

HAITIAN PEASANT CONTOUR RIDGES:  
THE EVOLUTION OF INDIGENOUS EROSION  
CONTROL TECHNOLOGY

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**Haitian Peasant Contour Ridges:  
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by

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In these pages I will describe and analyze the recent emergence, in a mountainous region of rural Haiti, of a locally unique but technically effective erosion control strategy which, though unknown some two decades ago, had by the late 1970's become an essential, universally adopted element in the agrarian repertoire of peasant cultivators in the research community. The significance of this pattern lies not only in its uniqueness within the context of the ongoing, virtually unimpeded erosion which continues to undermine the agrarian base of most regions of this mountainous Caribbean nation. In addition the appearance of this locally confined erosion control complex as an unplanned result of early 1950's developmental inputs illustrates for development planners at least one type of technically successful project outcome in a process involving selective retention by peasant cultivators of some developmental inputs, the rejection of other elements, and--above all--the evolution of locally created devices for the solution of agrarian technical problems for which planners had been unable to provide any convincing, cost-effective remedy.

But this paper is intended, not as an anthropological encomium of Haitian peasant wisdom, but as an attempt to identify those key factors which have led to the successful emergence of appropriate erosion control technology in one corner of a

denuded island Republic whose massive but tragic and economically most significant export is an unintended annual contribution of irretrievable topsoil washing out into the Caribbean Sea. The first Europeans to see this island in the late 15th century had described it as a lush tropical paradise. The erstwhile fertility of the island's soil is evidenced by 18th century colonial export figures, which earned for the colony of Saint-Domingue (as the island was then called) the title of most valued jewel in the French overseas empire.

But if the colonial economy was uniquely prosperous, the colony's slaves were uniquely successful in pulling off the first and only New World slave rebellion in which ex-slaves were to organize into an autonomous, centrally governed nation-state.

Yet the early Haitian governments which emerged in the wake of the uprising, though able to make their presence felt throughout the island, lacked the organizational strength and coercive capacity to carry out their original designs for reviving the prosperity of the devastated colonial economy, a scheme which would have entailed bringing the newly liberated and now dispersed population down from the hills back onto governmentally managed export crop plantations. The rural populace of those germinal early decades, by staking claim to and remaining entrenched on their own plots of ground, set at least two precedents, which have been faithfully reenacted by each successive generation of Haitian peasant: a basic economic strategy of diversified multiplot peasant gardening and a basic economic autonomy which with few exceptions has successfully

continued to ignore and resist the designs of virtually any and all would-be economic planner.

Some contemporary observers would undoubtedly question the appropriateness of the term "successfully." It would be anthropologically rewarding to be able to unveil a portrait of success for this first and only New World experiment in radical, nation-state autonomy for masses of ex-slaves. But such a portrait would be a flattering distortion of a contemporary reality which must be deemed tragic by any reasonable economic or social yardstick, per capita income, mortality, morbidity, malnutrition, illiteracy included. Even the most fervent anthropological admirer of the rich body of music, folklore, folk-religious beliefs, and other autochthonous manifestations of collective creativity that make rural Haiti unique in New World perspective must concede, however, that economically all is not well there, that very few things in fact are well.

The dynamic which has increased local poverty, and in the process thwarted the effectiveness of so much assistance planning, is multidimensional in character. In these pages I will focus in on one of these problems: the ruthless application by the rural population of ecologically inappropriate and catastrophic lumber extraction and gardening techniques which have transformed the once lush landscape of entire regions into grim, denuded savannas.

The ecologically destructive behaviors which have led to this environmental degradation have arisen in the context of particular technological antecedents, a particular type of

colonial history, and a particular type of subsequent national isolation from many mainstream international currents. In addition their incidence has been made more serious, and their impact more strongly felt, by recent patterns of sharp demographic increment. That is, technology unfolds and operates in the context of a multidimensional field of force.

My analysis here, however, will not attempt to cover all aspects of this field. I will focus in rather on specific issues of concern to two types of analysts: anthropologists interested in stress-generated patterns of spontaneous technological evolution, and planners interested in cases of the successful introduction of erosion control practices among groups whose technology formerly lacked such practices.

