

PEASANT INITIATIVE FOR SOIL CONSERVATION: CASE STUDIES OF RECENT
TECHNICAL AND SOCIAL INNOVATIONS FROM MAISSADE, HAITI

By

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ABSTRACT

Theories of Haitian underdevelopment, and of the causes and solutions to that underdevelopment are many, complex and often competing. At a very basic level though, Haitian development involves the mastery of ever changing conditions and requires continual innovation, adaptation and the ability to create and exploit resources both internal and external to the farm, to the community and to the nation. The capacity to innovate and adapt is thus essential and is a foundation of sustained economic and social development. The purpose of this paper is to consider the phenomenon of innovation in rural Haiti by examining two case studies of technical and social innovations for soil conservation

The studies are prefaced with a historical review of indigenous and donor responses to soil erosion, and a synopsis of theories concerning how innovations emerge and the factors influencing that emergence. Special attention is paid to the role of history and culture, political economy, and social organization in innovation. The studies suggest that the soil conservation innovations examined can be understood as thrifty and incremental cultural evolution; that small groups were loci for innovation; and that knowledge shared between scientists and peasants in a conversational approach positively affects the generation of innovations.

PREFACE

The author is currently conducting research on peasant cooperation and watershed management issues in Haiti. Field research was carried out during the summer of 1990 and also during the month of December, 1990. The area of Maissade, where the author had previously lived and worked as a technical assistant to the Save the Children Watershed Management Project, has been the site of primary focus. The advice and support of the Forestry for Sustainable Development Program and the Department of Anthropology at the University of Minnesota, Save the Children Federation/Haiti, and the Inter-American Foundation is greatly appreciated. Special thanks are especially due the peasants of Maissade who have patiently taught, entertained and supported the author since 1986.

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INNOVATION AND DEVELOPMENT IN HAITI

The extreme environmental degradation, rural poverty and political instability of Haiti has become the stuff of legend. To say that it is the "poorest country in the western hemisphere" is beyond cliché. Put simply, since the culmination of the slave revolt in 1804, Haiti has gone from "emergence to emergency", its population growth outpacing its ability to innovate and manage in the face of changing conditions (Lowenthal 1989). In seven short generations the basic site of domestic production for a majority of the rural population has shifted from flat, fertile plains to steep, stony slopes. Peasants have not yet mastered this new environment, and resultant soil erosion figures highly in Haiti's declining rate of per capita food production estimated at 2% per year (USAID 1985).

Theories of Haitian underdevelopment, and of the causes and solutions to that underdevelopment are many, complex and often competing. At a very basic level though, Haitian "development" -- however defined -- involves the mastery of ever changing conditions as per the desire and design of the Haitian people. This mastery of changing conditions would require continual innovation, adaptation and the ability to create and exploit resources both internal and external to the farm, to the community and to the nation. The capacity to innovate and adapt is thus essential, and is the foundation of what has become the new goal of the concerned international community, sustainable development.

It is widely recognized that the Haitian State has historically played an overwhelmingly predatory role in rural Haiti -- through taxes and police control -- and has essentially left the peasant alone to face the vagaries of changing environmental and market conditions (Trouillot 1990). Where extension services have reached the peasant they have been supplied by disparate and uncoordinated "projects" of various scope and quality, implemented by missionaries, private voluntary organizations, and occasionally by the State. A review of soil conservation approaches and techniques indicates that conventional development projects which have misunderstood or ignored the personal and social factors influencing Haitian technology have failed; and that projects which use participatory approaches can result in the sustained adoption of soil conservation techniques. Further, though it is widely recognized that projects which involve peasant groups in innovation and diffusion can have positive results, the dynamics of these relationships have not been thoroughly investigated.

The purpose of this investigation is to briefly consider the phenomenon of innovation in rural Haiti, with special attention paid to the role of social organization in that innovation. Two case studies of technical and social innovations for soil conservation will be presented, and several conclusions will be drawn. A brief review of the history of soil erosion; of

indigenous and donor responses is presented to provide a background for the following discussion.

This paper will examine the issues of innovation and soil conservation from the perspectives of these institutions which are most directly engaged in the resolution of soil erosion problems in Haiti: the peasant, the community and the project. Issues related to the role of the State, and the macro-economic and political causes of soil erosion will not be explored in depth.

HISTORY OF SOIL EROSION AND SOIL CONSERVATION

Legacy of Erosive Agricultural Practices

Substantial soil erosion has been a problem in Haiti since the colonial period when mountain forests were cleared for coffee production, and plantation crops (cotton, indigo, tobacco) were clean-cultivated (scraping weeds between plants, and pre-till field burning). Some reports state that due to excessive erosion coffee plantations were difficult to reestablish after the first generation, and indigo crops were only productive for three years (Paskett "et al." 1990). After the revolution, the slaves "cum" peasants combined remembered horticultural practices of Africa with learned agriculture and plantation cultivation methods of Haiti. The result was a mixed system where Haitian farmers clean-cultivate agricultural crops, burn crop stubble prior to tilling, periodically leave annually cropped parcels fallow for an extended period, and establish tree gardens around family compounds. With increasing populations, and resulting pressure on the limited arable lands, the fallow practice has increasingly been precluded, tree gardens have diminished in size, and peasants have steadily moved to less desirable mountain lands for annual crop culture. Agriculture and clean-cultivation, two erosive and resistant remnants of the colonial period, have been carried from the plains to the mountain slopes by the new generations.

Indigenous Anti-Erosion Innovations

The widespread annual cropping of hill slopes is a fairly recent phenomena, it was not until the mid twentieth century that substantial numbers of farmers were faced with new, sloping cultivation conditions. Some peasants have adjusted the techniques developed on, and appropriate to the plains in ways which mainly conserve soil moisture, require limited amounts of labor and non-financial input, and can be implemented with the common tools; hoes and machetes. These techniques are also

predominantly found in ravines and in association with higher valued crops ("e.g." rice, bananas, taro). With limited exception, they are not commonly found in extensively managed gardens planted to cereal crops.

Indigenous innovations associated with annual cropping which conserve soil and water include: "zare" (soil and stubble scraped up into a mound to retain water for rice cultivation); "sakle en woulo" (weeds hoed into small mounds along the contour at one pace intervals); "ramp pay" (stubble gathered along the contour and supported with stakes); "dig ravin" (assorted plant and soil material placed in ravines to retain soil and water for banana, taro, rice or yam cultivation); "bit" (soil heaped into mounds for sweet potato cultivation). These techniques, where practiced in the traditional manner, must be reconstructed on an annual basis, and are frequently inexactly constructed and relatively inefficient in controlling soil erosion.

The "tram", a peasant innovation, is the combination of the "bit" and a contour seed bed promoted by a Haitian agronomist. Since the 1950s when this innovation took place it has become standard practice in the vegetable producing areas of Furcy. In analyzing the evolution of the "tram" the anthropologist G. Murray concluded that peasants were not interested in saving their soil "per se", but in saving the fertilizer sown for vegetable production. In essence, "erosion control has occurred as the secondary result of an innovation whose primary function, from the peasants viewpoint, is the immediate enhancement of their cash profits" (Murray 1979:58). This finding is consistent with the author's finding that the indigenous "dig, woulo, ramp pay," and "zare" are constructed to retain moisture for enhanced crop productivity, not to necessarily to retain soil.

Review of Soil Conservation Project Approaches

Conventional Approaches

Since the initial development aid of the early 1950s, Haiti has witnessed numerous reforestation, soil conservation and watershed management projects, the majority of which, by most accounts, have produced disappointing results (AID 1990, BREDA 1988, Murray 1979). Most major development projects have utilized an "equipment du territoire" approach which assumes that enhanced rural welfare will automatically follow investments in engineered environmental rehabilitation. This approach has been characterized by large-scale prescriptions of contiguous land and large ravine treatments, mechanical rather than biological structures, and monetary and commodity incentives to attract peasant adoption (Lilin and Koohafkan 1987). Highly degraded and steep lands have often been the target for intervention. Contour rock walls, canals, and bench terraces, the internationally standard techniques, have been the primary techniques promoted by international donors and professional technicians.

