Productive Land Use Systems

Haiti

South-East Consortium for International Development

and

Auburn University

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A Review of PDAI and ADS II Project Technologies

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I am indebted to many institutions and individuals who facilitated the completion of this consultancy assignment. Auburn University, which employed my services through Dr. Dennis A. Shannon. Dr. Shannon took even personal time to attend to the author's needs while undertaking the task. He provided the initial background on the PLUS project and the details of the assignment. Likewise, his valuable suggestions in the report made my output more meaningful.

The USAID/Haiti and its able officials in the PADO, led by Dr. Abdul H. Wahab, a long-time associate and friend; Agr. Michelet Fontaine, who provided direction in the accomplishment of the task, and the support staff - Nadine, Anouk, and Magalie - my sincere appreciation and gratitude.

In similar manner, I am thankful for the assistance provided by the senior staff of CARE and PADF, Haiti - Arlin Hunsberger, Mike Bannister, Greg Brady, Artus Pierre and Wilner Alix - in providing valuable information so that I can understand better the philosophy of PLUS and its implementing organizations. I am also grateful to Agr. Reynold Alexis and Agr. Gardy Florantin for their assistance during my field visits and to Dr. Fenel Felix of the Faculty of Agronomy and Veterinary Medicine for his help in locating published material needed for the project in their library in Damien.

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Finally, may this report give some insights, however little, that can benefit the Haitian peasants.

FORWARD

This review of previous agricultural research and extension activities conducted under the PDAI and ADS II projects had its origins in the restructuring of the Agroforestry II Project (AFII) to create the Productive Land Use Systems Project (PLUS). While the purpose and goals of PLUS are identical to those of AFII, the strategy and focus of AFII was on tree planting and soil conservation, while under PLUS, the focus has been widened to include farming systems and crop production. Because farming systems and crop production were for the most part new to the project, background information was lacking on which potential crops and crop production practices to base a new extension thrust. Little was known of the experiences of previous agricultural projects. It was therefore with much insight that Dr. Abdul Wahab, USAID's Private Enterprize and Agricultural Development Officer recommended to SECID/Auburn University to enlist the services of Dr. Marianito R. Villanueva, an experienced agronomist who worked in the PDAI Project, to review the accomplishments of the two projects and recommend technologies based upon their successes.

Dr. Villanueva's review highlights some of the successes of the previous projects. At the same time, he makes it very clear that much remains to be done in the areas of technology development and extension. While high yielding, adapted varieties of several crops were identified, in only one case was the variety superior to local varieties under prevalent farming conditions. Both research and extension activities were suspended prematurely, with the result that farmer adoption of the more complex soil conservation practices was less than satisfactory in many instances.

For PLUS and for USAID, the lessons learned have significant implications. During the short period of PDAI and ADS II, more was learned about what varieties were not appropriate to small farmers in Haiti than about those that were appropriate. Had variety selection not been suspended, it would have been possible to use the new information gained on consumer preferences and the deficiencies of the introduced varieties to focus the selection process in order to overcome these constraints. Adapted varieties, superior in quality and higher yielding than local varieties under prevalent low-fertility conditions, would now be available. With the exception of black beans, PLUS will now have to look elsewhere or to conduct its own variety testing program.

With respect soil conservation practices, longer periods are required for training and follow-up than occurred under ADS II, much longer than the life of PLUS. A one-dimensional approach, promoting hedgerows for soil conservation without a parallel strategy to address livestock nutrition, and a lack of continued

research and extension have resulted in a failure to achieve the level of sustainable soil conservation and improved crop production for which the technology is most suited.

This report highlights the need for continuity between projects and for a long-term strategy for agricultural research and extension. ADS II built on the successes of PDAI, but its premature termination resulted in stagnation in the development and refinement of technology. Clearly, if more than a marginal improvement in environmental conservation and increased farmer production and income is to be achieved, a long-term strategy emphasizing continuity in research and extension is of paramount importance. The time frame for attainment of specific goals must be realistic.

Dr. Villanueva's insightful observations, while of practical use to the PLUS project in Haiti, point out some of the broader concerns shared by agricultural workers throughout the developing world. In a funding environment typified by zero-based budgets, short-duration projects, changes in orientation in on-going projects and lack of transitions between projects, the goal of meaningful improvement in agriculture and the environment is becoming increasingly elusive. It is my hope that Dr. Villanueva's recommendations will be taken to heart, both in the context of PLUS, and in the USAID Mission's plans for future agricultural projects in Haiti.

Dennis A. Shannon
Campus Coordinator
Auburn University

S U M M A R Y

A task was undertaken on behalf of the Productive Land Use System (PLUS) project to review technologies tested or developed in two earlier USAID-funded projects in Haiti with potential application to the PLUS project. The two projects, PDAI and ADS II, were assessed on the basis of their accomplishments in technology development, socio-economics, institutional collaboration and linkages, and research and extension approach. Emphasis was given to technology development as the issue of primary interest to PLUS. As also the major achievements of PDAI and ADS II, the major technologies addressed were varietal improvement, cultural management, and soil conservation.