With respect to the anthropologist, the relatively recent burst of theoretically and methodologically more sophisticated studies carried out in a "cultural ecological" framework has produced documentation of the manner in which many horticultural and agricultural groups have come to improve the efficiency of their productive technology, not only by diversification of their tool inventory, but also through improvements in their techniques of ground preparation, irrigation, cultivation, and even of harvesting. And the disagreements between those who argue for spontaneous reinvention as opposed to those who believe technological diffusion to have played the prime role, have come to lose importance, as both groups recognize that acceptance of new technology introduced from elsewhere is as much a function of empirically identifiable determinants as is the indigenous

creation of such technology.

It would seem in either of these two regards that the Haitian case illustrates the dynamic of technological failure. In neither biological nor cultural evolution is "success" the only, or even the most frequent, outcome. The destruction of the Haitian environment--and visitors to Western Hispaniola will recognize the non-exaggerated quality of this assessment--appears to illustrate the negative case, that of a group which has not to all appearances adapted its technology to its environment. And whether one is more inclined to join those who explore "culture-internal" causes, or those who feel the blame should be placed on colonialists, imperialists, or some other group of international scoundrels, there seems little question but that in either case the analyst must explain why, when so many groups have devised effective technological measures for protecting the environment, the Haitian peasantry has clearly remained in the camp of those whose behavior has continued to contribute toward its destruction.

But analysts of developmental planning will find themselves equally challenged and perplexed by the Haitian case. The early UNESCO team of the 1940's, which entered the Marbial Valley of Southern Haiti to initiate what was one of the first attempts of the newly created organization to carry out its developmental mandate in any part of the world, began its task with the excitement and optimism of the bearers of good news to an island which, at least developmentally, was an untouched virgin. By now, however, more than thirty years later, the virgin has received the persistent attention of probably more suitors

than any other country in the Western Hemisphere.

The advances have been generally welcomed. This is particularly true of those more highly educated sectors of Haitians who have rushed in as intermediaries between the profferers of assistance and the intended beneficiaries, and who have thus been able to forge careers and livelihoods in the solicitation, reception, and administration of enormous quantities of cash, food, and other relief resources. Though the standards of living provided by these activities is far below that of the local expatriate counterparts from the donor agencies, it is far above that of the ordinary Haitian and helps to explain, at least in part, the generally enthusiastic (but by no means necessarily deferential) welcome which offerers of assistance have received.

But there is overwhelming evidence attesting to a generally positive reception among the peasants themselves--if not to the content of the plans, at least to the presence of resource-bearing planners. Because the donors have generally made "community self-help" a prerequisite for their attention, the past three decades have witnessed a mind-boggling proliferation of "Community Councils" from one end of the island to another. The initially puzzling spectacle of crudely painted roadside signs announcing the presence in this or that hamlet of a Community Council falls into place when one becomes acquainted with the hordes of overseas relief organizations, missionary groups, and other donor agencies who have frantically searched for village structures through which to disburse deadline-bound cash or relief food. More than one observer has suspected that the entire Community Council

movement can be viewed as a resource-collecting strategy. And though virtually every evaluation has pointed in dismay to the fact that most Councils are administered and run by wealthy, better educated villagers who rarely work the land themselves--i.e. by non-peasant--the peasants themselves collect at least part of the resources and the presence of these Councils does give accurate testimony to the enthusiasm with which outside assistance is welcomed.

Few planners or resource-bearers have viewed themselves as charitable agents. Most have rather devised plans in which the resources would be channeled in such a way as to make possible and trigger off significant changes in the behavior of the recipient communities, changes which would take hold and continue once the outside assistance is withdrawn. Several agencies, including the Food and Agricultural Organization of the United Nations and the United States Agency for International Development, have specifically earmarked large amounts of support for the proliferation of techniques of soil conservation.

