

CHAPTER 6

SETTLEMENT IN THE MIZQUE SURVEY AREA

The Mizque survey area has a larger and richer piedmont topographic zone than the Capinota area. Additionally, the year-round water supply to the valley is more regular than in the Capinota-Parotani survey area. Given these advantages for agriculture, we hypothesized that we would expect to see a larger and denser prehispanic occupation in this survey area than in the Capinota-Parotani area. Specifically, we would expect the Mizque survey area to show a larger overall occupation, and a proportionally greater occupation in the most productive soil group zones. These patterns should have been especially pronounced in the Intermediate Period when the exploitation of the mesothermal resources of this survey area would have been the focus of the residents using Tiwanaku style pottery, perhaps even Tiwanaku colonists.

Analysis of settlement in the Mizque survey area reveals larger occupation area figures than the Capinota-Parotani survey area, for all chronological periods except the Formative. Comparison of the estimates of total occupation size (Table 7; Figure 41) indicates that the Early Intermediate Period and the Late Period occupation figures for the Mizque survey area are significantly larger, suggesting that in these two periods Mizque has a larger prehistoric population. In the Mizque

survey area, there was no settlement preferences for the best agricultural soils, contrary to what we had hypothesized.

The detailed information on the Mizque area survey quadrat data is presented in Appendix B. The location, site size, and architectural features of the recorded sites is found in Appendix D, as are tabulations of ceramic style presence in each lot collection and site. The detailed soil features in each survey quadrat of the sample is tabulated in Appendix F. Finally, each site recorded in the Mizque survey area is described in Appendix H.

The sample of sites

The sampling survey strategy produced a total site fraction of 18.22, recorded at 40 sites in the three topographic zones and three soil zones of the survey area. A total occupation size of 124.31 ha was calculated for this sample of sites. However, more specific estimates are made for total occupation by chronological period (Table 7 and 11); and by topographic and soil zones (Table 12 and 13). These figures will be used in the analysis of soil zone topographic preferences.

THE FORMATIVE PERIOD

The survey sample produced a total site fraction of 6.03 for the Formative Period at eight sites. The calculated occupation area was 14.28 ha and the total Formative Period occupation for the survey area

is estimated at 121.2 ± 93.8 ha at a 95% confidence level (Table 7). These figures include the three sites with no sherds on the surface assigned to this period.

Formative Period occupations were recorded at eight sites: MI 1, 4, 11, 18 and 29; and MI 19, 28, and 40 (Figure 36). The latter three sites did not have sherds on the surface, but have been assigned to this period based on their surface features, such as stone construction styles similar to cases reported from Conchupata (Brockington et al. 1985). With the addition of these three sites the Formative Period occupation in Mizque is still smaller than the Formative Period occupation in the Capinota-Parotani survey area.

The Formative pottery recorded on the surface corresponds to the Middle and Late Formative phases. However, due to the low number of sites of the former phase, the occupation of the Formative Period will be assessed by lumping these phases together. The most important Formative occupation is found at the site complex MI 1-11-40. These three sites were differentiated because they were identified as separate surface clusters of sherds in the same survey quadrat (N 14750 E 51250). They were identified as a result of surface disturbance at different locations in the urban area of the town of Mizque. These clusters were found under a ruined church structure, a school patio and a modern house courtyard. Some evidence suggests that the area separating these clusters was also occupied: sherds in the mud bricks of house walls and from trenches made for sewer construction. So these three recorded sites

probably formed a single site during the Formative Period. The settlement in this area would parallel the occupation observed in previously known sites: Villa Moderna lies 500 m west and Conchupata about 1200 m east (CUMAT-Pereira 1988; Brockington et al. 1985; Figure 36: C and B). However, only the documented surface area of these three locations is used in calculations.

