thus, the process of crop adoption is seemingly not as important as landscape, water, and plant management. Furthermore, it is important to reiterate that agriculture did not spread evenly nor rapidly throughout the study area. Testing and excavations at thirty-seven sites in the Zaña Valley, Nanchoc Valley, the Q. del Batán and Q. Talambo, and elsewhere show that broad-spectrum foragers relying primarily on algarrobo pods, large and small animals, cactus fruits and leaves, other wild resources, and probably some cultigens continued into the fourth millennium BP. The absence of macro-botanical and micro-botanical (i.e., phytoliths and starch grains) remains at sites in the Q. del Batán and Q. Talambo, as well as the absence or minimal presence of other indicators of agricultural activity (e.g., canals, grinding stones, storage facilities, stone hoes, buried fallows) at these locales, indicate an economy different from that of the Nanchoc basin.

Although foraging and farming are by no means mutually exclusive strategies of subsistence, the relative significance of foraging across the study area cannot be understood without reference to both strategies. Groups and individual settlements could and did shift between subsistence foraging and farming; the conditions allowing farmers to exist in some environments is somewhat different due to soil conditions, water supply, and probably local social factors. We also suspect that some foragers were traders who exchanged local forest products for other items. We should keep in mind that a wide variety of forest products in the upper middle Zaña and Nanchoc areas (e.g., fruits, coca, algarrobo pods) must have been desired by outside groups living along the coast, on the desert, and in the nearby highlands. We would suggest that this kind of exchange network, along with an organizational ability to mobilize and exchange these resources, was central to the development and maintenance of relationships between foragers and others and probably to accessing the exotic cultivars brought into the area throughout the study period. Although more remains to be learned about the relationships between foragers and farmers in the area, it is probable that the farming populations in the valley were small enough so as not to threaten the environments of foraging peoples, and whatever the circumstance of their relationships, it is clear that the area supported a wide range of economic strategies from foraging to farming. Why continue practicing a foraging and long-distance exchange lifeway when agriculture and its incentives were available nearby? The incentive to continue foraging probably relates to the year-round to
seasonal abundance and availability of *algarrobo* pods, cacti fruits and leaves, snails, and other resources in many lower elevated areas, much in the same way that the coastline provided a year round abundance and diversity of foods.

The Las Pircas and Tierra Blanca communities were probably self-organizing through the interactions of the diverse inputs of all the participating households. These types of communities were comprised of a dynamic network of several households acting in parallel, constantly reacting to what the others were doing, especially during the Tierra Blanca phase. The communities were dispersed within aggregated areas on the alluvial fans and decentralized except during communal rituals at the Cementerio de Nanchoc site and later during the construction and maintenance of irrigation canals. If there was coherent behavior in the community, it must have come from negotiation and cooperation among the households themselves. The overall behavior of these communities thus was the result of a number of decisions made by many individual households. There must also have been a certain level of co-dependence between a variety of neighboring economic and social households during the Tierra Blanca phase, if not the earlier Las Pircas phase.

During the Las Pircas phase, it is clear that objects and materials circulated and some items from outside were imported and redistributed throughout the study area. As noted earlier, intra-regional exchange of cultigens and other commodities may have occurred in part as simple “down-the-line” exchange, particularly along rivers and inter-valley stream drainages or along the coastline, and thus did not necessarily require long distance movements of people. Yet, certain lines of evidence suggest that such exchanges may have been embedded in increasing regional interactions, likely including the movement of some people, as part of a process of increasing social and perhaps occasional ritual integration at places like the mounds at CA-09–04 and intensification and spatial expansion of economic interactions after 7800 BP when other long-distance cultigens (but not other exotics) moved into the area. An intensification of these processes at this time is the larger houses that first appear in the Tierra Blanca phase in the Nanchoc Valley and later in certain localities of the Q. Talambo. These areas contained multiple households linked economically and socially in various respects as household clusters, possibly residential kin groups (Dillehay et al. 2004). The appearance of larger rectangular and often internally segmented houses during this phase is a marker of a substantial reorganization and intensification of the domestic mode of
production, including increases in food production, storage capacity, and sedentism.