The use of this approach and these techniques has been criticized for its orientation to long-term and downstream environmental benefits rather than short-term and on-site socio-economic benefits; its disregard for indigenous knowledge and techniques, socio-cultural institutions and land tenure complexities; for creating dependencies; for not responding to primary peasant motivations, needs or requests; and for failing to result in the sustained adoption and maintenance of the promoted technologies (Murray 1979 and Lilin 1986). In short, because of the pervasiveness of such projects in rural Haiti, many peasants have become accustomed to being approached by alien people intent on transferring alien technologies for frequently alien reasons. To a large degree, these technologies have not been adopted or maintained by peasants and have not spread beyond the immediate project boundaries.

Current Approaches

An "agricultural parcel" approach to soil conservation developed in the early 1980s in response to the weaknesses of the conventional soil conservation approach stated above and the recognition that:

- 1) farmer remuneration was not necessary for technique adoption and even acted against technique maintenance and diffusion;
- 2) a number of indigenous techniques existed which could be improved, and;
- 3) peasants have a natural incentive to conserve soil in order to increase agricultural production.

This new approach takes a farmer rather than an engineering perspective of soil erosion and as primarily an "upstream" agricultural problem rather than a "downstream" sedimentation problem. Projects adopting this approach target individual parcels and do not disburse external incentives to encourage adoption. Increased agricultural production via retained moisture and soil is the primary incentive for farmer adoption of soil conservation techniques. Due to the success of projects utilizing the "agricultural parcel" approach in achieving sustained adoption: consensus among technicians is currently emerging in which the "agricultural parcel" approach should be used when targeting private lands, and the conventional "equipment du territoire" approach be subsequently employed to treat the "public" ravines. This basic strategy has been recommended by STABV. Remuneration would be used only in cases of collective effort for collective good (such as the treatment of public courses or public roads).

Current Extension Modes

In addition to overall project approaches, implementors choose different extension modes and methods to promote soil conservation techniques. Put generally, current extension modes

can be separated into three broadly defined categories (adapted from Murray 1990):

1) A comandante mode in which adoption occurs because of either project authority or project disbursed wages (Murray 1990). This mode is usually associated with joint GOH/international donor projects which use the "equipement du territoire" approach. This "peasant persuasion" mode can result in rapid construction of treatments but can also jeopardize long-term development objectives. When used for installation of hillside treatments it has not generally resulted in maintained structures, sustained soil conservation or crop production increases. Ravine treatments constructed with this mode have however received a higher degree of volunteer maintenance.

2) A technique by task mode in which an agricultural extension type network organized by specific extension tasks is used solely to promote project selected techniques. The Pan American Development Foundation (PADF) agroforestry hedgerow campaign, which since 1988 has paid extension agents for each meter of structures established on private land is an example of this approach. This approach is based on project-peasant conversation, is generally administratively efficient and has resulted in a large number of treated parcels.

3) A integrated and participatory promotion mode in which soil conservation techniques are developed and extended along with other agricultural system interventions. Techniques are frequently based in indigenous practices and are refined and promoted with the participation of local farmers. Projects employing this mode usually focus on select communities and use peasant groups as vehicles for technique diffusion. The MCC's Bois de Lawrence project and SCF's Maissade project are examples of this approach. Project experience has shown that investment in peasant organization can permit the voluntary treatment of common soil conservation problems such as "public" ravines.

As soil erosion problems are immense and diverse in Haiti, each of these modes used appropriately can and has made a contribution to soil conservation and enhanced rural welfare. The differences between the modes are fundamental and choice between them would be based on implementor objectives, level and duration of funding. Projects employing the comandante mode calculate that the cost of paying upstream farmers is worth the protection of downstream investments. Those employing the promotion by task mode aim to enhance the welfare of individual farmers, and those employing the integrated and participatory promotion mode cast their net further and aim to increase local capacity to respond resiliently to changing conditions. Soil conservation is incident to this process.

Review of Techniques Promoted by Soil Conservation Projects

Summary of Experience

Conventional Techniques. Various soil conservation techniques have been promoted in Haiti with varying degrees of success. Early projects primarily prescribed mechanical, internationally standard techniques ("e.g." bench terraces, contour rock walls, contour canals, and rock checkdams). Generally efficient in terms of soil retention, these techniques are labor intensive, alien to the Haitian agricultural system, and have not been adopted unless wages were paid as incentive. In the case of bench terraces and contour canals, infertile subsoil is brought to the surface during construction resulting in crop production declines. Bench terraces have not been maintained except in the high-valued crop area south of Port-au-Prince. Contour rock walls have had a similar history, many kilometers have been constructed on infertile lands in food for work projects, and maintenance has been extremely limited. Checkdams have been maintained to a greater degree as evidenced in the existence of checkdams built by FAO/MARNDR projects in Aux Cayes and Limbe during the 1970s.

Vegetative Techniques. Vegetative hill and ravine treatments began to be promoted by a majority of projects during the 1980s. These include "Leucaena" and elephant grass hedges, "ramp pay" (contour trash barriers covered with soil), and wattling ("kleonaj") in ravines. These techniques are sometimes used in combination. These require low labor inputs, and can result in short-term, net financial gain to the adopter. They have been promoted throughout Haiti without wage or food incentives and have been widely adopted. These techniques are generally less efficient than mechanical structures in terms of soil retention, but can be altered or combined to meet specific landowner site conditions and management objectives to a greater degree.

Contour vegetative hedges of lemon grass and vetiver were also promoted during the 1970s. Like the mechanical techniques of the period, these techniques were also widely rejected. This rejection could be due to several factors: an adverse reaction to the manner in which they were promoted; or because they did not yield an adequate short-term economic return.

Factors Affecting the Adoption of Soil Conservation Innovations

Given the soil conservation innovation is deemed worthy and desirable by the farmer, several primary contextual conditions appear to impact farmer decision on whether or not to adopt a new soil conservation technique on a certain parcel of land (adapted from Pierre-Jean 1991):

- 1) level of land security felt by the farmer [note 1];
- 2) productive and economic value of the soil (impacted by distance to markets);
- 3) capacity of the farmer to invest time and labor for learning the technique and then for installing it, and;

4) natural willingness of farmer to take risks and adopt innovations.

DEFINITIONS AND THEORIES OF INNOVATION

What is an Innovation and Why Does One Happen?

A review of the literature on innovation and diffusion reveals several distinct schools of thought as to just what an innovation is and why one might happen. The "school" which has been most influential in North-American and North-American influenced development projects is led by Everett Rogers. He defines innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers 1983:11).

This school views innovation and diffusion as distinct processes, takes the need for the innovation as given, treats technology as a free-standing object independent and devoid of cultural meaning, and views problems of diffusion as ones of communication and persuasion. To E. Rogers, innovations are singular inventions that are adopted via a process of protagonistic "marketing". At issue is the potential adopters behavior ("i.e." attitudes and personality) -- rather than their ability to adopt, and the ability of the agent promoting the innovation to persuade the potential adopter.

In contrast to the Rogers school, H. Barnett (1953), B. Agarwal and others have argued that innovation and diffusion are not separate processes -- that innovation is essentially the first step in the diffusion process -- and that potential adopters decisions concerning adoption is based on rationality rather than persuasion (Agarwal 1983). In this school, innovations are ideas or technologies which are continually adapted as they are adopted, and represent sequential socio-cultural change. H. Barnett, an early proponent of this school, stated that "When an innovation takes place, there is an intimate linkage or fusion of two or more elements that not have been previously joined in just this fashion, so that the result is a qualitatively distinct whole" (Barnett 1953:181). J. Schumpeter's simple definition, that innovations are "the carrying out of new combinations" (1971:47) also fits this contrasting school of thought.

Economists have focused on the economic factors "inducing" innovation, and have taken a market rather than personal perspective. Ruttan and Hayami (1984), utilize a functionalist, neo-classical argument that innovation results from the endogenous scarcity of some component of production. Thus, using this argument for example, the tractor was adopted in the United States in response to increasing labor costs. This is essentially the "scarcity is the mother of all invention" school.