The results have been generally discouraging, in some instances catastrophic. In the course of an evaluation which I was commissioned to carry out on the status of past and present soil conservation projects in Haiti, it became clear that projects had on the whole and with few exceptions been unable to interest peasants either in trees or in terraces. The vast majority of projects had been able to marshal support only by resorting to strategies of paying peasants, either in cash or --more often--in relief food which was subsequently sold by most recipients in local markets.



Haitian peasant technology has emphasized the cutting of trees, but has given very little attention to their planting. Small quantities of fruit trees are planted in the vicinity of new houses. But the concept of planting orchards of fruit trees was absent. And the concept of planting a lumber tree is virtually absent from the traditional economy. A pine tree or a mahogany tree is something that "l'évé pou ko-li," grows by itself. And systematic contour terracing is equally alien to traditional practices. Some recent studies on aboriginal terracing in the New World indicate that, even in pre-colonial times, terracing was not present, on the islands. It has certainly been absent from the technological repertoire of the island's current inhabitants.

To give at least some compliance with project expectations, communities have built rock walls and planted trees--but on the agriculturally marginal lands where cultivation is less frequent, where the danger of erosion is subsequently less, and where the need for soil-conservation measures is consequently least. But the placing of soil-conservation measures in these places permits communities to receive wages and other rewards for their "self-help" activities without actually endangering their already stressful horticultural economy by taking up cropping ground with questionable structures whose payoffs are at best longterm and remote. In other projects, town-based foreign project administrators have simply issued mandates to their nursery specialists to plant nurseries. And when the seedlings were getting dangerously mature, but the anticipated masses of eager,

grateful peasant takers never materialized, further orders were issued to village personnel hired by projects to "get those trees planted." The consequence was predictable. The village personnel (many of them outsiders) simply ordered the work-gangs in their hire to invade gardens and plant trees. Peasants who protested were informed that this was a "proje léta" (a government project), and in at least one instance a farmer was brought before the authorities for resisting efforts to plant trees on his land.

The trees planted, or the rock walls built, under these circumstances, rarely survive, even when placed on marginal land. This latter type of land is used for the grazing of animals. When the trees have been planted, the walls built, and the wages collected, animals are let back into the field. And then, in the words of the peasants, "bouch bet manjé plan-bwa, pyé-bet krazé mi-sek", the cow's mouth eats the seedling, its feet destroy the dry-wall. The result has been the destruction, in most project regions, of probably more than 75% of the trees that were planted and perhaps 90% of the walls that were built.

This account is disturbing on at least two levels. The very sequence of events itself--and one or another variant of this sequence has occurred in a depressingly large number of projects--is a charade of the development process as envisioned by planners. But at another level the description of the failure entails a replay of a somewhat irritating role that anthropologists have come to assume: that of debunker. Justifiably irked by "official" models which even today occasionally depict planners as bearers of light to benighted, technologically ignorant peasants, and

armed with the basically on-target insights that even a brief period of linguistically and behaviorally sensitive fieldwork can bring, anthropologists respond with their own competing caricature: that of the hard-pressed but rational and clever peasant making a fool out of stupid (or at least out-of-touch) foreign planners.

Let each professional be aware of the crumbling clay feet that constitute the shaky support of all those who make a career out of analyzing or intervening in the dynamics of poverty and let us return to the common ground that can unite both fields: searching for the conditions under which technological improvement, which has occurred in so many world settings, can be anticipated or encouraged in other regions where it has not yet made its appearance.

I believe that the anthropological contribution to this task is achieved less through post-mortem debunking of the instances of program shortsightedness and failure, than by examining the dynamics of success. For if the vast majority of soil conservation projects which I observed in Haiti must be classed as failures, I had the good fortune of stumbling on one region where the peasants were protecting their soil through the use of back-breaking labor-intensive techniques that were absent from the repertoire of any other community which I or other observers had visited. It is this case which yields richest insights into the dynamics of failure in most other projects, and which identifies for us the most promising path which future efforts should take,

