Inter-Regional Ties in Costa Rican Prehistory

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SUBSISTANCE CHANGES ON THE COAST OF THE GREATER NICOYA REGION

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ABSTRACT

Changes in subsistence are compared between four subareas of the Greater Nicoya region. In the Culebra to Salinas area (and probably to a lesser extent in the Lower Tempisque drainage area) maritime resources were extensively used from the Early Polychrome Period on to the contact period. On the contrary, the Matapalo-Nosara (and probably the Rivas region) is characterized by non-coastal orientations. Ecological and cultural factors are looked for that might explain these differences.

RESUMEN

Se discute cambios en patrones de subsistencia en cuatro sectores del region de Gran Nicoya. Desde Bahia Culebra hasta la Bahia Salinas, y a menor grado en la cuenca baja del Rio Tempisque, las indigenas aprovecharon extensivamente los recursos marinos desde el Periodo Policromo Antiguo hasta la llegada de los europeos. Al contrario, la region Matapalo-Nosara, y probablemente lo de Rivas se caracterizo por adaptacion no costeño. Se examina factores ecologicos y culturales que pueden explicar esta variacion.

INTRODUCTION

This paper represents only an incomplete attempt to understand the diversity of human adaptations along coastal Nicoya Peninsula because 1) the comparison of all the data currently available from the sites in this region is not completed and 2) the reflection itself is preliminary, whatever the state of the comparison of the data.

From the Bay of Salinas south through the tip of the Nicoya Peninsula and northeast into the Gulf of Nicoya (Fig. 1), many ceramic sites are located on or near the coast and date from the period between a thousand years B.C. and pre-contact times. However, there is a marked contrast between those sites located along the northern segment of this coast (Bay of Salinas to Matapalo) and those along the Nicoya Peninsula proper (Matapalo to La Bocana) since the northern sites clearly exhibit exploitation of marine resources, a trait not found in the southern sites.

Maritime Adaptation in Northern Sites

Although general statements have been made, particularly by Lange (1971) and Sweeney (1975) about the subsistence patterns in the northern section of coastal Nicoya Peninsula, there has been no attempt to qualify more precisely this maritime adaptation. However my own research (Moreau 1983) on the evolution of subsistence patterns at Vidor site on the Bay of Culebra may be summarized in the following words (Table 1 and Fig. 2). Basic data about the different elements of subsistence will be found as follows: molluscs (Moreau 1983), fishes and terrestrial animals (Kerbis 1979), plants (Norr and Coleman 1982).[1]

Marine resources increase both in absolute and relative terms from the Early Polychrome Period (A.D. 500-800) to the Late Polychrome Period (A.D. 1200-1550). However, relatively speaking, these resources never represented more than a secondary or complementary resource. In Early Polychrome times, they represented about 15% in weight of all the subsistence (5% molluscs and 10% fishes) and about 25% at the Late Polychrome Period (10% molluscs and 15% fishes).

Terrestrial animals exploited by hunting decreased from 35% in Early Polychrome times to 15% in Late Polychrome times. This decrease in relative value through time is paralleled by somewhat similar absolute weight through time, at least between the Early Middle Polychrome (A.D. 800-1000) to Late Polychrome Periods.

The importance of molluscs and fishes as well as terrestrial animals was estimated by direct reckoning of bones and shells using Minimum Number of Individual methodologies. The importance of plants was estimated by indirect observation, namely the analysis of relative contents of carbon isotopes in the collagen of human bones (Norr and Colemen 1982). The so-called C3-path plants, those most probably gathered, suggest a relative decrease in importance from the Early Polychrome Period (20%) to the Late Polychrome Period (5%). However in absolute terms these plants increase through time except from the Late Middle Polychrome Period (A.D. 1000-1200) to the Late Polychrome Period. The C4-path plants, essentially maize in Central America,

suggest a relative increase from 30% of the subsistence in Early Polychrome times to about 55% in Late Polychrome times with a concommittant increase in absolute values.

Unless the carbon isotope technique is not at all dependable, it can be suggested that the above results may err only by a slight tendency to overemphasize the importance of plants because we are dealing with a kind of double independent equation. High concentrations of carbon isotopes generally characterize both C3 plants and terrestrial animals while low concentrations in these isotopes characterize maize and marine resources. Thus, given that archaeological recovery techniques and Minimum Number of Individual analysis both generally tend to underestimate the real importance of meats, plant importance will be somewhat overemphasized. However, I firmly believe that maize was not absent in Early Polychrome times (and by extension during the Zoned Bichrome Period, 500 B.C.-A.D. 500). The importance of maize some five to six centuries A.D. (Early Polychrome Period) would have been between 10% and 30%. In pre-contact times, maize may not represent 50% to 60% as suggested above but certainly was on the verge of being a staple food (40% and over). Obviously these rectifictions in terms of plant importance induce changes, albeit minor, in the other means of subsistence.