Among the varieties recommended by PDAI and promoted by ADS II in two regions of Haiti, TAMAZULAPA black bean was the most accepted and extensively grown by the farmers up to the present time, nine years since its first introduction. The recommended varieties for the other food crops had not undergone extensive testing, but initial reactions of the farmers were negative.

Living hedgerows of leucaena and grasses were adopted by farmers in the hillside farms of Fond-des-Freres, Les Cayes. However, because the ADS II Project terminated five years ago and there has been no contact with any extension program since, many of the hedgerows are gone, primarily due to overgrazing of animals. In contrast, the rock walls introduced in Haut Cap Rouge, Jacmel are better maintained and have expanded slowly.

While the innovations introduced by those projects seem to be adopted by farmers, much more is needed to bring about their real impact to the Haitian farmers.

REZIMÉ

Fin bout rapò-sa se pou repasé teknik ke yo swa devlopé ou swa testé nan de pwojè finansè pa USAID nan ane ki sòt pase yo ki te ka genyen rapo ak pwojè PLUS-la (Sistem Itilizasyon Pwodiksyon Te).

Dè pwojè yo - PDAI e ADS II - te evalyè sou baz sa yo te akompli nan plizyè sèkte devlopman teknik, tet-ansam enstitisyonel, ak aktivitè reshesh ak ekstansyon. Yo bay sèkte devlopman teknik-la plis empotans pa rapò a pwojè PLUS-la. PDAI ak ADS II te plis travay sou teknik amèlyorasyon espes, amenajman kilti, ak konsevasyon sol.

Pami espes ke PDAI te konsèyé e ke ADS II te bay youn bourad tou nan de seten zon se te TAMAZALUPA, youn pwa nwa ke agrikiltè yo te byen adopte dèpi nef ane. Lòt espes yo pat byen testè, ni plantè yo pat montre yo two kòntan avek yo.

Antouka, he viv Leuceana ak zeb te byen pran nan fem zon Fond-des-Freres, au Cayes. Men, nan sank ane depi ADS II patè yo, agrikiltè yo rètè san kontwol ak oken pwogram ekstansyon, e pi fò nan he viv yo gen tan disparet a koz bet fin manjè yo. Pa kont, mi sec nan Haut Cap Rouge, Jacmel, rètè en fom de yap laji ko yo nan tout zon la tou dousman.

Mem si sa samblè ke teknik pwojè sa yo te tamè ap maché, agrikilte Aisyien-an beswen plis enfomasyon pou ke teknik yo ka vreman pran pye.

HAITI PRODUCTIVE LAND USE SYSTEM

A Review of PDAI and ADS II Project Technologies

by

M. R. Villanueva

I. INTRODUCTION

Haiti is one of the oldest countries in the western hemisphere and also the poorest. It has mountainous terrain with most of its resources impoverished. Hillside agriculture predominates as flat lands are very limited. About 80 % of the population lives in the countryside, generally on subsistence farming.

The situation in Haiti has attracted much foreign assistance, both from government and non-government (NGO) organizations. Many of these assistance programs have focused on the peasants in the countryside. Strategies have included irrigation, soil conservation, agroforestry, farming systems, research, extension, training and institutional development. The United States Agency for International Development (USAID) has been one of the major organizations undertaking development work in the country.

Among the major USAID projects implemented in Haiti were the Agroforestry Outreach Project (AOP), the Integrated Agricultural Development Project (PDAI), Agricultural Development Support II (ADS II) and Agroforestry II (AFII). Just as the AOP was starting in 1981, PDAI was also being implemented. This was followed by ADS II in 1984. The PDAI project was charged with agronomic research and extension in parts of Haiti and dealt mostly with the country's major food crops, i.e. rice, corn, sorghum, beans, cowpeas, sweet potato, cassava and other food crops.

The AOP and AFII provided continuous and vital delivery of agroforestry services to much of Haiti's rural population for a full decade until the advent of the most recent political turmoil stemming from the September 30, 1991 coup d'etat. This event provided an opportunity for USAID/Haiti to undertake a review of the thrust of AFII project. The intention of the reassessment was to sharpen the focus of activities and to assure a more meaningful and enduring economic and ecological impact. Consequently, the AFII project was amended to increase the project's emphasis on achieving both economically profitable and environmentally sustainable agricultural activities, thereby altering its image as essentially a tree-planting project. The nature of the redesign is characterized by the change of the projects's name from Agroforestry II to Productive Land Use Systems (PLUS), reflecting a change in emphasis away from subsidized tree-planting and conventional land conservation to a more sustainable program aimed

at extension of conservation practices and increased farmer income through greater production, improved operations and reduced management costs. The goal and purpose of PLUS have remained the same as the AFII project. They are as follows:

Goal: To maximize the productive potential of Haitian hillside agriculture by reducing the ongoing degradation of the country's natural resource base through sustainable land-use interventions;

Purpose: To achieve sustainable increases in on-farm productivity and income generation by integrating into existing farming systems appropriate land use and soil and water conservation measures, involving trees, shrubs, grasses, and other plant materials which will enhance soil fertility.