The neo-classical school has been criticized by another group of economists that emphasize the importance of exogenous, structural factors (history, international markets, politics and institutions) in "inducing" innovation ("e.g." A. de Janvry 1985).

The discipline of anthropology is also divided on the subject. Again, in general terms, the division is largely between those who consider humans to be pragmatists with innovations a function of their rational objectives and characterized by the materials at hand, and those who consider humans meaning- and symbol-making beings with innovations a function of their subjectively defined beliefs. From the latter perspective, innovation is culturally defined and stimulated, and thus innovation is essentially an overt act of cultural creation. Regardless of which of the two arguments one supports, anthropology informs us that for reasons related to either material or belief systems, each and every culture is necessarily and fundamentally different. Anthropology thus offers at least one clear contribution to the debate on innovation: an innovation which can be considered "rational" in one socio-cultural environment would not necessarily be considered "rational" in another.

Two anthropologists, H. Barnett and S. Gudeman, offer arguments that bridge this gap between the "induced" argument of the economists and the "culturalist" arguments of some anthropologists. Barnett maintained that the incentives to innovate can be described as: self-wants (including credit wants and subliminal wants); dependent wants (including convergent, and compensatory wants); or a voluntary desire for change (Barnett 1953). At the personal level, the "induced" innovation model of Ruttan and Hayami would fit within Barnett's model.

Accepting the Barnett's and Schumpeter's definition of innovation -- as that of making new combinations of familiar things -- S. Gudeman proposes that people create new things for use, and simultaneously create culture (Gudeman 1991). A discarded food bowl used for a chimney cap is thus both an innovation with practical use value and a cultural creation. This proposal is both a refinement and extension of the Barnett model.

Beyond economic and cultural rationales, there are of course "personal" motivations for innovation. By using the term "wants" rather than "needs", Barnett clearly asserts the uniquely personal nature of innovation incentives. Schumpeter notes that these motivations vary from "spiritual ambition...mere snobbery...will to conquer...to prove oneself...to succeed for success itself...[and] finally there is the joy of creating, of getting things done or of simply exercising one's energy and ingenuity." (Schumpeter 1971:69). Gudeman (1991) reminds us that the innovator can be motivated more by pride and excitement than by potential economic gain.

How Does an Innovation Happen?

We have previously discussed various theories concerning what an innovation is and why it might occur. How does it actually take place? Conventional American literature and the popular American belief hold that innovations are largely the product of supra-individual inventors who have great intellects, insight, and an eagerness to take risks. These independent innovators are also the entrepreneurs whose gall, brilliance and drive for profit make the market economy function.

Barnett (1953), Kash (1989) and others have proposed that the "American, independent innovator" is largely the stuff of myth -- or was only partially true in an earlier period -- and though often responsible for formulating new ideas, they are not, unto themselves, responsible for innovations. H. Barnett also emphasized that innovations initially and primarily take place on a mental plane where divergent ideas converge.

Barnett proposed that the breadth and depth of ideas increase the frequency of innovations and that social, cultural or natural barriers to the exchange of ideas necessarily limit their mixing and remodeling. Similarly, Barnett found that the collaboration of effort positively influenced innovation. Group interaction increases the possibility that a new idea will develop, not only because of the simultaneous and cooperative exploration, but because the interactions are mutually stimulating (Barnett 1953:42-43).

According to Kash, innovations are actually the product of organizations which integrate different knowledge and skills held by different individuals. This is not to dismiss the importance of the original idea, or of brilliant individuals. It is to state that brilliant ideas are initially just recombinations of old ideas, and that they are actually reformulated, adapted and processed by "normal" men who in the process create the innovation. Kash's theory that organizations sequentially create innovations is similar to that held by the innovation school represented by Agarwal: that innovation, adaptation and diffusion is a single process involving multiple individuals.

The term "brainstorming" illustrates Barnett's and Kash's proposition. From this perspective, groups or societies which are successful innovators are those in which individuals are organized in ways which stimulate the generation, interchange, testing and adoption of ideas. In essence, "the collective capacity to innovate becomes something more than the simple sum of its parts." (Reich in Kash 1989:53). Thus in modern western society at least, the secret to innovative capacity is propitious social organization.

Summary: A Proposed Theory of Innovation in Rural Haiti

The author will adopt the Barnett and Schumpeter definition of innovation and amend it with contributions of Agarwal, Gudeman and Kash: that innovations are essentially new combinations of

familiar ideas (or "things") or a new use of an old idea; that this innovation is first "induced" by motivations which can be described as self- and dependent wants, and then "formed" by culture, market prices, resource endowments, and social organization. More specifically, innovation is the first step in the diffusion process and group dynamics positively affects the creation of the innovation itself, and then its diffusion. The second step in the process, the "formation" of the innovation is directly dependent upon State "permission" of the individual freedom and social collaboration which facilitate the interchange of ideas. This theory implies that at least three major factors would influence innovation and diffusion: 1) the history and culture of a people; 2) the political and economic context within which they operate and; 3) the organizational framework within which they think, discuss and work [note 2]. These factors influencing innovation will be reviewed in relation to Haiti before analyzing the case studies.

FACTORS INFLUENCING INNOVATION IN RURAL HAITI

History and Culture

Haiti is itself a historical and cultural innovation. "Discovered" by Christopher Columbus in 1492 and colonized by France, approximately 800,000 African slaves were imported by the late 1800s (Mintz 1974a). The forced and long-term proximity of African slave and French master, and their necessary interdependence fostered a new, hybrid culture. This hybrid, "creole" culture consisted of a new language (Haitian Creole), religion (voodun-Catholicism), foods, behaviors and people (Afro-Caribbean). Upon the successful overthrow of the French colonizers in 1804, the ex-slaves established independent homesteads on what was previously plantation lands. Mintz (1974a) has termed this new agricultural class a "reconstituted" peasantry as they combined practices, crops and traditions from both their African ancestry and European heritage.

Expressions of cultural innovation are also found in rural craft and art. Traditional and modern Haitian music combines African drum beats, French, English and Spanish lyrics, Latin and North American rhythms. Inventive village blacksmiths have become iron sculptors when they forged artwork from scraps of iron and steel drums. Haitian iron sculpture has become an internationally recognized art form. One only needs to stroll through the "bric a brac" section of Port-au-Prince's Marche Salomon to be startled and then convinced of lower-class Haitian capacity to combine previously discarded items, find new uses for old articles, invent new items and then artfully market these constructs.

Also relevant to this discussion are Haitian notions of responsibility and causality. One of the most evident cultural

attributes to outsiders is Haitian "superstition" and related explanations of cause and effect. For example, a person is rarely if ever sick because of a physical affliction. Illnesses are usually the result of a spiritual spell cast by a malevolent individual, for the purpose of causing harm. Another brief but compelling indication of Haitian notions of responsibility is found in the following popular proverb: "se pa neg ki voye woch ki te twe kulev-la, se neg ki te we'l." Literally translated; it is not the person who threw the rock who killed the snake, it is the person who first saw the snake who killed it. This proverb at least indicates that at least some Haitians give credit to individuals who see a problem and initiate solutions rather than to those who conclusively solve problems. This proverb also interestingly insinuates that at least two people are required to solve a problem, one who identifies it and another who deals with it.

Popular proverbs reinforce the notions that interdependence is a fact of life which has both positive and negative aspects, and that cooperation is at least necessary and perhaps even a social ideal. A common proverb in rural Haiti is: "zanmi pre se kouto de bo; zanmi loin se lajan sere." Literally translated this means, "Nearby friends are double edged knives; distant friends are money saved." Another frequently heard proverb in rural Haiti is: "yon sel dwet pa ka manje kalalou". Literally translated this means, "Okra can not be eaten with only one finger."