The Formative Period sites recorded in this survey displayed few architectural remains on the surface. Evidence of domestic activity, with middens, hearths, ash clusters, soil discoloration and stone walls in the profiles, was noted at MI 1 and, to a lesser extent at MI 11. Much of the surface remains at MI 11 reflected the disturbance of burials in large urns. Sites MI 4, MI 18, and MI 19 share similar surface features consisting of cobblestone remains of circular domestic structures. Site MI 28 is a mound site with heavy modern occupation, and MI 29 is in an agricultural field; each lacks surface architectural remains and only MI 29 has sherds. Complex MI 1-11-40 was the only exclusively Formative site, although part of the pottery assemblage could not be date stylistically. Site MI 18 presents a very diverse post-Formative occupation, and MI 29 has a dominant Formative occupation (Figure 36).

Arriving at an accurate estimate of site size for Formative Period sites is difficult, according to Brockington et al. (1985), because of constant river flooding, erosion, and sedimentation of the alluvial plain. However, the Formative sites recorded in my survey were not

concentrated in this alluvial zone. Comparison of my site sizes with sizes of previously known Formative sites was prevented by the fact that no site size was estimated at known Formative sites such as Conchupata and Mayra Pampa. At these latter sites, surface evidence is very scanty, reflecting the impact of sedimentation on the Formative Period sites. From my observations at Conchupata and Mayra Pampa, a tentative size of 8 ha and 6 ha, respectively, seems reasonable. Pereira (1988) suggests that Villa Moderna is 6-7 ha. If these estimates are accurate, these would be the largest Formative sites in the valley, but, of course, as multi-component sites, their size would have to be estimated in proportion to the occupation of each period, as is done with sites recorded in this research.

Observations made in one of the survey quadrats adjacent to Conchupata (N15000 E52750) yielded evidence of possible agricultural fields, but no habitation areas. Agricultural loci were noted in the profiles of a quebrada that flows to the Mizque River. An anthropogenic dark organic layer can be discerned about 2 to 2.5 meters below the current surface, along with features such as burrows. Brockington et al. (1987) noted the presence of these features in one of the Conchupata test pits. If non-habitation areas --which are difficult to assess based on current surface remains in some settings and when no later sites are present-- extend beyond the domestic area of the sites, then the sizes of the Formative Period sites, based on surface evidence, are greatly underestimated.

Topography and site location

The bulk of Formative Period settlement was located in the lower piedmont zone on the edge adjacent to the upper alluvial zone. In my sample, the piedmont zone has 8.3 ha of occupation versus 6.0 ha in the alluvial zone (Table 11). No occupation was found in the mountain topographic zone. The random sample data produced an estimated occupation area of 61.4 ± 66.7 ha for the alluvial zone, and 70.5 ± 70.0 ha for the piedmont zone (Table 12). This difference between the percentage of occupation means of the zones is not significant at a 95% confidence level (Figure 43). Hence, the survey revealed no preference for settling any particular topographic zone in the Formative Period.

All sites but one (MI 29), are situated on the northern bank of the Mizque River. The piedmont sites MI 18, 19 and 29 are located on the edge of the alluvial plain zone. The sites on the alluvial plain proper are located on: (a) a low natural platform close to the piedmont boundary; or (b) at a distance inland where floods can be avoided. Only MI 28 is located in the middle of the flat alluvial plain. Some riverbank portions present natural platforms that clearly separate the piedmont from the alluvial plain (MI 18 is located on one such platform), while others present a more subtle slope in the area of sites MI 1-11-40 located about 500 m from the riverbed.

The pattern of Formative settlement on the edge of the upper alluvial and lower piedmont area is seen further in the location of

Villa Moderna and Conchupata, previously recorded in the Mizque area (Figure 36: B, C). The third site, Mayra Pampa (Figure 36: A), is located on the alluvial flood plain and river erosion has washed away the southern portion of the site. Survey inspection in quadrats that were located around the above sites (N15000 E 52750; N15250 E53500; and N17000 E55250) revealed no evidence of Formative occupation.