Further, the centrality of the Nanchoc populations between the coast and highlands may not have resulted solely from their positioning with respect to the close multiple stacking of different ecological zones along this section of the western Andean slopes. They may also have flourished because they were in a position to limit or otherwise regulate access of other adjacent and more distant groups to the dry forested slopes of the Nanchoc area and perhaps to the production of certain local products, such as cotton, coca, and fruits during the Tierra Blanca phase. We think this might be a critical point in the development of the mounds and canals along the Nanchoc River between 7800 and 6000 BP. With the location of Tierra Blanca sites at the lower end of the quebrada fans to more directly access fertile agricultural soils, the settlement pattern changed from the previous semi-aggregated type of the Las Pircas phase into an aggregated pattern. Considering these patterns together, resource harvesting became more intensive and the scope of resource acquisition around the Tierra Blanca canal grew considerably.

Between 5500 and 5000 BP, settlement in the Nanchoc basin and the upper middle Zaña Valley was reduced significantly and the Tierra Blanca phase sites appeared to have been abandoned. Several propositions can be made regarding the cause of any changes in land use and settlement patterns after 5000 BP. First, as discussed previously, due to some kind of environmental deterioration, it may have become more difficult to maintain the higher level of aggregation of population supported by the Tierra Blanca settlement pattern, especially in more arid environments like the Q. del Batán and Q. Talambo near the coastal plains but less so in the Nanchoc basin. Adding to this, there are at least two points suggesting that climate change could not have made an impact strong enough to cause wholesale change in settlement patterns at this time. First, settlements located at ecotones like the Nanchoc basin constituted a key node of the economy, which was the basis for the development of a combined forest-shrub ecosystem stretching from the Nanchoc basin to ecological zones farther west. The general scale and size of sites increased from the Las Pircas to the Tierra Blanca phases. As seen in Figs. 12.1 to 12.3, land use in this area changed from the former dispersed pattern of the El Palto phase into a semi-clumped to an aggregated pattern from the Las Pircas to the Tierra Blanca phases, respectively. Further, the increasingly aggregated pattern took place from ~9800 to 6000 BP during the peak of the so-called hypsithermal arid period, as evidenced by the appearance of
cultigens, canals, and mounds in the study area. These observations underscore the point that environmental change did not have a negative effect (at least on the Nanchoc area) and also suggest that shifts in settlement patterns did not necessarily happen instantly in response to environmental shifts.

Another hypothesis concerning the settlement pattern change relates to intersocietal conflict. Tension with other groups may have occurred for various reasons such as a breakdown of sharing agreements for resource patches or exchange agreements. The archaeological evidence also suggests a conflict hypothesis; the limited presence to absence of exotics and any cultural influence from other areas during the Tierra Blanca phase, with the exception of cultigens from long-distance areas, can be observed in the types of artifacts, especially those from the Nanchoc area. Such changes in material culture happened gradually, perhaps with a cultural hiatus. Thus, cultural change was a subtle phenomenon that we might expect in the case of a shift in population downward in the quebradas toward the main valley floor, perhaps as a result of conflicts with other local groups. The mutilated human remains for both the Las Pircas and Tierra Blanca phases suggest a similar we/they, or local and nonlocal, dichotomy and social conflict. However, the haphazard breakage associated with human remains of the Tierra Blanca phase suggests more aggression and enmity to people than does the careful cutting and placement of bones during the earlier Las Pircas phase. Although difficult to examine at this time, these patterns could reflect a shift from cutting one's own relatives (endocannibalism) during the late Las Pircas phase to the mutilation of bones from the other (exocannibalism) during the Tierra Blanca phase.

THE ECONOMIC FOUNDATIONS OF ANDEAN CIVILIZATIONS

Understanding the nature of Preceramic subsistence practices is one of the cornerstones for postulating the development of the economic foundations of Andean civilization (e.g., Bonavia 1991; Dillehay et al. 2004; Lavallée 2000; Moseley 1975). It was once thought that permanent settlements, early monumentalism, corporate labor, and nonegalitarianism first relied on an economy based primarily upon maritime resources (Moseley 1975; cf. Patterson 1983), although early agricultural settlements also were known in the interior coastal valleys. In the highlands, early complexity focused on the interplay between agriculture and pastoralism (e.g., Aldenderfer 1998, 2006). In recent years, a more neutral approach has been taken that views
the early foundations as having been underwritten by mixed economies that
changed regionally as greater social complexity and increased populations
occurred (e.g., Dillehay et al. 2004; Lanning 1963, 1967; Moseley 1992,
2005; Patterson 1971).