The term "voodoo" is renown among academic and popular circles and often conjures up stereotypical notions of dolls riddled with pins, violent sorcery, and glassy-eyed zombies. In fact, the term "voodoo" refers to a dance not a religion in Haiti, and such lurid notions -- though empirically based -- are relatively rare in occurrence. The many investigators of Haitian religion (e.g. Metraux 1972; Herskovits 1971; Mintz 1974b; Murray 1980 and; Smucker 1983) have essentially agreed that it is a folk-cult involving belief in a pantheon of spirits and is syncretistic -- integrating various forms of West African animism, ancestor worship, magic and Catholicism. Rituals, which combine animal sacrifice, individual possession, drumming, dancing and singing, are performed to interact with the spirits who are both ambivalent and capricious (Smucker 1983). Authors also generally agree that an individuals relationship with spirits is managed through ritual and that these relationships "are fundamentally reciprocal and transactional" (Smucker 1983:140). Service -- spiritual appeasement through the offering of material goods -- is rewarded with protection, health, and sometimes wealth. And in general, the greater the service, the greater the reward.

The effects of such a belief system on Haitian social behavior and individual psyche are of course many, diverse and the subject of intellectual debate for many years. A common point of view is that the potential for inter-personal malevolence and the fear of retribution keep believers independent, careful and fearful; and provide strong incentive for conflict avoidance and social cohesion (Smucker 1990).

Political Economy

Another key remnant of French colonialism was the emergence of the mulatto "affranchi" class. Born to French masters and their slave mistresses, the economic and political power of this class was enhanced after the revolution. In many ways, the revolution did not so much change the distribution of wealth as it transferred ownership of power from the French colonialists to the indigenous elite.

Since the revolution, agriculture has remained the nation's essential productive activity, and returns from agricultural exports remained the primary source of federal wealth (Trouillot 1990). For example coffee, which is still grown by a substantial proportion of peasants, makes up roughly 50% of current export value, and government income (Farmer 1988). To this day Haitian peasants maintain three modes of production; cash cropping for local markets, cash cropping for export markets and subsistence (Mintz 1974a). The marketing and price levels of the export cash crops (chiefly coffee) was not controlled by peasant producers, but by the oligopolistic merchant bourgeoisie, their intermediaries ("speculateurs"), and the international market (Dupuy 1989). The above discussion illustrates that: 1) peasant production is embedded in the domestic and international market economies; 2) these markets are controlled or manipulated by the merchant elite or government forces; and 3) these forces have a substantial impact on peasant decision concerning what, when and how they produce.

The correlation between class and innovation also merits analysis. As stated in the previous section, the poor are often "bricoleurs" induced to innovate because of economic shortages. The upper class on the other hand, has historically had a hold on the economy and is not economically induced to innovate because they respond to guaranteed "rents" not uncertain "profits" (de Young 1958). This theory is supported with evidence that the upper class in Haiti has historically invested in traditional, low-risk ventures such as land, homes, and monopolistic marketing ventures, and has avoided risky new ventures.

Historically, Haitian peasants have never had institutional forms of political mediation (Smucker 1986). The traditional means of peasant "mediation" of political interests was the peasant revolt, the first of which took place in 1840. This large scale revolt was against low agricultural prices, merchant tyranny and insufficient land availability (Moral 1978). Agrarian revolts continued periodically to topple national governments until the American occupation beginning in 1919. By destroying rebel bands and constructing a strong, centralized military force, the Marine occupational forces effectively eliminated the traditional means of expressing peasant political discontent.

Rural Social Organization

In rural Haiti the basic unit of living, production and social life is the house (Metraux 1952). The "lakou" (compound) is the basic residential unit within which both nuclear and extended families are included. Male and female roles are complementary. Males are largely responsible for on-farm agricultural production. Females market family farm products but are usually primarily engaged in other commercial activities. Household resources and returns are normally pooled, and farm returns rather than commercial efforts are usually the greatest source of income (Murray 1980).

"In terms of social organization, rural Haitians are first and foremost members of the bilateral kin groups through which they receive their first access to land. But in addition, most Haitian farmers at one time or another in their lives traditionally become voluntary members of groups of six or seven individuals whose basic purpose in association is the exchange of labor." (Murray 1990:31).

Besides organizing for agricultural purposes, peasants organize themselves in religious, school, neighborhood, or livelihood related groups.

Neither the western concept of "community," nor the African concept of "clan," apply adequately to rural Haiti where the landscape is very much one of independent and scattered "lakou" (Smucker 1986). Rural towns have largely evolved from market places, and a sense of local solidarity is not strong. The peasantry, composed of families with widely varying access to wealth and productive assets, is not a homogeneous class. Jealousies and disputes are common. Levels of social solidarity, morality, confidence and trust would normally be strongest at the level of kin, and then subsequently (and approximately) at the levels of fictive kin ("i.e." god-parents), labor exchange group, local religious group, and then perhaps locality. It is within the context of these trusted social groups that peasants discuss, debate, and formulate responses to the changing conditions of life.

Huizer (1970) has noted the negative impact of political repression and terror on peasant cooperation, trust and peasant organization. The Duvalier dictatorship of almost 30 years certainly meet Huizer's criteria for political repression and terror. The regular assassination of opponents, predation on community organizations which did not explicitly espouse Duvalierist tenets, and the generalized and strong infusion of fear and distrust, all but eliminated leadership and organizational skills from the country. This repression and its attendant impoverishment also effectively attacked the very social fabric which is conducive to innovation and technology development.

This brief synopsis of Haitian history and culture, political economy and social organization suggests that: 1) peasants have a

historical and cultural foundation for great innovative capacity;

2) domestic and labor groupings are strong loci for innovation and diffusion; and 3) peasants must operate -- and innovate -- within powerful political and economic constraints.

THE "RAMP PAY"/AGROFORESTRY HEDGEROW TECHNICAL INNOVATION

Background

In early 1986 Save the Children Federation initiated a pilot integrated watershed management project in Maissade, Haiti. Project planners combined two new, apparently successful extension approaches: 1) the mobilization of "groupman" (small farmer groups); and 2) the promotion of agroforestry as an economically beneficial production alternative. Maissade was chosen for its high rates of soil erosion and lack of other service-providing organizations. The predominant cropping system in the area is a corn and sorghum intercrop. Field beans are cultivated extensively at higher elevations and yams, plantains, taro, and rice are planted in the more moisture rich sites. Hoes are used for cultivation and few agricultural inputs are used.

During the first year the project focussed on peasant organization activities, assisting farmer groups in the identification of local problems, solutions and strategies to achieve the desired results. During this period project staff also studied local farming techniques and systems, social and marketing networks, and the status of local perceptions and priorities concerning natural resources. It was during this process that the staff identified the indigenous, soil conserving, trash barrier ("ramp pay") as a technique with promising characteristics. It should be noted that at the time, contour canals, rock walls and checkdams were considered to be the soil conservation techniques of choice by technical assistants.

The Indigenous Technique

"Ramp pay" literally translated means "straw barrier". In its most typical form (Figure 1), it is a rough assemblage of crop residue ("e.g." corn and sorghum stalks) which is placed horizontally along steep slopes (most commonly along ravine sidewalls). The "ramp" might average 30 centimeters in both width and height. Wooden stakes are driven into the ground on the downhill side to support the structure. Because the structure is composed of decaying vegetative material, it must be

rebuilt annually. Project investigation indicates that with materials at hand a farmer can construct one linear meter of the structure in approximately 4 minutes (SCF 1988). The function of the "ramp" is to retain soil moisture and is constructed in association with the more highly valued and moisture demanding crops. Though few farmers actually practiced the technique in 1986, the term "ramp pay" was well known and understood by local farmers.

Some said that the technique was more widely practiced by older generations, though no explanation as to why was given. A similar indigenous technique termed "zare" is commonly constructed in low-sloping ravines as rice paddy dikes. The "zare" is constructed with weeds and stubble scraped up during the land preparation phase.