Soil class and site location

Occupation during of the Formative Period largely lay in group 2 soils, with 10.63 ha., and group 2 soils with 3.65 ha (Table 11). The total survey area estimates for the occupation area by soil group are 31.67±40.71 ha, and 89.44±78.13 ha for group 1 and group 2 soils, respectively (Table 13). Comparison of the percentages of occupation of each soil group zone does not indicate a significant difference in the occupational density of each soil zones (at a 95% confidence level; Figure 43). Hence, no soil group preferences can be suggested for the Formative Period population.

The Formative Period sites on group 2 soils are the MI 1-11-40, MI 4 complex, and MI 29. These sites are located in the piedmont area, adjacent to the edge of the alluvial zone. Sites MI 19 and MI 28 are located on group 1 soils. Of these two sites, the former is on a slope that overlooks the Tucma River, and the latter is located on the flat alluvial plain between the Uyuchama and Mizque rivers (Figure 36).

THE EARLY INTERMEDIATE PERIOD

The survey recorded a total site fraction of 5.15 of this period at 14 sites. The occupation area for the 5.15 sites recorded is 53.76 ha (Table 11). The total estimated occupation area based on the sample is 487.2 ± 324.4 ha (95% confidence level; Table 7).

The Early Intermediate Period diagnostic pottery styles are Sauces, Tupuraya, Gray Ware, and Mojocoya. Few Mizque sites or burials with these styles have been published. One exception is the Sauces site (Ibarra Grasso 1965; Walter 1958; recorded in the survey sample as MI 39; Figure 24). In the stratigraphic cuts at Conchupata and Mayra Pampa (Brockington et al. 1985) small quantities of Tupuraya and Sauces pottery suggested a decrease in occupational intensity during this period. My survey data, however, suggest that the Early Intermediate Period represents a period of occupational growth with respect to the Formative Period. Moreover, this occupation growth is significant at the 95% confidence level (Figure 41).

The Early Intermediate Period assemblage is dominated by the Tupuraya pottery styles that cover approximately 62% of the occupation area recorded for the Early Intermediate Period. Tupuraya style materials were recorded at 12 sites, Sauces style at eight sites, and the Early Intermediate Period Grey Ware assemblage at sites with mainly Tupuraya style materials. Finally, the Mojocoya style was found at two sites in the same lot collections with Sauces and Tupuraya material.

Tupuraya and Sauces style sherds co-occur in ten lot collections at sites MI 13, 15, 30, 34 and 39, with the latter style making up a higher proportion in every lot collection (Figure 37). At site MI 13, the styles co-occur in three lots, and Tupuraya occurs alone in three additional lots, the same pattern occurs at MI 15, where Sauces occurs in only one of the three lots with Tupuraya, and at MI 34, an important Tupuraya settlement, Sauces style occurs in three of the four lots in which the Tupuraya style dominates.

Topography and site location

The split between the alluvial and piedmont zones observed for the Formative Period occupation did not continue during this period. The piedmont occupation amounts to 44.7 ha, or 83% of the total occupation, whereas occupation of the alluvial and mountain zones is lower, with 15% and 2% of the total occupation, respectively (Table 11). The estimated occupation area for the alluvial zone is 9.6 ± 11.4 ha, 383.0 ± 258.5 ha for the piedmont zone, and 79.1 ± 139.0 ha for the mountain zone (Table 12). Comparing the percentages of occupation of these estimates reveals a significantly larger occupation of the piedmont zone (at the 95% confidence level) suggesting a preference for settlement in topographic zone 2 (Figure 43).

The most common setting for settlements during this period was in the lower piedmont zone on the southern bank of the Mizque River (Figure 37). Seven sites with Sauces style material are in the lower piedmont

zone. The eighth site with Sauces style (MI 26) is located in the mountain area, close to the edge of the piedmont. Five of the Sauces piedmont sites are located on the southern bank of the Mizque River on the first natural platforms of the piedmont area overlooking the alluvial plain. Sites MI 15 and 18, on the northern bank, are also located in the lower piedmont area.