Although the same three institutions, CARE, PADF and SECID, will continue to serve as the implementing agents, the focus will be on land use interventions which provide sustainable income for Haitian hillside farmers. Increased sustainability is viewed both in terms of the ecological sustainability of interventions introduced under the project and the financial sustainability of the technologies applied at the farm level. An important aspect of sustainability centers around a direct linkage to a wider range of market opportunities, providing farmers with a strong incentive to continue the new technologies developed under the project. To ensure the sustainability of practices introduced, subsidies provided under the AFII project will be eliminated. The incentive for the farmer to continue will therefore be based on the perceived value and utility of the practices learned under the project. On the other hand, PLUS is expected to train farmers and transfer appropriate farming systems technologies that are closely linked to ecological sustainability of the production system.

The ADS II project supported farming systems research in the Department of Agriculture of Haiti, working primarily in the Les Cayes and Marigot/Jacmel areas. In many ways, it had a similar goal as the amended PLUS project. This was particularly true of its activities on the hillside sites, except that PLUS is targeting a wider area in Haiti. For this reason, a short-term technical assistance was put together by PLUS to determine what can be learned from PDAI and ADS II.

II. SCOPE OF SERVICES

Given the similarities of PDAI and ADS II with PLUS, a review which derived lessons from their results and experiences was considered a valuable input to the PLUS project, which could saving considerable time in the implementation of this project.

The assignment had the following objectives:

1. To review technologies tested or developed in the PDAI and ADS II Projects with potential application to the PLUS Project and make recommendations as to what crops, cropping practices, soil and water conservation practices should be promoted by the PLUS project and the agro-ecological zones where these technologies apply.

2. To identify where future testing needs to be done.

The scope of work was specifically defined as follows:

1. Provide a list of technical reports of the PDAI Project of interest to the PLUS Project and aid the PLUS Project to obtain copies of these reports.

2. Meet with Dr. Swanson at Auburn, Alabama, to discuss the accomplishments of the ADS II Project and the location of technical information of relevance to PLUS. Obtain a list of technical reports of the ADS II Project.

3. Write a report synthesizing and summarizing the most important results of the PDAI and ADS II projects which have application to the PLUS Project in the different areas of research or extension (e.g. agronomic, economic, social, farmer adoption, etc.). Special care should be made to identify the agro-ecological zones or socio-economic settings to which the findings may be applied.

4. Visit PDAI and ADS II implementation sites with the SECID agronomist to determine if crop varieties or practices promoted by the PDAI Project are still in use.

5. Present a seminar to PLUS and AID staff summarizing his findings.

III. STRATEGY OF IMPLEMENTATION

The scope of work itself indicates some of the actions that have to be done for this assignment. In addition, the following were undertaken:

1. Interviewed some technical personnel and farmers who were involved with the PDAI and ADS II projects and/or the PLUS Project.

2. Searched in the libraries of PADF, USAID in Haiti, and the Faculty of Agriculture and Veterinary Medicine, Damien, Haiti for the publications of PDAI and ADS II referred to in the scope of work.

3. Contacted some of the personnel who were on the PDAI Project, both technical assistance and local counterparts.

4. Conducted field visits to the PDAI and ADS II sites and verified the existence of technologies introduced by these projects and elicited more insights from the farmers and former project personnel about these technologies.

Among the personnel contacted and consulted were the following:

1.	Dr. Merritt J. Taylor	Long-term Agricultural Economist, PDAI
2.	Agr. Reynold Alexis	PDAI and ADS II Local Counterpart, Agronomist
3.	Dr. Jean Fenel Felix	PDAI Local Counterpart, Physiologist
4.	Mme. Marguerite Blemur	PDAI Local Counterpart, Soil Conservation
5.	Paul Job Arisne, Sivilma Ulysse, Anoius Pierre, and several other farmers.	ADS II Farmer participants in Maniche uplands, Les Cayes, Haiti
6.	Dr. Abdul H. Wahab	Chief, Private Enterprise and Agricultural Development Office, USAID/Haiti
7.	Agr. Michelet Fontaine	Project Officer, USAID/Haiti
8.	Arlin Hunsberger	Director, PADF/Haiti
9.	Mike Bannister	Asst. Director, PADF/Haiti
10.	Gardy Florantin	PADF/Haiti
11.	Greg Brady	CARE/Haiti
12.	Artus Pierre	CARE/Haiti
13.	Wilner Alix	CARE/Haiti
14.	Galboril St. Germain	Dep. Agriculture, Sud'Est
15.	M. Guerard Lafontant	Dep. Agriculture, Sud'Est
16.	Agr. Rene Bellevue	Dep. Agriculture, Sud'Est
17.	Jean Charles Lamousnery	Dep. Agriculture, Sud'Est
18.	Villecinor Maxi	Animateur, Sud'Est
20.	Windscreil Heril	Animateur, Sud'Est
21.	Farmer groups	Haut-Cap-Rouge, Jacmel

Unexpectedly, an opportunity arose to participate in meetings among the leaders of the implementing organizations, SECID, CARE and PADF, held upon arrival in Haiti. The meetings were initiated by the SECID long-term agricultural economist, Dr. Zach Lea, and the short-term agricultural economist/consultant, Dr. Angelos Pagoulatos. These meetings provided an opportunity to gather additional background on the projected strategies that will be

undertaken by the Project and the operational involvement by each of the implementing organizations, and to gain a deeper understanding of the Project's operational philosophies.