The Innovation

Among other topics, the project encouraged peasant groups to identify major agricultural problems and identify probable causes. Project extension agents (who were locally hired and trained) would facilitate debate by asking the groups "why" identified problems were indeed problems. This non-directive approach stimulated open project-peasant conversation, and "groupman" ownership of the debate, the process and the results. Soil erosion and its negative affect on agricultural yields were widely recognized as a major problem in the Maissade area and indeed a fundamental contributor to increasing impoverishment. The deleterious impacts of the traditional burning of crop residue was also identified. Other problems recognized were the seasonally inadequate supply of fodder for livestock. Animal husbandry is an essential component of domestic production and forage scarcity during the annual four month dry season is a major constraint.

Through the group network, extension agents proposed (sometimes implicitly and sometimes explicitly) extensive use of the "ramp pay" as a solution to the related problems of erosion and declining yields. The argument was essentially: that "ramp pay" could be used on agricultural fields to increase agricultural yields; that crop stubble could be used for the construction of "ramp pay" rather than burned; and that the effectiveness of the "ramp" would be improved if an A-frame level was used to determine the contour and appropriate placement of the "ramp." The "ramp pay" were constructed as traditionally, during the field preparation period at the end of the dry season. The A-frame level could be easily constructed with readily available materials. Another technique, termed "met bra" (literally, "arm rule") was used to determine appropriate spacing between "ramp pay" along the slope.

Field tests and training sessions concerning these techniques were conducted in 1987 with early adopters, just prior to the onset of the agricultural season. Extension agents promoted

farmer experimentation of the techniques, maintained close dialogue with the early adopters concerning results, and encouraged their sharing of the new knowledge generated. The technique was not rigidly defined by the project, agents insisted only on the placement of the structure along the contour.

Figure 1. The "Ramp Pay"/Hedgerow Technique and the Formation of a Progressive Terrace

Design by Frantz Ewald, 1989.

The hedgerow, another adaptation to the "ramp pay," was proposed to farmers in order to increase local fodder production, and to transform the "ramp pay" into a perennial rather than temporary structure. Hedgerow establishment required planting live vegetation (leguminous tree or grass species) in front of the "ramp" (downhill side, see Figure 1.). The purpose of the hedgerow is three-fold: 1) to support the structure and thus protect the accumulated sediment and moisture; 2) to reduce labor investments by avoiding the annual reconstruction of the "ramp" after decay and; 3) to provide livestock forage material during the dry season. Leguminous species' nitrogen fixing capability have the potential of improving soil fertility.

Technique Impacts

Peasants quickly recognize the effect of the "ramp pay" after the fall of the first seasonal rains. Sediment accumulates on top of the "ramp" and continues to build during the rainy season. The retention of sediment 50 centimeters in height over the course of a season are not uncommon. To farmers, this sediment is an unmitigated indication of increased crop yields. Project studies of corn and sorghum yields on treated plots were 51 and 28% greater respectively than on untreated plots in 1988 and 22 and 32% greater in 1989 (SCF 1990). These agricultural yield increases are due to increased moisture availability and soil friability on the enriched microsite on the uphill side of the structure. With the installation of this technique a bench terrace is progressively formed. There is no evidence to date that the addition of the hedgerow to the "ramp pay" directly increases yields. Where hedgerows are installed, and are mature enough to harvest, the lopped material is commonly used for livestock fodder rather than on-site green manure. Another significant result of technique adoption is the subsequent cessation of the traditional practice of post-harvest field burning.

Patterns of Technique Diffusion and Adaptation

Diffusion

Adoption of the "ramp pay" was limited in the first year of technical activity (20280 linear meters installed by 153 participants, see Table 1.). The project measured the structures that were installed in agricultural plots with the A-frame level.

The technique diffused rapidly in the second year when 91,866 linear meters were adopted. Project technicians estimated that approximately 50,000 linear meters were installed without the A-frame level in addition to amount measured (SCF 1988). It should be noted that no monetary or commodity incentives were used by the project to promote adoption. The technique was adopted by individual farmers -- most of them "groupman" members -- and installed on their own privately held parcels. The project ceased monitoring "ramp pay" adoption rates after the second year as the technique was spreading rapidly and monitoring cost was exorbitant.

The hedgerow (agroforestry adaptation of the "ramp pay") was adopted at a slower rate -- 4160 linear meters the first year and 6568 the second. Adoption increased dramatically in the third year and reached 43,167 linear meters in the fourth. The "ramp pay" and hedgerow were usually adopted separately. Most participating farmers adopted the "ramp pay" first, analyzed impacts and then decided whether to install the hedgerow adaptation later -- perhaps that very season, but usually the year following. The "ramp pay"/hedgerow combination was thus usually adopted sequentially -- each farmer acquiring the different options at the specific pace of their understanding and appreciation of the techniques.

How Techniques Are Implemented and Reasons Given for Not Adopting

A formal survey of "groupman" members conducted in September 1990 found that of the members who had adopted "ramp pay" or hedgerow techniques, an average of 32% implement them as individuals, 49% implement them with the assistance of their "asosye" group, and 19% implement them with one other farmer (Annex, Table 1). 39% of "groupman" members sampled who do not adopt the promoted techniques cited a lack of time as the reason why they do not adopt; 21% stated that they do not own land; 17% stated that they do not have land appropriate for the techniques promoted; and 10% or less responded that they either do not know how to implement techniques, hire all agricultural labor, or gave some other reason not listed on the questionnaire.

Peasant Adaptations to the "Ramp Pay" Innovation

Peasant adopters have contributed notable adaptations to both the "ramp pay" and the "ramp pay"/hedgerow. From the initial stages of technique development, peasants voiced concern over the potential for increased rat infestation from the creation of what were seen as ideal nesting sites in the "ramp pay." Though this never proved to be a problem, the project introduced an

adaptation of covering the crop stubble with dirt from a shallow trench dug on the uphill side of the structure. In addition to filling air pockets of the structure with soil and thus reducing rat habitat, this adaptation increased the usefulness of the structure by increasing surface water infiltration.

Table 1. Adoption Rates of "Ramp Pay" and Hedgerow Techniques [note a]

Year	"Ramp Pay"	
	Quantity Installed (linear meters)	Adopting Landowners
1986	0	0
1987	20,280	153
1988	91,866	220
1989	(no record)	(no record)
1990	(no record)	(no record)

a. adapted from SCF 1988 and SCF 1990

Year	Hedgerow	
	Quantity Installed (linear meters)	Adopting Landowners
1986	0	0
1987	4,160	81
1988	6,568	143
1989	25,000 (approximate)	(no record)
1990	43,167	479

a. adapted from SCF 1988 and SCF 1990

Innovative farmers have also made significant changes to the hedgerow. Some farmers have used local species for the live barrier instead of the leguminous tree and grass species. Others have varied the density of seeds planted upon soil characteristics and management objective. One farmer recently planted perennial cotton plants in a hedgerow configuration. Though initially questioned by project technicians as cotton is a known soil nutrient depleter, this adaptation has gained project support as cotton achieves the principal hedgerow function of sediment support, and provides substantial economic benefits. Other farmers have experimented with different hedgerow lopping heights, and different management schemes. For example, a number of farmers leave several leguminous stems in the hedgerow to produce seed and in this manner they eliminate dependence upon the project for hedgerow seed. Others select the stems with the best form, leave them for polewood and harvest the rest of the hedgerow for forage.

Associations Between Group Membership, Labor Acquisition and Technique Adoption

A formal survey was conducted to learn of the relationships

between "groupman" membership, type of labor acquisition and technique adoption. The survey was prepared in questionnaire form and conducted by seven animators in their entire work zone (averaging 2000 hectares). The majority of the survey was completed by the animators themselves with information from their work-notes; additional information was obtained via informal encounters with randomly chosen peasants. The results of this survey are presented in Table 2 of the Annex. The data was analyzed using both Chi square and log-linear analysis. A description of the results and the meaning of those results follow.

Chi Square Analysis

The hypothesis that all categories of farmers: technique adopting "groupman" members, non-adopting "groupman" members, non-"groupman" adopters, and non-"groupman" non-adopters acquire labor for major agricultural tasks in the same manner was rejected at the .05 significance level.