Approximately 97% of the occupation area of the Tupuraya remains are in the piedmont zone. Four of the twelve locations with Tupuraya style materials occur in the same southern bank lower piedmont settings as the Sauces style occupation. Another Tupuraya occupation (MI 3) is on the southern bank, in the piedmont area. MI 27 and 8, on the edge of the alluvial plain are small and isolated habitation sites, accounting for less than 3% of the occupation area. The Tupuraya materials on the northern bank occur at sites MI 15 and 18, with Sauces materials, and at MI 14 and 37. These four sites are located in the piedmont zone on natural platforms overlooking the lower alluvial plain.

Finally, the Early Intermediate Period Gray Ware, representing the second largest occupational area, occurs at sites with Tupuraya materials, and is concentrated in the piedmont zone. Only two sites with Formative materials continued to be occupied during this period: MI 18 and MI 29, both on the edge of the lower piedmont and on group 2 soils.

Soil class and site location

In this survey area, unlike the Capinota-Parotani survey area, the piedmont zone, where 83% of the occupation is, includes plots of the best group 1 soils (Table 11). The total estimated occupation of each soil group are 204.2±225.3 ha for group 1, 75.0±58.60 for group 2, and 208.63±198.67 ha for group 3 soils (Table 13). The Early Intermediate Period settlements show a six-fold increase in the occupation area on the best group 1 soils with respect to the Formative Period. However, the percentages of occupation of each soil group zone show no significant differences at the 95% confidence level in this period (Figure 43). The percentage and error range of the occupation of the group 1 soils overlaps with the percentages and error ranges of soil groups 2 and 3.

The occupation area figure for group 1 soils is heavily influenced by the size of sites MI 13 and 14, which make up roughly 40% of the occupation on this soil group (Table 11). Early Intermediate Period settlements in the least productive soil areas show evidence of possible agricultural intensification, such as site MI 34, located on group 2 soils of the piedmont zone. The upper portion of this site displays extensive parallel stone alignments that may have functioned as check dams in agricultural fields for water retention purposes.

THE INTERMEDIATE PERIOD

The survey recorded a total site fraction 4.24 sites and a total of 40.9 ha of occupation in the survey at ten sites (Table 11). A total

occupation area of 365.9 ± 259.1 ha has been calculated from the random sample (Table 7).

Occupations dating to this period were diagnosed by three pottery assemblages: Tiwanaku style, Omereque style and, to a lesser extent, Gray Ware style pottery. This latter style occurs in the previous and following period and hence is not a good chronological marker. Pottery of these three styles have been previously documented as co-occurring in burials but not in domestic contexts (Walter 1958; Rydén 1959; see Chapter 2). All the Intermediate Period sites I found were of a multi-component character; no exclusively Intermediate Period occupations were found in the Mizque survey area. The trends in settlement location of the Formative and the Early Intermediate Period did not continue into the Intermediate Period.

The most important Intermediate Period site in the basin is the Condadillo-Lakatambo complex, recorded in the survey sample as MI 13 and MI 26. The major concentration of Intermediate Period occupation occurs at sites MI 13, 15, and 30, which make up 57% of the occupation area for the period.

The area covered by Tiwanaku style pottery represented approximately 60% of the total occupation recorded for the period. The Intermediate Period Gray Ware assemblage was 29% of the occupation, and the Omereque assemblage represented the remaining proportion. Tiwanaku style materials were found at nine sites: MI 8, 10, 13, 14, 15, 18, 29, 30 and 34 (Figure 38). More specifically, 19 out of the 26 lots

collected at these sites yielded Tiwanaku style materials. Only MI 10 did not yield Early Intermediate Period materials (Appendix D: part 7). The Tiwanaku style materials are evenly distributed at MI 13 and 30; but at MI 15 they are restricted to a portion of the site, the lower slopes of the piedmont, where the site also has a major Late Period occupation. At these three sites the distribution of Intermediate Period materials suggests the same estimated occupational area and sherd density as the Early Intermediate Period occupations.