This overall picture of subsistence at Vidor site is consistent with the subsistence data presented for the Bay of Salinas by Lange (1971) and those presented by Sweeney (1975) for Chahuite Escondido on the Santa Elena Peninsula.

Such use of marine resources is not characteristic of sites from the southern tip of Nicoya Peninsula. For example, Lange et al (1976) had shown that there is no maritime adaptation in the Nosara valley. Baudez (1967:22) reports some shells at La Bocana, although he does precisely say that these shells are few; we are not told if they were collected in maritime or fresh water (i.e. the Tempisque River: see Fig. 1) environments.

Why a Maritime Adaptation in the Northern Nicoya Peninsula?

Before proceeding to evaluate the various explanations that could explicate the contrast in maritime adaptation between northern and southern sites, it has to be stressed that marine adaptation in the former area is particularly enhanced by very important shell accumulations (shellmounds) that allow estimates of the importance of molluscs themselves but also of all other animal resources since shells neutralize the acidity of soil and consequently, preserve bones of fishes and land animals. Conversely, where there is no shell, few if any bones are found. In brief, we cannot say for sure that there was no marine adaptation in the southern sites because the absence of shells alone could very easily explain the absence of any bone elements.

Another methodological point to be stressed is that the impressive sizes of shellmounds push archaeologists to emphasize and often over-emphasize the true importance of marine resources. I have shown that marine resources at the Vidor site never were a major (i.e. 50% and over of the subsistence) resource. However they may be understood as a secondary resource. In this case, marine resources never had any

other importance than that of a "tasty" supplement to the ordinary resources. The minor status of the marine resources may also be understood as complementary. In this second case, in the very short term, they may have represented the difference between some days with food against some days without food. This may have been crucial especially during the generally severe late dry season in that area (March to June) when plants barely grow (unless there is irrigation) and animals tend to migrate eastward to the central Costa Rican mountains to find food in more humid and temperate areas.

Differences in Ecological Settings

In the context of ecological explanations offered today to understand the adaptation of prehistoric groups, it can be proposed that the contrast between northern and southern coastal sites along the Nicoya Peninsula is a consequence of different physiographical features. In fact the northern coastal strip is literally indented by numerous important bays and peninsulas, in marked contrast with a much less irregular physiography for the southern coastal strip around the Nicoya Peninsula (sensu stricto). The northern area also differs from the southern area by a dryer climate and a more marked contrast in weather between dry and rainy seasons. In brief, physiographical and climatological data sustain well the assertion made by Hubbs and Roden (1964:163) about the development of important upwelling currents of the sea along the northern coastal strip of Nicoya Peninsula, a condition that does not seem to prevail around the southern tip of the Peninsula. These currents are well known archaeologically for their positive effects on the overall sea production at all levels of the food chain.

This situation of contrasting marine resources production in such restricted geographical region as the Nicoya Peninsula is not unique. Linares (1977, 1980) suggests that a same kind of contrast in sea production exists in Panama between the Bay of Parita and the Gulf of Chiriqui separated by a distance of the same order of magnitude (150 to 300 milometers) as the distance between northern and southern coastal Nicoya Peninsula.

If sea conditions explain why the southern sites inhabitants did not have access to marine resources because of their simple absence (at least of molluscs), the presence of these resources do not explain by themselves why peoples began to exploit them in the northern area of Nicoya Peninsula. In all probability, given that there has not been any major shift in coastal physiography and climate since at least the beginning of human occupation in northwestern Costa Rica, marine resources probably had been present but were not exploited during all the Zoned Bichrome Period between about 1000 B.C. and A.D. 600. Why did this change in exploitation between the Zoned Bichrome and the following Early Polychrome Periods occur?

Demographic Pressure and Change in Subsistence

The answer to this question in northwestern Costa Rica had been "classically" the demographic pressure argument (Coe 1962, Baudez and Coe 1962, Lange 1971). Since the very first days of scientific investigations in the area, all interpretations strongly suggest an increase in population from the Zoned Bichrome to the Middle Polychrome Period. However there is less agreement between the searchers for the

transition from the Middle Polychrome Period to the Late Polychrome Period, although few authors would favor an increase in population; most authors favor either stability or decrease in population size.

Assuming that absolute value of subsistence means are closely correlated to the demographic size of the prehistoric groups, I suggest the following picture from Vidor site and the other sites located around and near the Bay of Culebra.