Independent consultations held with CARE and PADF officials provided a better understanding on their respective organizational philosophies and capabilities. This understanding is vital for the success of any project that is implemented through inter-organizational collaboration.

IV. SCOPE AND ACCOMPLISHMENTS OF PDAI AND ADS II

A. Integrated Agricultural Development Project (PDAI) Research and Extension Component USAID Project No. 521-0078-C-00-1010-00

The general objective of this project was to assist the Research Service of the Haiti Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) to strengthen its capacity to conduct research on the basic Haitian food crops and to develop a capacity to deliver the positive results of this research to the small farmers of Haiti in order that food production could increase, thus reducing the nation's dependence on importations. The implementation of this project was undertaken by Texas A&M University, Texas, U.S.A. as the contractor in collaboration with the Faculty of Agriculture (FAMV) and the DARNDR. Attainment of the objectives was pursued through the following strategies:

1) Introduction of crop varieties and testing against traditional popular varieties,

2) Identification of problems affecting production and the development of technological packages and cropping systems that offer solutions to these problems,

3) Production and distribution of improved seeds and plant materials, and,

4) Training of Haitian technicians in research and extension methodology and the procurement of the needed tools and equipment to effectively carry out their respective programs.

1. Varietal Improvement

In every development program, the variety or breed used is always given immediate attention. It is known that genetic composition determines to a large extent the productivity resulting from the interactions of all other management inputs such as tillage practices, pest management, fertilizers, etc.

Genetic composition is also viewed in terms of its long-term contribution to the farmer's enterprise, going beyond the life span of any development program. The cost of seeds of the best acceptable variety represents the least investment having a long-term effect on the overall production system.

For the purpose of the PDAI - Research and Extension project, the primary food crops were identified as cereals, legumes, and root and tubers crops. This decision was made through consultation with officials of DARNDR and USAID.

For cereals, the work was concentrated on rice, corn and sorghum; for legumes, on black beans, red beans, pigeon pea and cowpea, and; for root and tubers, on sweet potato and cassava. Nevertheless, some efforts were also given to other species that are produced in more limited areas of the country, like winged beans, potato, taro or malanga, elephant yam or mazumbel (tania) and yam.

It is always recognized that the farmer has his own way of choosing the varieties he uses. His varieties are usually the products of a selection process that have considered the circumstances of the farmer and his immediate environment. Consequently, a collection of the most commonly grown cultivars of the above food crops was undertaken in conjunction with the introduction of germplasm from national and international centers. This strategy took into consideration the physical and socio-economic conditions of Haiti.

Apart from indigenous germplasm, materials were introduced from the Dominican Republic, the International Center for Tropical Agriculture, Colombia; International Rice Research Institute, Philippines; International Center for Research in the Semi-Arid Tropics, India; International Maize and Wheat Improvement Center, Mexico; U.S. Department of Agriculture, and others. Hundreds of germplasm materials of the above commodities were assembled at the main experiment station of the Faculty of Agriculture and Veterinary Medicine (FAMV) at Damien where initial screening and selection was conducted. Following a system of screening under a more favorable environment, the selections were eventually brought to farmers' fields, but only after further screening was done in the outreach stations of the Ministry of Agriculture such as the Levy Farm in Les Cayes and in the Marigot-Jacmel area. On-farm trials were undertaken in the outlying areas of Les Cayes, Marigot, Jacmel and the Central Plateau (Annual Reports, 1981, 1982, 1983, 1984 and Terminal Report, 1985 Texas A&M University). All the varieties introduced were identified as tropical with possible adaptation to growing conditions in Haiti.

These screening and selection efforts led to the identification of superior cultivars which were then turned over to the FAMV and DARNDR. Toward the end of the project, seed materials of the selections were increased at the experiment station and on leased private farms and distributed to some selected farmers. The superior varieties were as follows:

CROP	VARIETY	SOURCE
Corn	La Maquina 7827	CIMMYT, Mexico
	La Maquina 7928	CIMMYT, Mexico
Sorghum	M5009	CIMMYT, Mexico (ICRISAT, India)
Bean	Tamazulapa	CIAT, Colombia
Cassava	CMC-40	CIAT, Colombia
Sweet Potato	Negsale	Haiti
	Mona Sent	Dominican Rep.