Omereque style materials occur at seven sites: MI 13, 15, 16, 18, 30, 34, and 39. All of these sites had Early Intermediate Period occupations as well, with the exception of MI 16. Omereque pottery co-occurs with Tiwanaku style material at five sites. The Intermediate Period Grey Ware style pottery was recorded at three sites: MI 13, 15 and 30.

No sites possessed only Tiwanaku style pottery. Rather, Tiwanaku style remains were found at sites which also had local Early Intermediate styles and/or the local Intermediate Period Omereque style. Of the 12 sites with these styles, only MI 13 and 30 have all four pottery styles. The surface slabs and urn fragments of these sites indicates that the Tiwanaku style material probably comes from burials. The absence of domestic structures may be due to looting and surface disturbance.

In our sample, the Intermediate Period occupation declines from the Early Intermediate Period occupation from 53.8 to 40.9 ha. The

number of site locations for Intermediate Period occupation is also reduced from 14 to 12. However, these differences are not significant at a 95% confidence level (Figure 43). Instead, the occupations show patterns of aggregation into three main settlements (MI 13, 14 and 15), a process that represents a continuation of the patterns seen in the previous period.

Topography and site location

A total of 98.5% of the Intermediate Period occupation area of our sample was in the piedmont topographic zone, with the remaining 1.5% is located in the alluvial zone (Table 11). No sites were found in the mountain zone. The total occupied area estimated for each topographic zone is 5.6 ± 9.7 ha and 345.3 ± 228.0 ha, for the alluvial and piedmont zones, respectively (Table 12). The comparison of the percentages of occupation by topographic zone shows that the difference in the higher proportion of occupation in the piedmont zone is significant at the 95% confidence level (Figure 43). We can suggest, then, a preference for occupying topographic zone 2. This pattern of topographic distribution seems to be a continuation of a trend initiated in the Early Intermediate Period.

The most important Intermediate Period occupations in the piedmont area are at MI 13, 15 and 30. These sites are located on natural platforms overlooking the alluvial area. MI 13 and MI 30 are located on the southern bank of the Mizque River at the junction of this river with

two southern tributaries (Figure 38). MI 15, the second largest site with Tiwanaku style materials, is located on a lower piedmont slope at the juncture of the Uyuchama River with the Mizque Basin. MI 14, on the tip of the long platform surrounded by three rivers, represents a fourth site of the Intermediate Period with a strong orientation towards riverside locations yet a location in the piedmont zone.

Soil class and site location

As in the Early Intermediate Period, the bulk of the Intermediate Period occupation was on the most productive soils, with 44.7% of the occupation, or 18.3 ha, on group 1 soils (Table 11). Occupation of group 2 and 3 soils constituted 24.8 and 30.5% of the remaining occupation area, respectively. The estimated total occupation area for the three soil groups is 150.3±180.8 ha for group 1, 85.32±71.03 ha for group 2, and 122.5±148.2 ha for group 3 (Table 13).

The percentage of the occupation of group 1 soils zone is not significantly different, at the 95% confidence level, from the percentages of occupation in the other two soil groups (Figure 43). As during the previous period, the settlement focus in the piedmont zone led to occupation of group 1 soil plots.

The Condadillo site, MI 13, one of the important sites of Intermediate Period occupation, is located on group 1 soils, in the lower piedmont zone. The dense occupation at MI 13 (the Late Period occupation is even more intensive), may have been supported by intensive

agricultural use of the natural terrace, with plots of land cultivated around the habitation and burial areas. Unfortunately, recent human activities have wiped out architectural remains on the surface, except in limited areas with dense vegetation (Walter 1966).