At Vidor there is a constant decrease in the rate of change in subsistence importance. There is a three fold increase between the weight of food available during the Early Polychrome and late Middle Polychrome Periods respectively; a 2.3 fold increase between early Middle Polychrome and late Middle Polychrome Periods and a 0.8 fold decrease between late Middle Polychrome and Late Polychrome Periods. On the other hand from maps of the general intensive survey made around Bay of Culebra (Lange et al. 1980), I suggest that from the Zoned Bichrome Period through Early Polychrome Period to Middle Polychrome Period, there is a marked increase in number of settlements with no parallel reduction in size for those settlements already established. But there seems to be a decline in number of settlements, although certainly not a decrease in size (in fact there may be increase in size) between the Middle Polychrome and Late Polychrome Periods. From these data, I feel confident that we can propose that demographic pressure may be a valid explanation for the changes in subsistence patterns for the period from the Zoned Bichrome to the Middle Polychrome Periods. However, this explanation falls short when trying to deal with the transition between Middle Polychrome and Late Polychrome Periods. Given that demographic pressure was the incentive to change the resources means, how was this accomplished through time? I stated at the beginning of this paper that if hunting and gathering decline in importance while marine resources and maize increase in absolute terms, only gathering shows a definite decreasing trend (albeit very late) between the late Middle Polychrome and Late Polychrome Periods, following a constant absolute increase from the Early Polychrome to the late Middle Polychrome Periods. Other resources show either stability (hunting, molluscs?) or definite increase (fishes, maize).

In sum, it does not seem that the northern sites' people exploited resources to the point where exploitation would have destroyed the natural population. On the contrary, it seems that the changes in subsistence in these northern Nicoya Peninsula sites suggest, at least from the Zoned Bichrome to the late Middle Polychrome Periods,that when people felt that a resource was on the verge of absolute decrease under new demographic increase, they did not--for either or both unconscious and conscious reasons--increase their exploitation of that resource but added a new one. This explains well the slow introduction and development of marine resources as well as the relatively slow development of maize agriculture. Although it is not the place to discuss that problem in detail, it seems that this switch to the exploitation of a new resource in lieu of overexploiting already exploited resources, can be understood in the context of a very delicate balance in human perception between input and output energies put into and gained from the exploitation of the previously used resources and new ones.

This model seems to fit well the changes in population from the Early Polychrome to the late Middle Polychrome Periods. However from (and possibly including) the late Middle Polychrome Period to the Late Polychrome Period, it is plausible that some kind of absolute overexploitation of some resources is perceptible, especially in plant gathering. However, the very important increase in importance of maize between the early Middle Polychrome and late Middle Polychrome Periods also has to be taken into account. In fact, the maximum increase of gathering took place in late Middle Polychrome times when maize did increase in a very important fashion. Given the possibility of decline in human population and increase in importance of maize during the Late Polychrome Period, the decrease in plants obtained through gathering does not seem to be a case of overexploitation but only a shift in resources exploitation (in fact it is really a shift: is there any sharp difference between horticulture and gathering?).

The demographic pressure model thus far seems to explain plausibly the changes in subsistence resources. However no sites along the northern Nicoya Peninsula coast exhibit artifacts that could sustain an important maize contribution to the diet. Only the few adzes may be interpretated as such (Bernstein 1979) and manos and metates are rare items. Moreover lateritic soils and the generally dry climate (except for the rather short rainy season) point to poor maize agriculture. In sum, we are seeking another source area than northern Nicoya Peninsula itself for maize.

The Maize Exchange Network

In this context it is very tempting to look eastward to the Guanacaste highlands and southward to the southern tip of the Nicoya Peninsula for a source of maize. In brief, from late Middle Polychrome on, an extensive and important exchange system may have permitted goods to move around northwestern Costa Rica. In fact, glimpses of such extensive exchange networks had been suggested between northwestern Costa Rica and the Costa Rican Atlantic highlands (Snarskis and Blanco 1978); it has been documented also at the more regional level of the Nicoya Peninsula (Accola 1977).

If maize effectively came from outside the northern coastal Nicoya Peninsula, what could be exchanged in return, unless we are dealing with philanthropic groups? Marine resources may well be one of these return items. In the Trobriand Islands for example, Malinowski (1935:17) has shown that those people exploiting the sea play the role of "buffers" between sea resources and those people living inland, literally controlling access to marine resources. It may also be that this exchange at the purely economical level also was an opportunity for social exchange (exchange of mating partners, competition for power between "chiefs," and so on).