2. Cropping Systems

Because crop associations represent a large part of the production in Haiti, the project embarked on cropping system trials comparing selected varieties with farmers' varieties and practices. Among the crop associations observed in the uplands of Haiti are the following:

a. Corn-Beans
b. Sorghum-Beans
c. Cassava-Sweet potato

The following observations were made:

a. Yields of corn and sorghum may not be affected when grown in association with beans.

b. Yield of bean can be reduced considerably when grown in association with corn or sorghum.

c. In associations involving crops of varying configuration, such as cassava, corn and sorghum, significant border effects must be considered (this has important implications for contour cropping with hedgerows).

d. Sweet potato may be grown on the contour but

cassava must be avoided when the slope gets to be too steep - beyond 30%.

3. Socio-Economics

To provide further basis on which to decide on which technology packages to be developed, a socio-economics component was included. Through surveys and personal interviews, the following information was obtained:

a. The factors that influence decisions in farming include rainfall pattern and availability of inputs to production, including oxen, fertilizer, improved seed, insecticide, labor and his financial situation.

b. Tenancy plays a major role in planning rotational systems. For instance, a renter cannot contemplate long-range plans or long-term crops since his access to the land is viewed as short-term.

c. For tenant farmers who must give 50% of the production to the landlord and who pay all of the costs of production, there is no incentive for the application of high cost technology since only the landlord would benefit.

d. Land is measured in carreau (12,900 sq. m or 1/16 of a carreau (seizieme = 806.25 sq. m).

e. Grain is measured by volume such as gros marmite, ti marmite and goblet or verre. A gros marmite is a gallon container which would hold approximately 2.5 kg corn or 2.7 kg dried beans. Tubers are measured in the double pack for a burro called "charge". Half of the pack was frequently carried by people and was called a "makout".

f. The peasant's main concern is not profit, but the daily availability of food needed for survival. For the purpose of characterizing the farms, three distinct types of micro farms were identified:

<u>Micro Farm A</u>

The home dwelling and immediate surrounding area planted with fruit trees, coffee and spices.

Micro Farm B

An area where the peasant plants primarily for survival. Plantings are scheduled so that food crops are harvested throughout the year. Crops grown include roots and tubers. Some may be sold in the local market. This farm unit may be large enough to plan for a monocrop and crop-association system or rotation system depending upon the prevailing climatic pattern.

Micro Farm C

This type of farm is usually limited to tubers such as mazumbel, yam, sweet potato and plantain. It is located in relatively fertile but almost unreachable places. Produce from such a farm is easily spotted in the market because of their better size.

The PDAI project produced a number of publications reflecting its various activities related to its objectives (Appendix A). These publications can be found in the library of the Faculty of Agriculture and Veterinary Medicine at Damien, Haiti.

B. Agricultural Development Support II (ADS II)

The overall objective of this project was to assist the Haitian Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) to strengthen its operational and administrative capacity to conduct and coordinate a national program of farming systems development and agricultural data gathering, processing and dissemination. The technical assistance was provided by the University of Arkansas over a period of four (4) years beginning in 1984.

There were two (2) specific components that were supported by the project:

1. The Research and Extension component which covered on-farm adaptive and cooperative research leading to the development of alternative, adaptable and economically viable farming systems; and

2. The Rural Economics and Agricultural Statistics component which addressed the strengthening of the institutional capability of MARNDR in gathering and monitoring agricultural data, data processing, data analysis and interpretation, identification of priority corrective

measures; and implementation and evaluation of the identified interventions.

The research and extension component was oriented towards what the Project called an "interdisciplinary, small-farmer, on-farm Farming Systems Applied Research." The other component was oriented toward a more macro national planning through establishment of a recurrent national-level agricultural statistics program together with a related spatially-referenced national data base using geographic information systems technology. For the present purpose, the focus will be on the Farming Systems component, although relevant aspects of the other component may be cited as they relate to research and extension.

The FSR component of the project was implemented in Les Cayes in the South and in Jacmel in the Southeast regions of Haiti as decided by MARNDR and USAID. Each region was divided into two representative farming communities, one located on the plain and the other on the hillside. Although most of the technical discussions in this document concern the experiences on hillsides, reference is also made to results obtained on flatlands, where the initial work on farming systems began. In this manner, the information contained in the report will be relevant to the major target areas of PLUS.

Initial research efforts were focused on the Les Cayes plain, where new varieties of rice, sorghum, maize and black beans and other crops, were tested for performance and suitability under the local environment. Studies were also conducted to test alternative management practices for increasing labor productivity, production and income. Capitalizing on the results obtained on the plains, the Project began working with hillside farming households in the middle of 1985.

The hillside work was started at Fond-des-Freres, about 15 km from Les Cayes at an altitude of 300-350 m. The site encompasses some 100 households and has a total area of 130 ha. It was chosen because of its severely eroded slopes, accessibility, and the willingness of the community to work with the project. The proposed innovations were first tested in researcher-managed trials in the fields of participating households. Much of the establishment and maintenance of these trials was undertaken by locally hired farmers, called "moniteurs" (monitors). The monitors eventually became the nucleus for diffusion and adoption in the community.