## The Valley of Furcy

The capital city of Port-au-Prince is located at sea level on a bay which juts into the western end of the island of Hispaniola, the second largest island in the entire Caribbean. But though Port-au-Prince itself is characterized by a hot lowland climate, it is flanked by steep mountains which rise precipitously to nearly 2,000 meters above sea level within the space of a few kilometers. A substantial percentage of the middle and upper class population of this region of Haiti (and virtually the entire foreign colony of diplomats and the private enterprise sector) make their permanent residence in Pétionville, the first major population center on the road up into the mountains. But a well constructed and reasonably well maintained all weather road continues further up into the hills. At some 1,000 meters of altitude (only some 45 minutes by vehicle from Port-au-Prince) the road passes through the mountain town of Kenscoff, the site of a famous market and the furthest point of penetration for most of the tourist trade and the wealthy Haitians and foreigners who have built summer retreats.

But the mountains continue to rise, and the road as well, although the pavement stops shortly after Kenscoff and with it all regular vehicle traffic except jeeps and vans with four-wheel drive. Summer homes continue to be found, but as the road rises and approaches the small town of Furcy, the landscape becomes dominated by the increasing prevalence of peasant cottages and the increasing signs of peasant cultivation. The visitor who has come this far will have already observed on the

hills flanking the road between Pétionville and Kenscoff, some of the most barren, eroded land visible in Haiti. The lush vegetation to which earlier chroniclers attested has long since been totally removed, and the signs of all varieties and stages of soil erosion--from rilling to gullying to sheet erosion--present dramatic evidence of the long-term result of cultivation on steep slopes by peasant communities whose agrarian repertoire is devoid of the terracing techniques that had characterized the agriculture of other groups in other world regions.

In the context of this landscape, the Valley of Furcy strikes the visitor as a misplaced page from some other country. As the vehicle road reaches its highest point, the visitor is suddenly confronted with the vista of a heavily cultivated valley. The peaks of many of the mountains are still covered with stands of pine and eucalyptus but, most importantly, the cultivated slopes --from which, of course, virtually all trees and shade plants have been removed--are nonetheless carefully protected with closely spaced rows of terrace-like structures.

The unusual status of these structures was vividly underlined by their apparent restriction, or at least concentration, in only one of the valleys. The most complete vista of the system was to be had by travelling south along the crest of a ridge. The majority of the erosion control structures were to be seen in the valley to the west of this ridge. The hills of the adjacent valley, to the east, in contrast, were characterized by the same style of unprotected denuding and cropping that is the more common landscape seen throughout Haiti. If one can

expect technology to transfer, at least within a local region, one was justifiably puzzled as to why the farmers of one valley appeared to concur in protecting their hillsides whereas their neighbors in the adjacent valley were equally consistent in their adherence to the traditional un-terraced horticultural model which had long since impoverished and/or removed the soil of so much of Haiti.

The most promising research entry point appeared to be a line of questioning which first explored, not why the non-users rejected the terraces, but why their users, in defiance of general Haitian practice, had adopted them. But the very nature and taxonomic status of these structures was not at first clear. Though constructed approximately along the contour in regularly spaced descending steps in the mode of terraces, these structures nonetheless lacked the flat "bench" surface, which is a central feature of classic terracing systems, even those in which the bench is constructed with a forward or backward sloping incline. The terraces of Furcy, in contrast, were more in the nature of elongated mounds. That is, a schematic cross-sectional diagram would take the form, not of a series of descending steps, but of a constantly-descending "S"-like structure in which the crops were placed at the higher outside loop, whence the structure descended vertically to the inner canal of the next terrace, and so on.

But if the functional classification of these structures was problematic, the developmentally critical issue of their origins was even more so. Preliminary questioning of the peasants

resulted in contradictory assertions. Some claimed that the system came as a result of the presence in the community, during the 1940's and 1950's, of developmental inputs and personnel. Others insisted, in contrast, that the tram were a recent invention of the peasants of the region. "Se youn bagay ki sòti nan lidé abitan, nan lidé pa-nou mèm." "It's a thing that came from the ideas of the peasants, from our own ideas." The first point of view would excite developmental planners, who so rarely are granted the sight of planned interventions which actually work and catch on. The second point of view would excite anthropologists, interested in the rarely granted view of spontaneous invention by a community of indigenous soil-conservation techniques. But though at first it was not clear which of these substantially different frameworks was the one more appropriate to analysis of the system, it was clear that the system was a) the product of fairly recent change b) an ecologically sounder cultivation practice than the unprotected clearing and cropping done in virtually all other regions of Haiti and thus c) of interest to both planners and analysts interested in exploring the conditions under which agrarian systems create, select, and/or adopt improved technology. It was this concern which led to the establishment of temporary residence in the community to permit careful exploration of the origins and functions of these locally unusual contour ridges.