Similarly, the hypothesis that adopting and non-adopting "groupman" members acquire labor in the same manner was also rejected at the .05 level. These tests indicate that there is some correlation between the manner in which farmers acquire labor and technique adoption. "Groupman" members who have adopted techniques exhibit a greater tendency to participate in group labor exchanges ("asosye") than "groupman" members who are non-adopters (approximately 43% of adopters cooperate in "asosye" while 34% of non-adopters cooperate in "asosye"). Non-adopting "groupman" members have a greater tendency to exchange labor with one other individual than do adopting members (38% and 18% respectively). Both adopting and non-adopting members exhibit a low tendency to hire day labor for the execution of major agricultural tasks (approximately 9%).

The hypothesis that adopting non-"groupman," and non-adopting non-"groupman" acquire labor in the same manner was accepted at the .05 significance level. When categories are lumped together, adopters exhibit a slightly greater tendency to cooperate on tasks (either in groups or in pairs) than non-adopters, and also have a lower tendency to hire labor. Non-"groupman" farmers have a greater tendency to work their land individually than do "groupman" farmers (36% and 24% respectively). Non-"groupman" farmers also have a lower tendency to cooperate in "asosye" groups (16% compared to 39%). The percentage of farmers who exchange labor with one other individual is approximately the same (28%) in both "groupman" and non-"groupman" categories.

Log-linear Models

Log-linear analysis was used to determine the degree of interaction between the "groupman" membership, labor type and technique adoption variables. As indicated in Annex 1 Table 2, nine models were tested for goodness of fit. The model which

assumed that technique adoption was independent of "groupman" membership and labor type was the strongest model. The model which assumed adoption and "groupman" independence conditional upon labor type was the second strongest model. The third strongest model was one which assumed adoption independence with labor conditional upon "groupman" membership. No other model resulted in significant interaction. Odds ratios were calculated from the u-terms of the best fitting model and the following conclusions can be drawn:

- 1) non-"groupman" farmers are 3.5 times more likely than "groupman" farmers to work as individuals rather than in groups;
- 2) non-"groupman" farmers are 1.4 times more likely than "groupman" farmers to work as individuals rather than in pairs;
- 3) non-"groupman" farmers are 2.7 times more likely than "groupman" farmers to work as individuals rather than hire labor;
- 4) "groupman" farmers are 2.4 times more likely than non-"groupman" farmers to work in groups rather than in pairs;
- 5) "groupman" farmers are 3.2 times more likely than non-"groupman" farmers to work in groups rather than hire labor;
- 6) "groupman" farmers are 2.1 times more likely than non-"groupman" farmers to work in pairs rather than in hire labor.

Survey Conclusions

As if it needs to be said, this survey does indicate once again that human behavior is difficult to model and predict. The survey does point out that "groupman" members and non-"groupman" members do acquire labor differently, and that this interaction is independent of technique adoption. Generally speaking, "groupman" farmers exchange labor more, and work individually and hire labor less than non-"groupman" farmers. As indicated in previous sections, there is an expressed (and apparently increasing) tendency for "groupman" to perform as labor exchange groups. In addition, it is informative to recall that the survey took place two years after the "ramp pay" innovation was generated, and after the technique has been widely adopted. If conducted the year prior, a difference might have been found in the social linkages between the early and the late adopters.

Discussion: Lessons From the "Ramp Pay" Case Study

Many factors appear to have positively influenced the adoption and diffusion of the "ramp pay" and the "ramp pay"/hedgerow techniques. In particular, the "ramp pay" and "ramp pay"/hedgerow combinations:

- 1) combine components familiar to peasants ("e.g. ramp pay,"

hedgerows) and are compatible with other agricultural and social activities;

2) are simple and require low and non-financial installment costs (The "ramp pay" can also be easily destroyed if farmers decide against continued use.);

3) provide short-term economic returns (usually in the same season as installment);

4) are adaptable to farmer specific site conditions, management objectives and preferences. This factor facilitates a sense of farmer "ownership" of the technique and;

5) can be adopted sequentially, at the farmer specific pace of knowledge and decision accretion.

The participatory technology development method utilized also permitted peasant "authorship" of the structures on their own land. This "authorship" quality probably positively influenced adoption and further innovation. In one sense, these innovations were a product of "cultural" rather than "financial" capital. Finally, it should be noted that the "ramp pay" on the contour, and "ramp pay"/hedgerow innovations were originally designed and promoted by the project technical staff. These are clearly not examples of independent and spontaneous, local peasant innovation. These innovations are cases of knowledge and practice shared in conversation between peasants and technicians.

In sum, it appears that social affiliations (via labor exchange or "groupman" membership) are facilitating, but not necessary conditions for technique adoption. Though this apparently indicates that if a technique is sufficiently beneficial to the individual then social affiliations are not necessary for the technique to diffuse, it should be remembered that the survey took place two years after the innovation was generated. The rapid adoption rate of the "ramp pay" indicates that though social affiliations may have facilitated generation of the innovation and initial adoption, they are probably no longer critical for "ramp pay" diffusion.

THE "GROUPMAN KONSEVE TE-A" [note 3] SOCIAL INNOVATION

Traditional Agricultural Labor Exchange Arrangements

As stated in the previous section on Haitian social organization, labor exchange plays a critical role in agricultural production. Because rainfall often determines the timing of agricultural tasks, labor is urgently required by all farmers at unpredictable moments. Labor is thus sporadically in great demand, of limited

supply, and thus scarce. Access to labor at critical moments during the agricultural season can make the difference between great yields and no yields, abundance or scarcity. For this reason peasants "strategize", operating in ways to assure that when the rain suddenly falls and assistance is needed on an agricultural task, they get help.

Many forms of labor groups exist and they range from the large, festive, religiously affiliated "sosyete" to pairs of friends who regularly cooperate on any task requiring more than two hands. An intermediate arrangement is the "asosye" or "esquad" labor exchange group. A great deal of literature has been written on this topic, and the importance of the traditional "kombit" festive work party in Haitian society has reached almost mythic proportions in Haitian popular history. Labor exchange is strongly rooted both in the cultural belief system of transactional relationships with the spiritual world, and the exchange oriented market system.

In the Maissade area, informants claim that the "kombit", which was in the past a dominant means of accomplishing field preparation tasks, is rarely used now except by the more prosperous peasants. Reasons cited are the increasingly high cost of the requisite festivities and the uncertain and low quality of labor. Informants also state that "asosye" has also been popular, but that this arrangement declined in prevalence during the oppressive Duvalier regime. The causes of this trend are reportedly several: local police action caused social division, a paucity of trust, and a general reservation towards group action for fear of malevolent accusations of "communism" or co-option for "voluntary" participation government labor activities.

Motivations cited for participating in an exchange labor group include both those of utility and social approbation. Peasants state that working in groups is "encouraging", that the work seems to be completed quickly and that no costs are incurred (because it is not festive and no food is provided).

SCF and Labor Exchange Groups

As stated in the previous case study, SCF has promoted peasant organization -- chiefly for community development objectives -- in Maissade since early 1986. In 1989, after substantial adoption by individuals of soil conservation techniques on private agricultural parcels, the project began promoting peasant cooperation for the treatment of erosive ravines which crossed private property boundaries. In short, the project encouraged the formation of new social groups of farmers who owned or worked land within small watersheds which were especially degraded. This approach was in accord with the recommendations of Murray (1978 and 1990) and others who have called for the establishment of hillside labor gangs for the construction of soil conservation structures. Cernea (1989) also has called for the testing of

such an approach.

Field research conducted by the author in 1990 on the topic of peasant cooperation for micro-watershed management in Maissade generated a number of lessons for the project, some of them unexpected. In short, cooperative efforts for the treatment of trans-boundary ravines operated to a degree surprising to both peasant and project. A total of 649 checkdams were constructed by approximately 900 person days of volunteer labor on over 100 different parcels of private land between April 1989 and August 1990 (White 1992). A fact surprising to project staff was that 42% of regular participants did not own land in the watersheds treated. Further investigation concerning the incentives for participation in the cooperative activity indicated that the overwhelming majority of these "external" participants were members of agriculture labor exchange groups ("asosye" or "esquad") with watershed landowners who participated.