1. Farming Systems

The farming systems component emphasized interventions related to soil conservation practices and production techniques. The trials included the following:

a. testing of new varieties of maize, beans and sorghum,

b. assessment of alley cropping for soil conservation and increased crop yields,

c. comparisons of growth rates between different tree species from direct seeding and planting from root trainers and plastic bags, and

d. comparisons between conservation structures planted in a leucaena/Napier grass combination to structures planted solely in leucaena or Napier grass.

Details of the interventions are presented in the documents produced by the Project (Report No. 23, 57). Items that are considered of primary importance and have more relevance to the PLUS project are presented in this report.

The Project began its work in early 1984 with a series of exploratory surveys to formulate the focus of its researcher-managed, location-specific trials. These trials continued throughout the life of the project and were used as the channels through which new ideas, activities, crops, etc., were introduced to farmers. Results from these trials were incorporated into farmer-managed demonstration trials, which eventually led to either acceptance or rejection of the innovation by the farmers. Focused socioeconomic surveys were conducted to better understand farmer evaluations and specific costs and benefits of the proposed innovations.

On-farm trials were set up in various locations in the two target regions of the Project. Monitors established and maintained the trials under the supervision of the Technical Assistance Team and the Haitian Agronomes assigned to the Project. From researcher-managed trials, the project quickly shifted to farmer-managed trials in order to better assess the value and applicability of the innovations being tested. These activities culminated in the identification of higher yielding varieties of corn, sorghum, rice, and black beans, labor-saving techniques for harvesting and threshing rice, and the development of effective soil conservation strategies. The Project also participated in the reintroduction of swine and the raising of rabbits.

Because of their importance, corn, sorghum and black beans were given top priority. Considerable effort was devoted to rice at Les Cayes. Other crops, like cabbage at Jacmel, sweet potato and pigeon pea were also given attention later in the project. Use was made by ADS II of the results and experiences of the PDAI Project - Research and Extension component in the choice of germplasm included in the on-farm trials. Whenever applicable, socio-economic analyses accompanied all Project efforts in order to identify the major constraints in the household farming system

which might related to project interventions. This strategy enabled the refinement of innovations developed in consideration of the constraints identified. A good example of the results of these analyses are the explanations for acceptance or non-acceptance of the improved varieties introduced by the Project at selected sites (ADS II Reports No. 20, 32, 42, 43, 44, 49, 51, and 54). The reasons given by the farmers based on a survey conducted by the Project are summarized in Appendix B.

As a result of the on-farm trials, the following introduced varieties were selected based on yield performance as compared with the farmer cultivars:

Crop	Variety/Cultivar	Origin
Corn	La Maquina 7827	CIMMYT, Mexico
	La Maquina 7928	-do-
Sorghum	M5009	ICRISAT, India
Black beans	Tamazulapa	CIAT, Colombia
Rice (paddy)	Amina (IR-5931-113-1)	IRRI, Philippines

A general description of the physical conditions and farming practices in ADS II sites is presented as a background.

a. Les Cayes

Elevation	30-100 m on the plain and 100-350 m on the mountain
Temperature	Rarely exceeds a 10 degree change for any one day; Daily minimum/maximum is 24.4-37 C
Precipitation	Bimodal: Plain - 1985 mm; Mountain - 1200 mm
Soil	Plain: fairly fertile; pH 8; good conductivity. Mountain: eroded slopes at 30-45 degrees, low fertility
Land Tenure	Plain: 54% owned; 26% share-cropped; 5% rented; 13% undivided family Mountain: 52% owned; 30% share-cropped; 7% rented; 11% undivided family
Farm Size	Plain: 1.49 ha; Mountain: 1.53 ha

Cropping System	In both plain and mountain zones, largely subsistence farming; approximately 30% of produce are sold in the market; men are most active in agriculture, women in the commercialization of produce; many households hire labor for land preparation; all labor done manually, animal traction rare.
Cropping Seasons	February-July; August-January

Les Cayes is in the Southern Department of Haiti. Some 76% of the agricultural households are located in the mountain zones and 53% of the cultivated area is located on mountain slopes, many between 40-50 degrees (ADS II Report No. 23). In terms of area cultivated, corn, sorghum and grain legumes are the predominant crops in the Southern Department. Among the grain legumes, black beans is definitely the most important. Other major crops of the Department are sweet potato, cassava, yams and plantain. The average size of a parcel is 0.32-0.41 ha on the plain and 0.30-0.50 ha on the mountain. A household may have as many as three (3) parcels.

With the exception of paddy rice, most of the crops are grown in association. Cropping patterns are dictated by the rainfall pattern. Consequently, corn is mostly grown during the first season which is relatively wetter while sorghum is usually grown during the second season.