## BACKGROUND ON THE LOCAL AGRICULTURAL CYCLE

As a methodological point, the decision to research erosion control strategies or any other specific topic automatically entails other research decisions as well. For applied research the investigator must steer a course between myopic, literal focus on the specific assigned topic--in this case, erosion control structures--and the broad general "holistic" research of traditional ethnography which tries to learn a little about everything. An exclusive focus on the terraces might reveal how the terraces are built. But if the analyst wants insights on the origin and overall role of the structures in the local economy, research must go beyond the narrow confines of the terraces themselves. An attempt was made thus to utilizing research time in putting together at least a general descriptive picture of the overall horticultural economy of the research community.

### The Physical Setting

As is true of more than 75% of Haiti, the topography of the region was mountainous, many cropped plots sloping at a 45 degree angle. From the point of view of the selection of soil conservation strategies, this region was characterized by a virtual absence of the boulders and rocks that are a prominent feature of the landscape in other nearby communities. Precipitation averaged a modest 1,500 centimeters per year, the rain falling in two periods, permitting in effect two annual cropping cycles. The population density of the region and the intensity of cultivation was somewhat higher than is usual in Haiti for



regions of this altitude (nearly 2,000 meters). This was due to the unusual proximity of this zone to the capital city of Port-au-Prince and the presence of a good all weather road that began within a few kilometers of the community and took produce to Port-au-Prince. This road at the same time had encouraged the purchase of land in the area by middle and upper class city people, who built summer residences. The presence of these dwellings, and the presence of still untouched stands of pines and recently planted stands of eucalyptus, made this region clearly atypical of most of rural Haiti. The survival of so many trees was directly due to the purchase of land by the city people. Because the land was purchased, not for agricultural purposes, but for vacation purposes, the urban landowners insisted on protecting the trees on their property, and turning over to peasant cultivators only those parts of their holding which had no trees on them. The presence or absence of trees on the land was in general an excellent indicator of whether the plot of ground was "peasant land" (te abitan) or "city people's land" (te moun lavil).

#### Land Tenure

Some 30% of the land in the region was owned by city people; most of the remainder was the property of peasants who cropped the land themselves. Urban landowners in general did not attempt to put their land to productive use. As will be seen below, a great deal of money was being made from cropping the land, but urban landowners who tried to crop it by wage labor and occasional visits generally failed. That is, this community

presented the cross-culturally unusual sight of absentee, well-capitalized owners making less money off the land than local peasant cultivators.

There were a small number of better off local residents who had managed to secure other local non-agrarian sources of employment --e.g. working as government officials or tailors. Such individuals would crop land by the use of wage labor without wielding the hoe themselves. They were able to do this profitably as their continued residence in the community and their contacts with (and regular supervisory access to) local sources of labor permitted them to make a profit from the land without working it themselves.

But the majority of males in the community were peasant cultivators. Though the research period was too brief to gather quantitative data on this delicate matter, most appeared to be cropping multiplot holdings and most appeared to have proprietary control of at least part of the holding which they were cropping. The average household holding probably had between 1.5 and 2 hectares of land under cultivation in a given year.