To elaborate briefly, maritime economies have been suggested for pop-
ulations of the late Pleistocene that occupied the coastal zone prior to the
rise and stabilization of the sea level (e.g., Chauchat 1988, 1998; Dillehay
2000a, Sandweiss 2003, 2005a,b). Most early sites were submerged by ris-
ing sea levels at the end of the Pleistocene, which precludes an accurate
assessment of early settlement/subsistence patterns. Nonetheless, evidence
for late Pleistocene and early Holocene maritime economies has been
found along the central and southern coasts of Peru at the sites of Q. de los
Burros (Lavallée et al. 1999), Q. Jaguay (Sandweiss et al. 1998b), and Q.
Tacahuay (deFrance et al. 2001). Deposits at these sites variably include
remains of marine mammals, fish, mollusks, and birds – in some cases to
the exclusion of evidence of terrestrial resources.

In considering the arguments of Chauchat et al. (1998, 2006) for a
maritime focus of the Paiján economy, Gálvez and Quiroz (2008) contend
that varied faunal remains from early sites of the Chicama/Cupisnique
area – particularly in the upper reaches of quebrada drainages – reflect a
much broader economy focused on different ecological zones. Gálvez and
Quiroz (2008) further suggest that Paiján points were more likely used in
the process of hunting land mammals such as deer, and that net technology
would have been sufficient to acquire the smaller and larger fish that were
exploited by Paiján populations (Gálvez and Quiroz 2008). Our collective
data from the Zaña and Jequetepeque Valleys support the interpretation
of Gálvez and Quiroz (cf. Dillehay 2000a, Dillehay et al. 2003). They
also support Moseley’s contention that the Paiján culture was the first
on the north coast of Peru to establish certain techno-economic pulses
toward social complexity (Moseley 1992), as evidenced by the aggregated
proto-households mentioned earlier.

Several middle Holocene sites along the coast and littoral zones, whose
periods of occupation range between ∼ 8200 and 5500 BP, indicate sub-
sistence economies that were similarly focused on marine resources. The
more prominent sites include La Paloma and Chilca on the central coast of
Peru (Benfer 1984, 1986, 1990; Donnan 1964; Engel 1966; Quilter 1989;
Reitz 1988), El Anillo and Yara on the south coast of Peru (Sandweiss
et al. 1989), and various sites of the Camarones Complex and Chinchorro
in northern Chile (Bird 1943, 1946; Llagostera 1992; Schiappacasse and
Niemeyer 1984; Standen 2003).
Earlier occupation at the Las Vegas site (∼11500–8500 BP) in southwestern Ecuador also indicates a more mixed economy that included deer, peccary, fox, edible fruits from plants and trees (e.g., Opuntia cactus and algarrobo trees), and fish and shellfish from nearby mangroves (Stothert 1988). In addition, early Las Vegas populations transitioned from exploiting wild varieties of squash (Cucurbita) to intentionally growing domesticated squash by 11500 to 10800 BP (Piperno and Stothert 2003). Intensive exploitation of plants, including domesticates, is also evident among Preceramic occupations of the Huarumey Valley, such as at Los Cavilanes (Bonavia 1982b). A mixed economy of terrestrial and aquatic resources is also indicated among Preceramic sites of Villa del Mar and Carrizal on the south coast of Peru (Wise 1999) and in the Chicama/Cupisnique area (Chauchat 1988; Chauchat et al. 1998; Gálvez and Quiroz 2008).

Although little is known about the later periods after ∼5500 BP, several Preceramic coastal (e.g., Bandurria, El Paraíso) and inland sites (e.g., Caral and other sites in the Norte Chico area; Haas and Creamer 2006; Shady 2000, 2005) exhibit large-scale monumental architecture with economies based primarily on agriculture and secondarily on marine products. As discussed in Chapter 2, these sites clearly reflect the beginnings of permanent towns, possibly ceremonial and exchange centers, social inequality, and public ideology.