To summarize, the project learned that: 1) it was largely unsuccessful in creating new social groups based on land ownership in the same watershed; 2) this did not prevent complete watershed treatment and; 3) that pre-existing social arrangements ("e.g." labor exchange groups) were the principal actors in the work accomplished and the vehicle by which the techniques were being diffused (White 1992).

Research resulted in another interesting observation concerning the relationships between project peasant organization promotion and the prevalence and nature of labor exchange groups. In 1990, 11% of the farmer groups participating in project activities claimed that they had operated as labor exchange groups prior to project activity. The same survey indicated that 46% of farmer groups currently operate as labor exchange groups. This increase does not necessarily imply that the project caused farmers to adopt cooperative behaviors -- in all likelihood as labor exchange is a common traditional activity -- the members of the 46% of the groups now exchanging labor had exchanged labor in the past. The project then seems to have influenced groups of people who had not exchanged labor together to collectively adopt the labor exchange practice.

In addition, in an adjacent area named "Bwa Wouj" where the project has recently initiated limited peasant organization and technical assistance programs, peasants who have traditionally engaged in festive work parties ("kombat") are now operating in labor exchange groups. Informants indicated that though there were other reasons for shifting from the "kombat" to the "asosye" arrangement, it was project influence which inadvertently triggered this change. Neither of the above mentioned project impacts on labor exchange patterns were known to project staff at the time of the survey in 1990. Thus in essence, while the project was promoting groups for community development purposes, peasants were also utilizing this new tool ("groupman") to facilitate labor acquisition.

As stated above, the period of project implementation (January 1986 to the present) corresponded directly with the overthrow of

the repressive Duvalier dictatorship of 30 years and the subsequent blossoming of cooperative activity of diverse forms throughout the country. This occurrence undoubtedly positively affected the reformulation and formation of labor exchange groups to some degree, and is an example of the effect of the State politics on local-level innovation.

The "Groupman Konseve Te-a" Innovation

In the Larik area of Maissade several groups of males began exchanging labor ostensibly for the construction of soil conservation structures in March 1990. These self-initiated and self-named "groupman konseve te-a" operated during the dry season and installed techniques on their own land but also on lands of non-members who owned land upstream of their own. In this manner they assured the protection and effectiveness of their investment in their own lands.

Both of the groups interviewed by the author were composed chiefly, young, single males who had previously participated in traditional labor exchange groups ("asosye"), though not always in the same groups. There was some overlap, about 50% of members also worked together in "asosye" groups during the agricultural season. The primary criteria for participation was apparently an individual's interest in cooperatively installing soil conservation structures on their lands. A majority of members were also members of the SCF sponsored "groupman." One group interviewed had held eight work days during two months, installed 15 "ramp pay"/hedgerows, 14 ravine checkdams, and worked on seven different parcels of private land. Both groups plan to continue working each dry season and are actively encouraging others to form their own soil conservation groups.

Summary Discussion

This social innovation, which combines traditional labor exchange arrangements with a newfound motivation to implement soil conservation techniques is purely a peasant innovation. Project personnel were surprised to learn of the innovation and have since encouraged other farmer groups to consider the same. Though peasant initiated, it is realistic to assume that the project played some role in influencing peasants to consider this particular use of a traditional organization.

It should be noted that after the field survey was completed, the author discovered that an identical social innovation had occurred the year previous in a nearby region. In that case, farmers -- who were members of "Moveman Paysan Papay" (MPP) project sponsored "groupman" -- began forming new and independent groups to do soil conservation tasks. They too exchanged labor on each others lands. In this instance the groups termed

themselves "brigad." The MPP project was also ignorant of this innovation initially, but has since promoted this type of organization. There are now reportedly 500 such groups operating in the region (Gerner 1990).

CONCLUSIONS: PEASANT INNOVATION AND "DEVELOPMENT" INTERVENTION

Peasant Groups and Soil Conservation Innovation

Innovation as "Thrifty" [note 4] and Incremental Cultural Evolution

In the case studies presented, Haitian peasants either adopted project promoted innovations, or independently generated innovations which combined indigenous techniques or social arrangements. The innovations were recombinations of familiar practices and were only incrementally different from the original practices. The "ramp pay" technique promoted differed from the indigenous technique in that it was placed in agricultural fields and was on the contour. The "groupman konseve te-a" differed from the indigenous "asosye" arrangement in that it met during the dry season to construct soil conservation structures. These incremental differences also apparently permitted incremental adoption and incremental adaptation by peasants with different productive objectives, constraints or tendencies.

A fundamental characteristic of both innovations was that they were relatively simple, required low non-financial investment costs which did not threaten domestic thrift, and showed quick results. Upon examination of the soil conservation techniques which have diffused spontaneously ("tram, ramp pay, kleonaj"), one determines that erosion control has only been adopted in Haiti when it results in thrift, or increased net economic gain -- not necessarily because it saves soil. Thus with relatively low investment, peasants could determine whether the innovation was worth their time or not. This low investment and quick return characteristic of the innovations suggest that economic efficiency is a minimal, necessary condition for adoption.

Small Groups as Loci for Innovation

In both cases, the innovations took place in association with and were evidently facilitated by the dynamics of small groups of which most adopters were members. Apparently these groups of kin, friends and labor exchange partners form a mutually stimulating network of trust, solidarity and confidence which encouraged and promoted innovation. The groups are apparently not only the forum for "brainstorming" and organizational learning, but they permit the sharing of uncertainty over the outcome of adopting the innovation, be it externally or

internally generated. A study of innovation adoption in Nigeria also found that farmer group membership was positively correlated with adoption. This study even suggested encouraging group membership as a means of improving innovation adoption (Njoku nd). If these hypotheses are true, then it was no coincidence that the "groupman konseve te-a" and "brigad" innovations occurred independently and that in the appropriate social conditions, peasants will spontaneously innovate and adapt.

Even the SCF and MPP projects which explicitly support peasant organization did not recognize the social and reciprocal nature of labor acquisition, an apparently fundamental peasant preoccupation. Haitian peasants are members of social networks, and their decisions are influenced by the trusted groups of which they are members. Again, in Haiti it is not the person who threw the stone who killed the snake, it is the person who first saw the snake who killed it; and no one finger can eat okra. Though often the cause of substantial consternation among peasants (nearby friends are double edged knives), peasant interdependency is recognized and accepted as a rule. Conversation among trusted associates regarding individual decision is standard.

In addition to the function of generating the innovation, participation in small groups, either labor exchange or "groupman" apparently facilitate (but is not necessary) for technique adoption. Continuing from the previous section, if the innovation is sufficiently and obviously economically beneficial then individuals are likely to adopt it regardless of social affiliation. As many agricultural development innovations are not obviously economically beneficial, then the role of group dynamics -- to test, adapt, and share the risk of an innovation -- becomes apparent.

Conventional soil conservation approaches embodied the western cultural bias to the individual. In USAID's first major report on the human resources of Haiti written in 1962, the author concluded that "the peasant is receptive to innovations and, except under extreme duress, is incapable of group action to defend his interests" (Schaedel 1962:iii). This conclusion implicitly encourages approaches which understand the Haitian farmer as an individual, and more explicitly, as an individual decision maker. Judging from history, past soil conservation experience and from the case studies presented in this report, the conclusion that Haitians are "incapable of group action to defend his interests" is apparently not only untrue, but refutes the positive role group action can have on innovation adoption and cultural change.

Effectiveness of Shared Knowledge and Conversation Approaches

One of the key elements illustrated by the case studies was the benefit of shared knowledge between peasant and scientist. Both sets of knowledge and perspective have limitations, and reliance upon one set of knowledge or the other would not suffice in solving rural Haiti's massive and complex set of problems. Another key element suggested by the case studies was the

usefulness of technology development and diffusion approaches based on project-peasant conversation rather than manipulative persuasion. Both of these elements represent substantial departures from conventional soil conservation approaches which largely assumed Western notions of "innovation diffusion as marketing", and Western defined "rationality". Western or western trained technicians largely promoted western techniques while ignoring indigenous knowledge, techniques and social affiliations.