Access to this owned land came through two principal routes: inheritance and purchase. The inheritance system operative in the community was similar to the partible, bilateral inheritance system, modeled on French legal codes, that has prevailed elsewhere in Haiti from the earliest days of the independent Republic. But in addition to inheriting land from parents, a large percentage of adults of both sexes (but particularly males) augment their holdings by the purchase of land. This initially enigmatic pattern of intensive land transaction now constitutes a central

element in the economic career of the average Haitian peasant and maintains a circulation of land even in the face of population growth. I have called this pattern enigmatic simply because, in standard Western economic perspective, it is difficult to account for the constant supply of land available for sale. Though space does not permit the presentation of the tabular data which I had gathered in other regions of Haiti, it turns out that the peasant themselves, at different crises in their lives, sell land. The most frequent occasion on which land is sold is on the occasion of a healing ritual. Such ritual expenditures account for some two thirds of all land transactions, as peoples' participation in the folk religion called "Voodoo" nudges them into these heavy ritual expenditures. In other publications I have presented the data showing the manner in which the ritual system thus functions as a latent resource circulator, illustrating the manner in which the distinction between "economy" and "culture" begins to disappear under the impact of carefully collected quantitative data.

Summing up the land tenure system in this community, we see that it is a creative, evolutionary blend of European-derived and locally evolved arrangements. But the principal actor in this system is the freeholding peasant cultivator who generally owns at least part of the land on which he is growing his crops.

#### Cropping Patterns

As is true throughout Haiti, the crops grown in the research community are a mixture of domestically consumed and marketed crops. The traditional subsistence crops are corn, sweet potatoes, and yams. Beans were also traditionally grown but have always served

as an important source of cash. Probably most households that grow beans sell the bulk of the harvest.

But in addition to these traditional, "ancient" crops, the past 25 years has seen the arrival of cash-cropping vegetable gardening. The major sources of cash in the Furcy region are cabbage and potatoes, but other vegetables, including lettuce, carrots, and tomatoes are also grown. Though much of these are consumed in the home, there is no question but that their planting is done first and foremost with an eye to the lucrative urban market that has existed for these crops for over three decades. It is in the context of this recent vegetable garden that practices of systematic soil conservation arose for the first time in the region. As we analyze this terracing process, our attention will remain fixed on the demands of vegetable gardening.

An important conceptual key to understanding this entire process is the cash cropping orientation which has been found to characterize peasants in all parts of Haiti. I have worked among New World peasants (in El Salvador) who adhere to the classic peasant model of growing first and foremost for home consumption, selling their surplus to the market. This characterization cannot be applied to the peasantries of Haiti and the Dominican Republic. These Caribbean peasants have been found to manifest a cash-cropping orientation that is substantially more radical than would be expected from the traditional model of subsistence peasant.

- Though they grow some of their food, on both sides of the island households rely on purchases during large parts of the year. Concomitantly their very cropping decisions may be made more with

an eye to the market than to the home table. Their "cash-cropping" orientation should not be identified with their planting of export crops such as coffee or sugar-cane. They are "cash-croppers" in the additional sense that they will grow nationally consumed foodstuffs principally with a view to the local agricultural marketplace. The emergence of erosion control behavior would not have happened, as we will see, without this orientation. It is the marketplace which has led to much of the deforestation that has occurred in Haiti; by the same token the forces of the market have, in this community, provided the most powerful spur to undertake the heretofore unheard of practice of systematic erosion control.

#### Agrarian Technology

The principal tool in the community is the long-handled iron hoe. In addition most peasant households also possess an axe, a broad machete, and a short scythe-like knife called a kouto digo. In view of the mountainous topography, all ground breaking activities are done with these tools. Neither machines nor animals supply energy for this most strenuous phase of the horticultural cycle.

Though there are numerous streams and springs in the area, there are no locally utilized techniques of gravity-mediated irrigation. Some cultivators will carry buckets or gourdes of water to vegetable seedbeds during the first weeks. But in general the horticulture of the region is totally dependent on the two periods of heavier annual rainfall. For some twenty years, all households have now been using chemical fertilizer in the planting of vegetables.

### Marketing and the Female Role

The vegetables that are grown for the market are sold along those channels that are common throughout Haiti: traveling female intermediaries. Women in wealthier households will assume the role of purchaser of the produce of other households, in addition to marketing the crops from their own plots and those of their husbands. Even those women who lack the wherewithal to engage in trade will nonetheless undertake the harvesting and original marketing of their husband's crops. Developmental planners who have come into the region have occasionally attempted to institute cooperative marketing of produce. But this is one domain where traditional patterns have reasserted themselves with vigor.