The complexity of small farmer cropping systems found in the Southern Department is typical of Haiti. ADS II reported 440 unique crop associations in one of the surveys it conducted in the Department. Black beans was found in about 89% of these associations.

b. Jacmel

Elevation	Plain - 20-100 m; Mountain - 100-600 m
Temperature	Rarely exceeds a 10-degree change for any one day; Daily min/max 24.4-37 C
Precipitation	Bimodal: Plain - 1200 mm; Mountain - 2200 mm. Irregularity of rainfall in the plain is a major constraint.
Soil	Plain: good conductivity, pH 8, low potassium and phosphorus, considered

	fairly fertile. Mountain: excellent conductivity, pH 8, generally high fertility with red and grey soils more fertile than black ones; 30-45 degree slopes.
Land Tenure	Plain: 56% owned; 24% sharecropped; 15% rented; 5% undivided family. Mountain: 59% owned; 5% sharecropped; 13% rented; 23% undivided family.
Farm Size	Plain: 2.01 ha; Mountain: 1.39 ha.
Cropping Systems	Same as for Les Cayes
Cropping Seasons	Same as for Les Cayes

Minimal data are available for the Southeast Department. In terms of area, the predominant crops are corn, sorghum, black beans and sweet potato. Farms on Haut Cap Rouge are rocky, otherwise, the soils seem to be suitable for crops.

Through results from the researcher- and farmer-managed trials, feedback from farmer participants in the trials and farmer field days, the Project identified the interventions that were eventually incorporated in the formal extension program.

The Project was unable to replicate the success it achieved with the adoption of Tamazulapa black beans with improved varieties of other crops by the time the Project ended. Some of the reasons obtained from farmers for not adopting introduced varieties were as follows:

1)	Corn	Later maturity, requires fertilization to obtain high yields, cannot adapt under adverse conditions like the local cultivar, ear not completely covered at maturity resulting to severe loses during rainy period.
2)	Sorghum	Tight head resulting to rotting during the rainy period.

2. Soil Conservation

A major objective of the ADS II project was to develop successful conservation strategies that can be adopted by hillside farming households. Different systems were tested in Les Cayes and Jacmel, with a functioning system finally adopted as most feasible.

a. Les Cayes

A major focus of the ADS II in its soil conservation efforts in Les Cayes was to identify farmer sustainable methods of continued soil conservation. This included creation of contours and plantings by farmers using household or invited labor. A farmer trained as monitor provided assistance. Ultimately, a living terrace was the soil conservation measure most commonly employed in this site. The terraces were constructed by digging shallow contour canals perpendicular to the slope every five (5) meters. These were then reinforced by planting vegetative materials, usually Napier grass, along with different varieties of tree seedlings planted at regular spacings. Among the tree species used were "bois blanc" (*Simarouba glauca*), "bois pele" (*Colubrina arborescens*), lemons and oranges.

Most of the soil conservation work undertaken by farmers at Fond-des-Freres was undertaken with the assistance of the ADS II project. Some 6% of the households performed the work on their own initiative and 12% had undertaken the practices with another project before the arrival of ADS II in the area. To encourage more farmers to adopt the practice, the Project established a tree nursery on site. This was supplemented by a education program for farmers on the need and value of conservation practices.

According to the latest project record, 39 ha of land or one-third of the total farmland at Fond-des-Freres was covered by hedgerows. Three-fourths of this area was owner-occupied. Owner-occupied land represented 66% of the land not conserved. The average size of land conserved was 0.43 ha with an average of 1.13 plots per household.

Labor was the most important household expenditure in undertaking the conservation work. Of soil conservation activities, construction of contour canals required most of the labor (68%). In Les Cayes, where living hedgerows were adopted, a household would spend about $28.00 per hectare without assistance from the project. This cost included all labor input and planting materials. However, the Project subsidized the planting materials and contributed one gourde per 2-m of hedgerow established.

In a survey of the soil conservation practices, all respondents expressed willingness to conserve land, regardless of whether they were landholders or sharecroppers/lease-holders. They all recognized the benefits of soil conservation.

One important aspect of the ADS II work in Les Cayes was

the farmer-to-farmer extension activities that took place at the instigation of the researchers.

b. Jacmel

In Haut Cap Rouge, Jacmel rock terraces were introduced in combination with vegetative strips and fruit trees. Rock terraces became the major focus of the intervention in this site for obvious reason. Rocks abound, scattered in the farmers' fields. Farmers normally cleared the soil surface of these rocks and piled them in heaps within the plot. Consequently, the project did not have much difficulty convincing farmers to pile the rocks in rows at regular intervals across the slopes. About 40 man days were needed to build 150 m of rock wall. The Project contributed one gourde per meter of wall installed.

The strategies employed in Jacmel were similar to those in Les Cayes except for some change in the focus of priority crops. The bean variety Tamazulapa was common to both sites with nearly the same history of adoption.