The faunal and botanical remains from our study area point to the simultaneous but spatially and temporally uneven convergence of maritime, agriculture, and foraging economies, depending upon the location of sites on the coastal plains and in the foothills. There are a number of both wild faunal and floral species that are present throughout the El Palto, Las Pircas, and Tierra Blanca phases, although they decrease significantly in number and diversity through time, particularly in the Nanchoc basin where agriculture began (see Chapters 9 and 10). The late Paiján subphase to early Las Pircas phase witnessed the advent of cultivation (i.e., squash), a process that intensified over time and resulted in the manipulation of the landscape to develop a growing agricultural infrastructure, at first house gardens and probably feeder ditches to household garden plots during the Las Pircas phase and then canals and larger crop fields during the Tierra Blanca phase (Dillehay et al. 2007, 2008; Rossen 1991). We have no evidence to suggest early economic development along the coast, but as noted earlier, complex social and economic transformations were occurring in other coastal areas by at least 8,000 years ago.

Thus, what can we say about the early Andean economy and the rise of civilization in our study area? Certainly there was intentional cultivation of
key resources during the late Paiján to Tierra Blanca phases, many of which were domesticated. It is equally important to realize that wild resources always supplemented domestic ones throughout the study areas during all phases but much less so in the late Las Pircas and Tierra Blanca phases. With the exception of domesticated squash in the late Paiján subphase, people during the El Palto phase were generalized foragers exploiting a wide range of wild plant and animal resources. A mixed forager lifeway continued into the Las Pircas and Tierra Blanca phases in the Q. Cupisnique, Q. del Batán, and Q. Talambo. Given the presence of fish bones at nearly all sites during all phases in the study, including several in the Nanchoc basin, we can surmise that people were living along the coast in early times and exchanging marine foods into the interior or inland people were directly exploiting the littoral zone. We thus perceive a multiple-origin economic model for the beginnings of Andean civilization in our area of study. While the Nanchoc basin can be viewed as having an early farming society that intensified through time, as evidenced by the economic, artifactual, architectural, and organizational data, extensive and intensive farming did not occur in other sectors of the study area, at least not until the terminal Preceramic period at ∼5,000 to 4,500 years ago. In other areas, such as the Q. del Batán, Q. Talambo, and Q. Cupisnique, a mixed forager and perhaps farming lifeway was pursued. Along the coast, fisherfolk based their economy on marine resources, with resource exchange taking place among all groups from the Nanchoc area and the highlands above down to the coast.

SUMMARY

There was a generalized forager adaptation to the coastal plains and adjacent western slopes of the northern Peruvian Andes between 13,000 and 11,000 years ago that resulted in a pattern of scheduled, possibly seasonal movements between coastal and interior locations, where various plants, animals, and seafood would be available during all or at different times of the year. As noted previously by Dillehay, Rossen, Stackelbeck, and Maggard, regional and local variation in late Paiján stone tools and raw material indicates constriction of local territories, which we regard as territorial, if not semisedentary. This constriction of territory, reduced mobility, and agglomeration of population continued and accelerated past 9,800 years ago into the Nanchoc Cultural Tradition, which is divided into two phases: the Las Pircas and the Tierra Blanca phases. In some areas, this pattern of resource exploitation began to change rapidly between 9,800
and 7,400 years ago. For instance, in the upper middle Zaña Valley between 800 and 2,000 m above sea level, forest foragers began a local permanent or semisedentary life during the Las Pircas phase with small organized communities, careful burial of the dead (though other human bones were disarticulated and placed in pits), domestic circular houses, initial mound building at CA-09–04, house gardens, and subtle social differences. The technology was dominated by unifacial tools, a varied ground stone technology, simple food storage, and a food economy based on cultigens and some wild plants and animals. The Las Pircas sites yielded cultivated squash, chenopodium (cf. quinoa-like), peanut, yucca, and several unidentified wild fruits. Low frequencies of exotic materials (e.g., marine shell, carved stingray spines, quartz crystals, and raw stone material) suggest minor contact with distant coastal and highland areas.

The following Tierra Blanca phase between 7,800 and 5,000 years ago was marked by changes in house style (from small elliptical to larger, multiple-room rectangular) and the addition of cotton, beans, and coca. Although exotics disappeared, the separation of public and private space was more pronounced as evidenced by the dual, stone-lined, multiterraced earthen mounds at the Cementerio de Nanchoc site where lime was produced in a controlled ritual context for probable use with coca leaves and/or as a food supplement. While Las Pircas sites were located primarily in the middle and upper reaches of quebrada fans near springs and headwaters of small drainages, Tierra Blanca populations preferred the lower edges of the fans near low terraces or benches above the river. The Tierra Blanca sites are associated with early canals. It is during both the late Las Pircas and the Tierra Blanca phases that we refer to different degrees of household clusters and to co-residential groups with stable foci of residence.