The settlement at sites MI 15 and 30 is located on moderate slopes on group 1 and 3 soils, respectively. The lower and flatter areas of these two sites include cemeteries, on group 2 and 1 soils, respectively. These soils extend beyond the site boundaries onto the alluvial plain.

THE LATE PERIOD

The Late Period displays the largest population and the most stylistically diverse chronological period in the Mizque sequence. The survey produced a total site fraction of 12.76 and a total of 114.6 ha of occupation at 32 sites, including ten sites with no sherds on the surface (Table 11). A total occupation area of 1065.9±470.7 ha was calculated based on the survey sample (Table 7).

Eight sites were found in this period: MI 2, 5, 6, 17, 25, 31, 32 and 33 (Figure 39). Late Period components were found at eleven sites with Intermediate Period occupations, eleven sites with Early Intermediate Period occupation, and two sites with Formative Period occupation.

This period is distinguished stylistically by the Yampara, Late Utilitarian ware, Mizque Lakatambo, Ciaco Mizque, Grey Ware, Presto Puno

and Inca styles (Figures 8-12; Figure 39). Assemblages were generally dominated by the Late Utilitarian ware that made up approximately 35% of the total pottery fragments.

The largest settlements in the Mizque area date to this period indicating increased population nucleation. Seven sites are larger than 5 ha, although two of these are aceramic (MI 7 and 23). Sites MI 13 and 15 had the largest Late Period occupations, measuring 12.47 and 12.37 ha, respectively. Site MI 13 remained one of the largest occupational centers in the Late Period as it had been in the previous two periods.

Topography and site location

Most Late Period settlement (79.8% of the 114.6 ha of the total occupational area) was located in the piedmont topographic zone. The mountain zone held 16.4% of the occupation area, and the alluvial zone held less than 3.8% (Table 11). The total estimated occupation area by topographic zone is 43.6±62.3 ha for the alluvial zone, 784.0±366.3 ha for the piedmont zone, and 181.2±156.6 ha for the mountain zone (Table 12). The most extensive occupation of the piedmont topographic zone is significant at the 95% confidence level. Therefore, a Late Period preference for the piedmont zone can be suggested.

A concentration in the piedmont zone holds for every stylistic assemblage of this period, with the exception of the very limited Inca and Ciaco-Mizque materials (these were most abundant in the mountain topographic zone). The largest sites of this period, MI 15 and MI 13,

and MI 7 and 23, are located on the piedmont zone. Only one of the large sites (MI 26), is located in the mountain zone, several hundred meters uphill from MI 13.

Soil class and site location

The pattern in which the bulk of settlement was on the most productive group 1 soils observed for the previous two periods did not continue into the Late Period. The Late Period saw 61.1% of the occupational area on soil group 3 (Table 11). The area of soil groups 1 and 2 make up 23.9% and 14.9% of the total occupation, respectively. The estimated occupation area for each soil zone is 237.5±246.1 ha for group 1 soils, 144.4±86.1 ha for group 2 soils and 683.3±360.3 ha for group 3 soils (Table 13).

These differences in the percentage of occupation by soil group are not significant at the 95% confidence level (Figure 43). Therefore, the Late Period population did not display a *preference* for any soil group zone.

The bulk of occupation on group 3 soils characterizes each of the stylistic assemblages, and is true as well, for each of the ten sites without surface ceramics. The major occupation on class 2 soils was at MI 13 which has three major ceramic components of this period: Yampara, Mizque Lakatambo and the Late Utilitarian ware.

Late Period agricultural features

Most of the agricultural features recorded in the Mizque survey area date to the Late Period. These features are located on group 2 or 3 soils, and are concentrated in the latter zone. The shallow soil of these groups is high in stone content, and has low water retention, which is to say that they are soils that require water retention devices to allow significant cultivation. Agricultural fields, recognizable as parallel alignments of stones, surround the habitation areas, or are located on surrounding steep slopes and hills (e.g. MI 7, 24 and 35).