In the author's opinion, Haiti is not short of the resource scarcity which is often considered "the mother of invention", its very history is one of cultural innovation; and peasants also do not seem short of new ideas, of a willingness to try new things, or of the social organizations which facilitate innovation. What does seem lacking is a political and economic environment conducive to peasant innovation and the widespread use of project approaches which promote innovation.

Role of Development Intervention

Key questions for project development agents are: "How should we intervene; how do we recognize promising local knowledge and practice; how do we discern what of our knowledge is appropriate to rural Haiti; and how do we converse with the peasantry?" Development agents should begin with the recognition that land use patterns (and soil conservation innovation in particular) are products of a synergistic mix of economic incentive, cultural heritage and social organization. Agents should also begin with the premises that: for soil conservation to be adopted and sustained it must be an extension and incremental transformation of existing cultural and technical behaviors; this transformation can be stimulated but not forced by external agents; the exact character of the technique must be authored by local inhabitants in order to mesh with existing cultural and technical standards; and, this extension can be achieved by dialogue with existing landholders.

A small but growing group of development practitioners provide some food for thought. Noting the wealth of indigenous agricultural and forestry knowledge, and the legacy of farmer innovation and adaptive strategies: their orientation is not to transfer or market technologies from research stations and western technicians but to "empower farmers to learn, adapt and do better; analysis is not by outsiders... but by farmers and farmers assisted by outsiders;... what is transferred by outsiders to farmers is not precepts but principles, not messages but methods, not a package of practices to be adopted but a basket of choices from which to select." (Chambers 1989:182). Thus, in response to the question of how to intervene, this group of practitioners would respond; "Ask and assist the farmers".

To conclude, the following specific recommendations should be considered by individuals concerned with soil conservation and

sustained rural development in Haiti: 1) use group-based extension strategies; 2) use extension strategies in which peasant and technician knowledge is "shared" in conversation (rather than persuasion) for the identification, design and testing of new practices; 3) promote practices which combine elements familiar to peasants, are simple, of minimal uncertainty, show short-term returns, and can be sequentially adopted; and 4) explicitly aim at reinforcing local innovative capacity.

APPENDIX

Table 1. Description of group membership and technique adoption

Category	Variable
Total no. of "groupman" (gp).	114
Total no. of gp members (gpm).	1046
No. of gpm who are not potential adopters ("i.e." aged or schoolchildren).	285
No. of gpm who have adopted techniques.	571
No. adopters who are not gpm.	184
Total no. of adopters.	755
No. of gp founded upon pre-existing labor exchange groups.	13
No. of gp which currently operate as labor exchange groups.	53
No. of gp which implement techniques as a group.	27
No. of gpm of labor exchange gp who have adopted techniques.	261
Manner in which gpm implement techniques (reported as % of n = 85 farmers):	
individually ("pou kont yo").	32
cooperatively, in a labor exchange gp ("asosye").	49
share labor with one other farmer ("boukante maten").	19
Reasons given by non-adopting gpm for not adopting techniques (% of n = 71):	
I do not have time to implement the techniques.	39
I do not own land.	21
I do not have land appropriate for the techniques promoted.	17
I hire labor for all agricultural tasks.	10
I do know how to implement the techniques.	10
Another reason not listed above.	3

Notes:

1. The techniques referred to in this table are soil conservation techniques which can be implemented by a single individual.

2. Figures presented for the "Manner in which gpm implement techniques" and the "Reasons non-adopting gpm for not adopting techniques" categories are results of a stratified random sample of at least 10 farmers from each category in each of seven comparable zones. The null hypothesis that proportions were the same for each response in each category was tested with the X squared statistic. This hypothesis was not accepted at the .05

significance level for either category.

3. Data collected in Maissade, Haiti, September, 1990.

Table 2. Association between group membership, labor acquisition and technique adoption

Category	Labor Acquisition Type (%)				n
	individual	group	pair	hire	
Adopting gpm	25	43	18	13	83
Non-adopting gpm	23	34	38	6	86
Adopting non-gpm	32	18	31	17	70
Non-adopting non-gpm	38	14	26	22	85

Notes:

1. The techniques referred to in this table are soil conservation techniques which can be implemented by single individuals.

2. Figures presented are results of a stratified random sample of at least 10 farmers from each category in seven comparable zones.

3. Labor acquisition type refers to the predominant manner in which farmers in each category acquire labor for major agricultural tasks (tilling, planting, weeding, harvesting of cereal crops).

4. Labor acquisition types are explained as follows:
individual: the farmer works individually ("pou kont yo");
group: the farmer works as a member of a labor exchange group ("asosye"); pair: the farmer works with one other farmer ("boukante maten"); and hire: the farmer hires day labor ("bay djob").

5. Statistical analysis: The X squared statistic was used to compare type proportions between categories.

Test 1 The null hypothesis that true type proportions are the same for all category populations was rejected (X squared = 34.84; $p = < 0.0001$; $df = 9$).

Test 2 The null hypothesis that true type proportions are the same for gpm adopting and gpm non-adopting category populations was rejected (X squared = 9.97; $p = 0.019$; $df = 3$).

Test 3 The null hypothesis that true type proportions are the same for non-gpm non-adopting, and non-gpm adopting was accepted (X squared = 1.66; $p = 0.647$; $df = 3$).

Test 4 The null hypothesis that true type proportions are the same for gpm adopting, and non-gpm adopting was rejected (X squared = 11.23; $p = 0.011$; $df = 3$).

Test 5 The null hypothesis that true type proportions are the same for gpm non-adopting, and non-gpm non-adopting was rejected

(X squared = 19.53; p = < 0.0001; df = 3).

6. Statistical analysis: A 3-way table was established and log-linear analysis used to test for interaction between technique adoption, group membership, and labor acquisition type. Nine models were tested, and the model with group and labor interaction independent of adoption provided the best fit as the p value was highest and the AIC lowest of all models.

Model	p-value	df	G2	AIC
Labor Group Adoption	.0001	10	36.32	32.32
Adoption Group*Labor	.1256	7	11.49	13.49
Labor Group*Adoption	<.001	9	35.81	33.81
Group Labor*Adoption	<.001	7	32.72	34.72
Labor*Adoption Adoption*Group	<.001	6	32.22	36.22
Adoption*Labor Labor*Group	.0988	4	7.89	15.89
Adoption*Group Group*Labor	.0954	6	10.98	14.98
Labor*Group Labor*Adoption Group*Adoption	.0545	3	7.70	17.70
Labor*Group*Adoption	1.000	0	0.00	16.00

As a test, single term partialization was used to test the significance of the separate u-terms. The u(adoption,labor) and the u(adoption,group) terms were not significant at the .05 level, and thus the model of choice is the [adoption labor*group] model. The u-terms for the labor type, group interaction from the [adoption labor*group] model are as follows:

labor type	group member	non-member
individual	-.15516931	.15516931
group	.46946687	-.46946704
pair	.02469033	-.02469033
hire	-.33898789	.33898818

7. Data collected in Maissade, Haiti, September, 1990.

NOTES

1. Land security should not be confused with land tenure. Various land tenure arrangements exist in Haiti, and the degree to which a farmer is assured control over the benefit of the soil conservation technique, not necessarily tenure, directly affects adoption.

2. This theory corresponds to and is consistent with a three dimensional model for analyzing soil conservation independently generated by G. Murray in October of 1991 (Murray 1991). He proposes that soil conservation be analyzed as a behavior evolving within three interlinked components: 1) technoeconomic; 2) organizational; and 3) ideational. He also proposes that the technoeconomic component has greater strength than the others and

usually drives behavioral evolution.

3. Literally translated, this means "soil conservation group."

4. The term "thrifty" is used synonymously with "economically efficient."

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