CONCLUSION

The contrast in marine resource exploitation between northern and southern coastal sites of the Nicoya Peninsula urged us to try to find some explanations. Although ecological settings (especially the marine environment) had been shown as a necessary condition for differentiating northern and southern areas, they did not exhaust the

full range of plausible explanations. Demographic pressure on subsistence resources seems to explain with a good degree of credibility the inclusion of new resources, especially marine resources, in the subsistence. The demographic pressure explanation for the increase in maize importance is somewhat counterbalanced by the actual negative artifactual evidence and the general soil and climate conditions under which maize agriculture is difficult.

We have to conclude that maize probably came for a good part from outside northern coastal Nicoya, suggesting an exchange network for subsistence goods and also for other social purposes.

In conclusion, at least from the late Middle Polychrome to the Late Polychrome Periods, the northern and southern Nicoya Peninsula areas would have to be considered complementary regions in a vast exchange network while prior to the late Middle Polychrome Period, these areas may have experienced much more independent development with casual contacts only.

NOTES

1. Discussions and criticisms on the importance of the different food resources lead to somewhat different estimations presented in the final version of my Ph.D. thesis, herein referred to as Moreau 1983 (note added in proof, fall 1984).

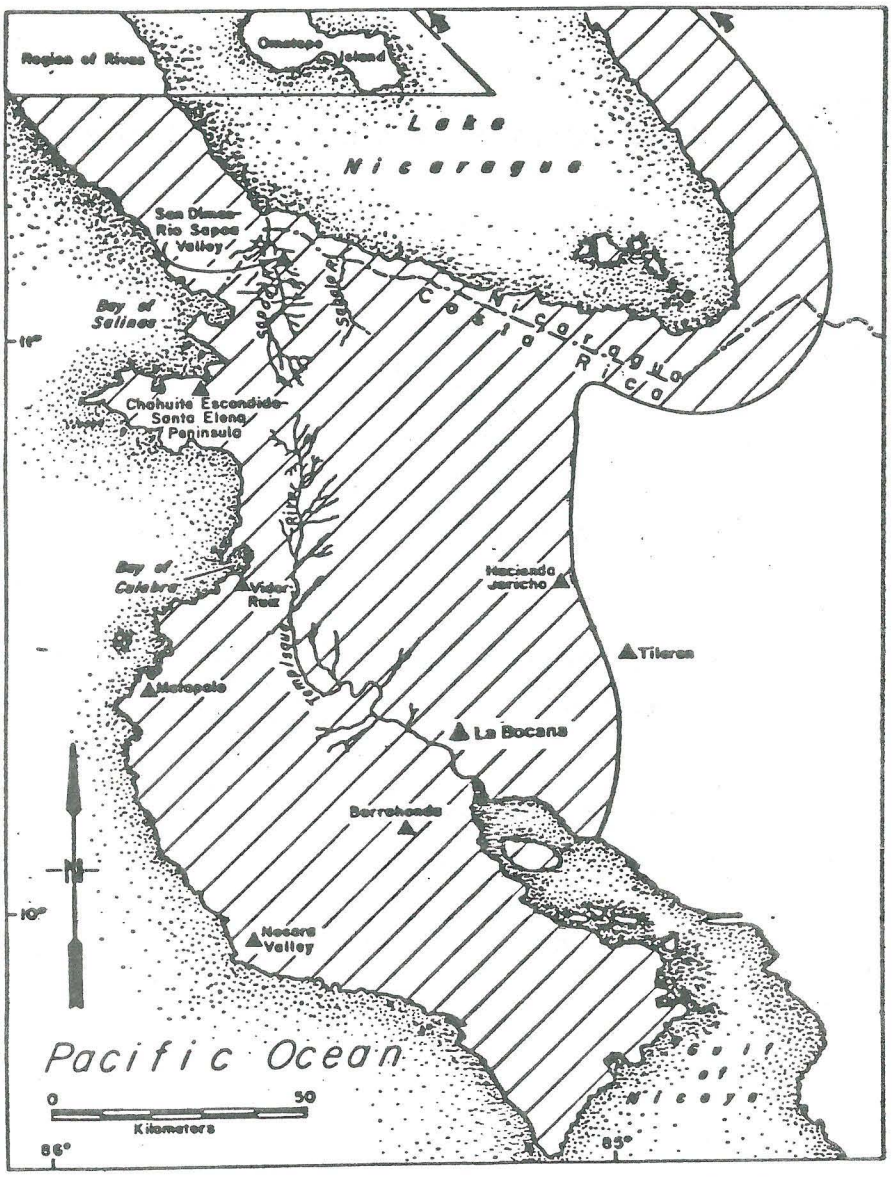

Figure 1. Locations of sites and research areas mentioned in text. The Greater Nicoya Archaeological Subarea is shown by hatching.