The bulking of the produce generally takes place, not in the local town market, but on the roadsides. Vegetables and other crops are generally transported in large sacks. The females who accumulate a load, combining the sacks from their own garden with produce which they have purchased from their neighbors, will accompany the produce on trucks or vans directly to the urban Port-au-Prince marketplace where they will sell it.

### Labor Arrangements and Social Stratification

It is rare for a cultivator to carry a plot through the entire cropping cycle with only his labor or the labor of his family. People use each others' labor. The most incisive socioeconomic indicator to gauge the status of a person in this community, as elsewhere in rural Haiti, is to ascertain whether the person is a purchaser or seller of labor. Most persons are engaged in one or another side of such transactions. Some people

actually do both. Though there are relatively stable socioeconomic divisions, to a large degree a person's behavior in this regard is at least partially governed by age. The labor sellers tend to be young, the purchasers tend to be old. Local norms of age-specific propriety result in some not-so-poor young men joining gangs that sell their labor, and not-so-wealthy older persons withdrawing, out of dignity, from the sale of labor to others in their community.

Labor is generally purchased and sold, not in the form of one-on-one relationships between buyer and seller, but in the form of voluntarily assembled (but ephemeral) work squads which assign one of the individuals to be the leader who makes the arrangements and collects the money from the purchaser of labor. Subsequently the members of these work squads will help each other out on their own plots with no cash payment involved.

What is important to note about the labor-transacting arrangements here (as elsewhere in Haiti) is that most of the sellers of labor themselves have proprietary access to at least some land. That is, the Haitian peasant not only complicates the task of standard planners. He also complicates the task of social analysts of inequality, who are at much more conceptual ease when they can juxtapose the absentee landlords with the landless proletarians who work their land. The prevailing arrangements in rural Haiti call for other conceptual tools.

#### THE CO. TOUR RIDGES: CONSTRUCTION AND USE

With a general overview of the local agricultural cycle, it was possible to begin asking more focused questions about the

nature and origin of the earth structures. Not surprisingly, investigation revealed that the erosion control behavior of the community was more varied and differentiated than original impression had led to believe. But somewhat more unexpectedly it also turned out that all variants of this soil conservation system were restricted entirely to one sector of their horticultural economy.

The soil conservation practices of agrarian groups utilizing such practices are generally divided into vegetative measures and structural measures. The former entail the planting of trees or other vegetal barriers; the latter consist of the construction of terraces or one or another type of rock barrier.

Much of the vegetation seen on the hills around Furcy turns out to have been planted with this erosion control view in mind. This was especially true of the heavy stands of luxuriant foliage planted in the ravines and in the folds of hills. In the absence of these plants, water quickly denudes the ravines. But such vegetal measures possess a substantially lower erosion control efficiency than earth structures. It is the construction of the latter which constituted the most important innovation.

On closer inspection, two fundamentally different types of structures were found to exist. There was one structure, referred to by the peasants as plat bann (literally "flat bed") which they did construct with some of the characteristics of a genuine mini terrace, most particularly in terms of a flat surface. But the peasants built these less frequently than the earlier described contour ridges, characterized by an oval/convex shape rather than



a truly flat terrace-like surface.

The functional specificity of each of these structures will be discussed below. In terms of their actual creation, the construction of the ridges was found to be a tedious back-breaking task entailing as many as four or five major operations depending on the state of the plot when the ground preparation begins. On those occasional plots that had been left to rest and protected from grazing animals, secondary vegetation could reach heavy brush proportions (but generally not more). The first operation in this case is the cutting of the vegetation. In times past any trees on the hillside would also be felled. But in recent years somewhat loosely enforced forestry laws forbade this. The cultivator will solve the problem by chopping off the lower branches of the tree, thus dealing at least partially with the shade/sunlight problem. The vegetation will be pulled together into small piles, allowed to dry, and eventually burned. That is, though the fertilizing value of ash is recognized, throughout most of rural Haiti the vegetation is so sparse that burning is localized and the spots covered with the resulting ash are planted in special crops.

