Work Parties and Raised Field Groups in the Bolivian Amazon

by John H. Walker

The Amazon River moves more water and sediment than any other river in the world, and at the mouth of the river, fresh water extends for forty miles out into the Atlantic Ocean. The area drained by this mighty river is about the same size as the continental United States and comparatively little archaeological research has been done there. However, what research has been carried out has shown that the Amazon was home to societies of people who lived in large settlements, made elaborate pottery, and practiced intensive agriculture. As more archaeological data from the Amazon Basin become available, a clearer picture is emerging of what life was like in lowland South America before the arrival of the Spanish.

One question anthropologists often try to answer about a particular group of people is the manner in which they organize themselves. Social organization often governs how resources are divided, how marriage partners are chosen, and where houses are built. For cultural anthropologists, the investigation of social organization is based on participating in the life of the society.
temperature does not vary greatly throughout the year, the seasonal changes in the landscape are striking. In the dry season some rivers can be crossed without getting your shirt wet (Fig. 4). In the wet season, the same river is 20 meters deep and several hundred meters wide (Fig. 6). As much as half of the landscape is under water during the months of January, February, and March.

Today, ranchers live in small outposts scattered along the river levees of the Iruyañez River (Fig. 6). Although these ranches are isolated, especially in the wet season (Fig. 7), radios and airstrips help to build a sense of community. Every night in the field we listen to the "messages," a radio broadcast that contains specific messages for individual ranches and people from their friends and relatives in town. Everything from instructions for immunizing cattle to happy birthday wishes is communicated via these radio messages. Maintaining a herd of cattle is hard work, and for each season of the year there are important tasks that must be attended to. But in July, the ranches are almost deserted as many people head into town to attend the yearly festival (Fig. 8).

**SEARCHING FOR RAISED FIELDS**

Over the course of fifteen months in 1996 and 1997, I carried out a program of survey and excavation in a study area of about 340 square kilometers along the Iruyañez River in the north-central part of Mojos, in an area characterized by so-called large raised fields. These fields are broad, long, shallow earthen platforms, averaging 20 meters in width by 200 meters in length and about 20 centimeters in height (Fig. 9).

Along the Iruyañez River, raised fields tend to be located in the open savanna, near to the smaller tributary rivers and creeks (Fig. 10). In the flood season, which differs quite dramatically from the dry season, raised fields remain dry for the most part, due to their location. They are most easily seen from the air (Fig. 11) and cover several square kilometers in the study area. I measured a sample of 1,711 raised fields using aerial photography and survey, totaling 5.68 square kilometers in area. The total area covered by raised fields in the study area is at least 10 square kilometers. In combination with the neighboring canals, or negative space between platforms, the raised fields cover at least 10 percent of the landscape.

Raised fields are associated with areas of forested high ground along the larger rivers as well as the smaller creeks. Sites in the study area include "forest island sites," as well as large sites along the river levees. A transect of test excavations yielded ceramics and anthropof (dark soils accompanied by charcoal, ceramics, and other evidence of human occupation) along more than 330 meters, suggesting a total occupied area greater than 5 hectares (12.3 acres), and perhaps higher than 20 hectares (49.5 acres). Ceramics recovered from the levees include flaring rim vessels, with fine-line painting on the flaring rims. Two sites, both associated with raised fields, were dated using radiocarbon analysis, one to the 14th and 15th centuries AD, and the other to the 5th and 6th centuries AD. One of these large sites may have represented a village of 1,000 or 2,000 people.

**WORK PARTIES AND THE ORGANIZATION OF LABOR**

To reconstruct the organization of labor, I hypothesize that communal "work parties" built the raised fields. Four lines of evidence suggest this hypothesis: ethnographic analogy, ethnohistoric data, ceramics, and the raised fields themselves. First, in farming systems around the world, agricultural yields are used not only to feed farmers and their dependents, but also as payment for communal labor. The coordination of this labor is often accomplished by means of so-called work parties. In cases described by such anthropologists as Erasmus (1965), Netting (1993), and Stone (1996), small communities of farmers pool their labor to perform intensive agricultural tasks such as harvesting crops and raising barns. Since these tasks must be completed in a short period of time, the amount of labor required is often beyond the capacity of any individual household. Therefore, communal work parties combine labor from several households in order to complete the task. As payment, the guests at a work party are usually provided with food and drink (especially alcohol) in exchange for their labor. Sometimes even the performance of difficult tasks can take on a festive, competitive feeling. Since these practices are common among intensive agriculturalists from around the world, they provide the basis for a reasonable hypothesis for
Fig. 4. During the dry season, which lasts from about May to October, rivers fall dramatically and water becomes scarce.

Fig. 5. During the wet season, from about November to April, about half of the study area is under water.

Fig. 6. This ox is being broken to the saddle. Oxen are the most reliable all-weather mode of transportation.

Fig. 7. In the wet season, animals like this armadillo search out high ground, even the high ground where ranches have been built. This armadillo made good his escape, after having taken refuge from the floodwaters in the kitchen of a ranch.