Agricultural terraces in the Mizque survey area do not correspond to the traditional **anden** type of construction, except at MI 6. At MI 6, the terraces were covered with domestic refuse and stone constructions, suggesting a domestic rather than agricultural function. At MI 7, 23, 35 and 36 --three of which are aceramic-- low and wide structures that followed the slope contours were observed. These structures probably served as water retention devices (MI 7, 24, 32, and 38). Some of these alignments occur on medium slopes. Their length, and the distance between them varied. No prehispanic canals were found in the survey.

The agricultural installations suggest a period of agricultural intensification, parallel with the large growth in the population of the Mizque survey area. These devices would have helped to put into production the areas settled in a situation where settlement location and soil productivity were not closely related.

Summary: the Mizque survey area sequence

Comparing the percentage of occupation with respect to the total size of each topographic and soil group zone by chronological period reveals several significant results: a preference for settling the piedmont topographic zone in the Early Intermediate, Intermediate, and Late Period. In no other cases, including occupation by soil group, were there differences significant at a 95% confidence level.

Thus, there was no preference for settling on the most productive group 1 soils in Intermediate Period, as predicted by our initial hypothesis. In the Early Intermediate and Intermediate Periods the larger percentage of occupation was indeed on group 1 soils, but the differences in occupation of soil zones failed to be significant at the 95% confidence level. As in the Capinota-Parotani survey area, topography may have been a more important factor than soil type in location of settlements. However, in the Mizque survey area the piedmont zone contains the most productive soils. Unlike the Capinota-Parotani survey area, in Mizque settlement in the piedmont area would not have precluded ready access to good agricultural soils.

Change in occupational area

The chronological sequence of occupational area can be assessed, first, with the total occupation figures by period (Figure 41), and, second, with the figures of percentage of occupation by topographic and soils group zones (Figure 44).

The increase in occupation area from the Formative to the Early Intermediate Period, and the explosive growth in occupation area in the Late Period, are significant at the 95% confidence level. The apparent reduction in occupation during the Intermediate Period was not significant change from the Early Intermediate Period (Figure 41).

Brockington et al. (1985) proposed a hiatus or drastic population decline after the Formative period in Mizque because the sites they studied lacked post-Formative occupation. In contrast, my research has found a significant growth, at the 95% confidence level, in the occupation area from the Formative to the Early Intermediate Period. The Intermediate Period was expected to show a larger population mostly concentrated in the best areas for agricultural exploitation, if surplus production was associated with the appearance of Tiwanaku style materials. In contrast there are indications of a reduction in occupation, although this shift is not significant at the 95% confidence level. Finally, the reasons for the Late Period explosive population growth elude us now. The size of the Late Period occupation demonstrates that the carrying capacity of the survey area was not even approached in the previous periods.

The sequence of percentages of occupational area by topographic and soil group zones displays an additional shift (Figure 44): a significant increase in the percentage of occupation of soil group 3 in the Late Period with respect to the Intermediate Period. In chronological terms the Late Period display a significantly larger

settlement in the piedmont zone and on group 3 soils than the Intermediate Period. There were no significant shifts in occupation by topographic zones or soil group from the Early Intermediate to the Intermediate Period.

The hypothesis that there should be a preference for settlement on the best agricultural soils (group 1) during the Intermediate Period is, again, not supported by survey. Yet the preference for settlement in the piedmont area would have permitted the exploitation of the most productive soils. This repeats the pattern seen in the less productive Capinota-Parotani area where there were no preferences for the best soils, or any soil group, during any period. In the next chapter the results described above will be compared to those from the Capinota-Parotani survey. The patterns of land use and settlement will be then considered with the framework of the models proposed for the distribution of Tiwanaku style materials and land use in both survey areas.