Further, the study area experienced some degree of resource stress during the middle Holocene period as well as changes in social structure during all periods. Based on current evidence, we suggest that the subsistence change from a mobile forager to a sedentary farmer-forager and then to an intensified farmer in the Nanchoc basin was initiated by social and ideological factors and not so much environmental stress and population growth. Further, these changes must relate to the close juxtaposition of multiple ecological zones in the study area (especially the dry and humid forests), some richer than others in resource diversity and abundance, which provided generally higher return rates for both mobile foragers and later mixed foragers and farmers. This type of heterogenous landscape that was patchy and offered a variety of closely ranked and low-cost resources may explain why so few large animals appear in the faunal record of sites.
Curiously, despite the high diversity of dietary species within relatively easy short distances across these multiple zones, agricultural intensification during the Tierra Blanca phase took place in the low-risk zone of the dry forest of the Nanchoc basin.

For reasons not yet well understood, there must have been a need to find a different resource production strategy, which likely initiated the use of domesticated plants during the early to middle Holocene period – a strategy probably already practiced in other Andean areas (likely farther north), and possibly in farther inland regions adjacent to the study area. During the Las Pircas and Tierra Blanca phases, domesticated plants were supplemented by existing foodstuffs within a broad-spectrum diet, though increasingly through time people depended more on food crops. The dietary role of domesticated plants in the early Las Pircas phase foraging-gardening subsistence system was a significant economic component by 9000 BP. While cultivating domesticated plants, the Tierra Blanca people evidently increasingly appreciated the benefit of agriculture as a dietary staple and increased its use. Social inequality among different groups and/or households had developed beginning in the Las Pircas phase, as suggested by the skeletal and exotic material evidence. Emerging social inequality among these foragers/gardeners possibly promoted increased production and exchange of rare status and ritual items, such as purple shells and stingray spines from the coast and other items from the highlands. In the process of increasing social complexity, domesticated plants must have provided an excellent source of status differentiation on the individual and household levels.

It is clear that between ∼9,800 and 5,500 years ago, substantial sedentary and highly localized settlements, intensive foraging, house gardening, and diverse patterns of land use came to characterize a particular core area of the upper middle Zaña Valley, in the dry forest of the Nanchoc basin. Perhaps an important pattern is the shift from a variety, albeit low in numbers, of exotics in the Las Pircas phase to their absence in the Tierra Blanca phase. This shift coincides with the building of the two mounds at the Cementerio de Nanchoc site and others in the Zaña Valley, suggesting a change from individualized household accumulation and perhaps competition to public or communal concerns, in this case the ritual production of lime. The impact of this separation may have been to create a special place that served the local community for many generations as a communal and continuing focus for ritual. Of further interest is the interrelationship between the two mounds and the organization of the community that built them. The prevailing assumption is that the labor requirements represent the products
of communal activities and incipient corporate groups (Feldman 2009; Haas and Creamer 2006; Moseley 1975; Sandweiss 2009; Shady 2000, 2005). There is no reason that households, affiliated as a local community, could not periodically unite and cooperate to build structures that the community saw as important. However, there is no evidence to suggest that such cooperative efforts were organized by a formal leadership structure.

In sum, the first people in the Zaña and Jequetepeque Valleys were general foragers, specialized maritime gatherers and hunters, specialized highland hunters, incipient horticulturalists, and other combinations in a wide variety of environmental contexts. These diverse economies entailed different degrees of technological innovation, planning, low-risk management, resource sharing, mobility, territoriality, ritual, and social interaction. We see this as a heterarchical development of relations between different areas to one another whereby each possessed the potential for social and economic growth and for interacting in a number of ways. In other words, heterarchical interaction existed between different kinds of foraging, foraging/gardening, and farming societies where there were many different axes along which differentiation and transformation took place, rather than continuous development in one place, such as the upper middle Zaña Valley and more specifically the Nanchoc basin. However, when viewed from only the perspective of agricultural and community development, the Nanchoc area was clearly more advanced than other parts of the project area (e.g., Q. del Batán and Q. Talambo).