Fig. 8. The fiesta of Santa Ana del Yacuma, like the town festivals of all the former Jesuit mission towns in the Llanos de Moxos, is an important event for indigenous people.

Clark Erickson carried out experimental construction of raised fields in several lowland communities in the early 1990s (Fig. 15). These experiments in Moxos confirmed the results of similar work in the Andean highlands (Erickson 1988), that raised fields can be built, and could have been built, using labor coordinated at the local level. Intensive agriculture of this type does not seem to necessarily depend on outside authority or direction. Studies of time and labor from these experiments are also very useful for archaeological interpretation, as they can be used to estimate the labor that was required to build the prehispanic raised fields.

The amount of food that can be produced per unit area of raised fields is best estimated by using local production figures. Information comes from several agronomic studies, conducted at the Estación Biológica del Beni, a biological research station located in Moxos. The raised fields yielded roughly 25 metric tons of manioc per hectare, a very high figure. The crops on the experimental fields also survived an inundation that wiped out crops in conventional slash-and-burn fields. Recorded yields of agriculture practiced by the T'simane people are about 18 metric tons of manioc per hectare, confirming that agricultural yields from fields in the region can be high.

Working from these two sets of calculations, we can find the point where the amount of labor that is required to build the largest field in a
A lack of earthworks connecting raised fields to one another is further evidence for their individual construction. This absence of any larger agricultural infrastructure is a distinctive aspect of this part of Moxos. There are no long canals or causeways, which would have required higher inputs of labor, and would have affected more than one field. Though fields are usually located within 30 or 40 meters of one another, they do not depend on one another for water or for drainage. In addition, there is no evidence for any mechanism by which farmers living upstream could have controlled the water supply of farmers downstream. There are no structures that impound water, and no structures that improve drainage for more than one field. Though it would have been easy to restrict drainage by building connecting earthworks between fields, thereby closing off canals, no evidence of such constructions exists. The system required little or no water management, and communal decision-making was not necessary for its everyday functioning. These fields are particularly amenable to analysis, because they are all of a single type, and they are of a size that makes them easy to measure.
The 30 groups in the sample represent a total carrying capacity of just under 1,000 people, with about 55 people required to build the largest field. The groups have an average area of just less than 5 hectares. Taking the measured total area of each group and combining it with the estimate of raised field carrying capacity, the groups have an average carrying capacity of 33 people. The standard deviation, however, equals 32 people, with values ranging between 4 and 116 people. The estimates of the number of workers required to build the largest field in the group range from 8 to 55 people. Some groups, such as field group number 6, could have supported enough people to construct any raised field in a short period of time. Other groups could have supported people who probably cooperated with others to build more raised fields. There is great variation in the size of the groups, just as there is great variation in the size of the individual fields.

It is important to remember that this analysis does not claim to describe precisely the social groups that existed in the past. There are too many unknown factors for the results to be interpreted as anything more than estimates of the size of actual groups of people. However, the range of results from the production and labor estimates, combined with the spatial patterns of the raised fields, is illuminating. The evidence suggests that social units of between 20 and 100 people built raised fields in contiguous groups that corresponded to prehispanic social units. Though these hypothetical social groups varied widely in terms of size, they were large enough to build an average raised field in a single event, a single "work party."

Fig. 15. People from the community of Bermeo showing the raised fields they built in 1993. In this case, the fields are about 5 meters wide, 50 meters long, and about 1 meter tall.

Fig. 16. Theoretical estimates of raised field groups can be compared to actual groups of fields, measured from aerial photographs. The sample of raised field groups shows considerable variation. For example, raised field group number 10 is a small group of 5 fields, totaling just less than 1 hectare in area. Eight people could have built the largest field in the group, and the group of fields might have supported 8 people. Raised field group number 21 consists of 18 fields, totaling 5.5 hectares. Twenty-one people were required to build the largest field in the group, while the group might have supported 37 people. The third example is the largest in the sample, raised field group number 6. This group consists of 17 fields, totaling 14.8 hectares. While 55 people were required to build the largest field in the group, the fields in the group could have supported 99 people.

It is difficult to know more about these social groups from the evidence that we now have. However, the ethnographic and historical record from South America provides some interesting analogies. We know that in the highlands to the west, social groups called chullo were an important part of agricultural, political, and religious life at the time of the Spanish Conquest. To the east, along the Xingu River in Brazil, there are groups of people who have a social organization much more complex than might be expected on the basis of the size of their population. Some anthropologists have suggested that there may be links between the social organization of highland and lowland peoples. The archaeological and ethnographic evidence from the Llanos de Moxos could be an important part of this discussion.

This analysis of the agricultural system suggests that it did not require the coordination of large groups of people. In addition to these archaeological implications, the data suggest that the raised fields present in Moxos today could be renovated, or even built in new locations with the labor that could be coordinated by a single community. Raised fields might be part of an effective strategy for agricultural development, and the people of eastern Bolivia will make this determination.
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