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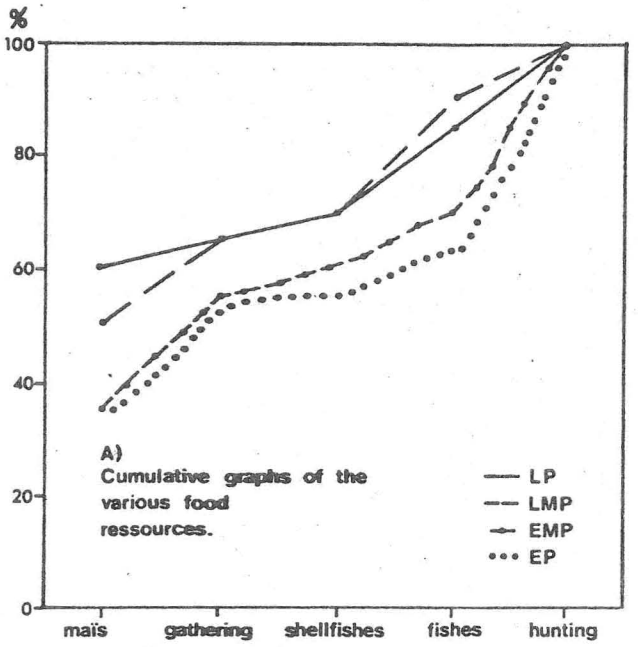
PREHISTORIC COASTAL ADAPTATIONS: 102)

Figure 2
SUBSISTENCE EVOLUTION AT VIDOR SITE (COSTA RICA)



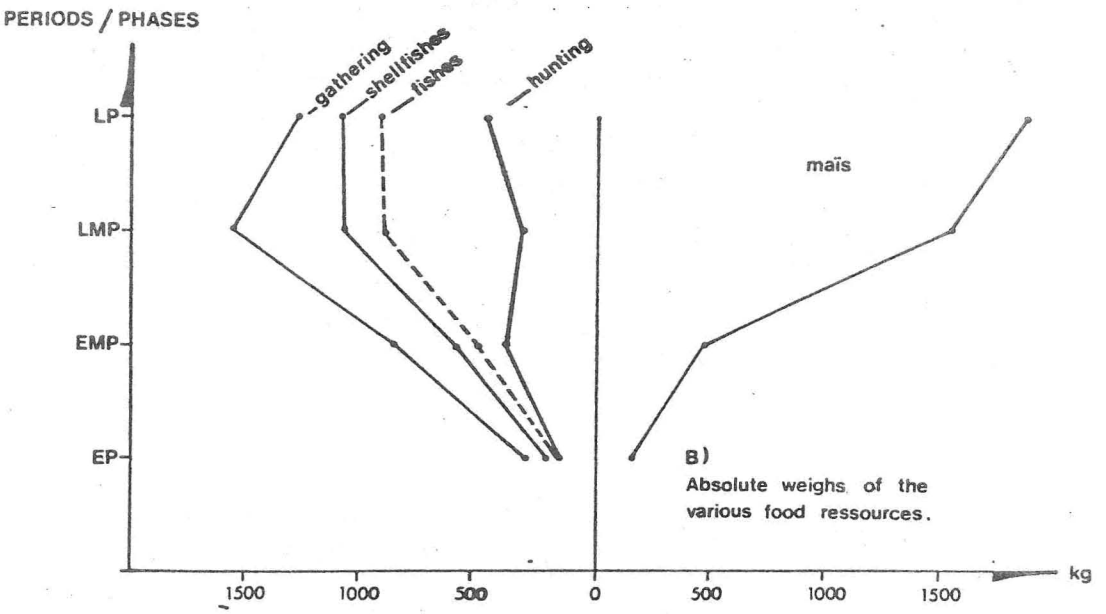


Table 1

Importance absolue et relative des ressources alimentaires au site Vidor

periodes/ phases	mais	cueillette	mollusques	poissons	chasse	total
PT	1883 (60)	157 (5)	160 (5)	427 (15)	512 (15)	3139 (100)
PMR	1550 (50)	465 (15)	169 (5)	548 (20)	368 (10)	3100 (100)
PMA	465 (35)	265 (20)	104 (7)	123 (8)	370 (30)	1327 (100)
PI	154 (35)	88 (20)	5 (1)	46 (9)	147 (35)	440 (100)

Note: biomasses absolues exprimees en kg et leur pourcentage entre parentheses

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