Once the vegetation has been removed, the task of ground-breaking begins. The ridges are constructed, of course, in descending order, the work team beginning at the top of the hill. The first groundbreaking operation is a deep turning over of the soil, perhaps six or eight inches deep, referred to in Creole as rabouré te. If the ground is particularly hard, a pick will be used for this task rather than a hoe. The work-crew moves

horizontally along the hill. Though agronomists have been recommending for decades the use of strings and stakes to help ridges and terraces stay on the contour, virtually no peasant uses such mechanical device. The contour is estimated by eye. Each ridge will generally traverse the entire span of the field where the garden is to be planted.

When the entire field has been thus given a preliminary turnover, the work-group will return to the top and begin shaping the final ridges with the use of the long handled hoe. Much more care is taken here to insure that each ridge is suitably deep. Though ridges vary in size and technology is not standard, a common series of dimensions would be for there to be about a three foot drop from the top of the outside of one ridge down to the bottom of the inside depression (kanal) of the ridge immediately below it. From this depression the earth is then piled up and outward again as much as a foot higher than the bottom of the depression from where it will drop three feet again down to the next lowest ridge. In this manner the field is converted into a series of descending S-like structures.

The construction of these ridges increases geometrically the amount of time that must be spent in the preparation of the ground. The most common unit of measurement that is locally used in discussing land quantities is the quarter of a carreau, which is slightly larger than a quarter of a hectare. The preparation of a quarter of a carreau (assuming a field cleared of vegetation) for the unprotected, traditional planting would take a work group of six men less than a day. It would take this same group of men

some twelve to fourteen work-days to construct protective ridges on the same field. In terms of the going wages for day labor at the time of research<sup>it was between 3 and 4 grades,</sup> (seventy to eighty U.S. cents for a day) this is tantamount to contracting between \$50.00 and \$60.00 of labor just for the ground preparation itself--an incredibly large sum in the context of traditional Haitian agriculture.

But the matter became even more impressive and--at least initially--even somewhat bewildering when I realized that these laboriously constructed soil-conservation structures were temporary, one-cycle phenomena, which were demolished at the harvest of the crop and which had to be completely reconstructed from scratch at the beginning of the next cropping cycle. The expenditure by peasants of this much time, energy, and in many cases money for the construction of ephemeral soil-conserving earthworks is unique in the context of rural Haiti and can probably be seen as one of the most important technological innovations that has affected the agricultural practices of any Haitian peasant community.

In terms of the erosion control efficiency of the structures, two soil conservation technicians with whom I was collaborating rated these ridges as being almost twice as efficient in arresting runoff as the stone retaining walls which are the most commonly used soil conservation structure by developmental groups in Haiti. On very steep slopes, one occasionally sees rilling even on plots structured into ridges. But this is rare. The ridges for all practical purpose stop rilling, gullying, and sheet erosion.

The structures do not, of course, meet all standards of "correct" erosion control. Specialists will find at least two technical flaws. On the one hand, because the ridges are not built strictly on the contour, there is some lateral rub-off in heavy rains, the water escaping at the sides of the garden, bringing with it, of course, some of the topsoil. Furthermore the outlets are not protected by grass or any other measure. That is the water, once it reaches the side of the garden, where the ridges stop, immediately begins plummeting downhill, causing the traditional gulleys. But despite these technical drawbacks, the ridges probably arrest at least 75% of the runoff that would otherwise occur--and that does occur and has occurred in those regions of Haiti where no such protective measures are taken. Stated differently, the technical criticisms of specialists should not blind us to the analytic importance of this pattern in Furcy, by which perhaps for the first time in Haitian history a group of peasants has begun systematically protecting their land.

#### ORIGINS OF EROSION CONTROL BEHAVIOR

From a developmental perspective this immediately gives rise to two issues: what are the factors which have brought about this soil-conservation behavior among this group of peasants? And what, if any, are the replicable elements of the process?

#### Preliminary Hypotheses

• Exploration of the origin of the ridge-building behavior was at first guided by three overlapping hypotheses.