Like Les Cayes, the Jacmel area realized some important changes that should be credited to the efforts of ADS II. The soil conservation measure using rock walls was the most dramatic innovation in the Haut Cap Rouge site. A major portion of several watersheds were covered with a combination of rock walls, vegetative strips, and fruit trees. The same tree species were introduced as in Les Cayes, but in addition, coffee, which was an important crop in the area, was also introduced in the strips.

The rate of adoption of living hedgerows at Les Cayes was relatively less dramatic than at Jacmel.

Numerous publications were produced by the project, reflecting the activities it undertook in Les Cayes and Jacmel from 1984 to 1988 (Appendix C). Copies of these publications are available in the library of USAID/Haiti and in the Haiti office of SECID.

V. PRESENT STATUS OF PDAI and ADS II INNOVATIONS

The original ADS II sites on the mountains of Les Cayes and Jacmel were visited to verify the progress of the hillside interventions introduced by the project after its termination in early 1988. Varieties and soil conservation practice were the primary items verified during these visits. Overall, the results were quite encouraging.

A. Les Cayes

Hedgerows of leucaena were found on several farms in the site, but it was obvious that a considerable amount of the hedgerows have been lost. Remnant plants of leucaena were observed in some farms, showing signs that at one time they were part of the hedgerows. The farmers interviewed recognized that leucaena was good for the soil, but claimed that it was difficult to manage. It was obvious that the farmers were not clipping the hedgerows regularly to prevent reseeding. Elephant and guinea grasses were good in this aspect, but they were hard on the soil and competed with the crop for nutrients. Expansion of hedgerows could not be done because, according to the farmers, they were expensive to set up. Food has to be provided when additional help is made available. The owner does not do it on his own. Much time is also needed mending existing hedgerows.

Another practice contributing to the deterioration of the hedgerows was grazing by animals. There is shortage of feed particularly during the dry months. Hence, animals are just allowed to graze on the hedgerows. Overgrazing was obvious, as evidenced by regrowth of leucaena from beneath the ground surface.

A few farmers have maintained their leucaena hedgerows more appropriately, but still less than ideal. In these parcels, terraces were observed forming between hedgerows of leucaena.

Adoption is sporadic but very encouraging considering that they have not been in contact with any agronome since 1988. However, no single watershed was observed to be completely covered by hedgerows.

B. Jacmel

Farmers continue to maintain their rock terraces. Some have added more rock walls after the project. There were a few who felt left out by the project and decided to do it on their own. At the site, farmers downstream reported that when it rains they do not get as much water from upstream as they used to.

Farmers have realized that the rock walls conserve their soil and improve water infiltration. Two farmers estimated that they have at least doubled their yields since they put up the rock walls. They are willing to continue and even expand, but they need guidance, even without subsidy.

With improved growing condition, farmers may be willing to adopt better cropping practices. Improved varieties of corn were tried but they produced high yields only when fertilized. Without fertilizer, farmers are better off with the traditional variety. Fertilizer is expensive and they do not have money to buy

fertilizer. In contrast, Tamazulapa variety of black beans is widely adapted even under traditional practice.

VI. IMPLICATIONS OF PDAI AND ADS II PROJECTS

The development strategies and implementation management of the PDAI and ADS II projects can be viewed in their several dimensions as they relate to the PLUS project. Although the strategies of PLUS are stated differently from those of ADS II, the farming systems component of the latter adopted strategies that led to similar goals as those of PLUS. The relationship between PDAI and ADS II on one hand and PLUS on the other hand are viewed in the following areas:

A. Technology Development

There is no doubt that technologies are one of the expected outputs of the PDAI and ADS II projects and to a large extent, technologies were indeed produced.

1. Varietal Improvement

A major part of PDAI's task related to varietal improvement of the major food crops in Haiti - cereals, legumes and root and tuber crops. Following the established process of collecting and screening a wide array of germplasm, at the end of four (4) years the project was able to selected varieties of these crops. Using the selections of PDAI, ADS II conducted researcher-managed on-farm trials that further confirmed the earlier selections made by PDAI. Yield and adaptability under farmers' conditions were the primary criteria used.

The varietal improvement work started by PDAI and continued by ADS II resulted in one "success story" in TAMAZULAPA, a variety of black beans introduced into Haiti by the PDAI project from Guatemala through the International Center for Tropical Agriculture (CIAT), Colombia. This variety consistently out-yielded the local variety by more than 50% under good growing condition and about 20-30 % under less favorable environment. It showed greater resistance than the local varieties to bean mosaic, a serious problem in Haiti. This variety is now widely grown in Les Cayes and Jacmel after it was popularized by ADS II.

Some headway was also being made by ADS II on the introduced varieties of corn, sorghum and root and tuber crops, but it did not progress much by the end of the project.

2. Cultural Management

On-farm researcher-managed trials were conducted by PDAI and ADS II, but the time frame within which these projects had to operate was not sufficient for promising technologies to be tested and promoted in an active extension program. These projects had to prioritize the focus of their work. In the case of PDAI, varietal improvement received the higher priority while ADS II worked on farming systems in conjunction with soil conservation strategies on the slopes.

3. Soil Conservation

Soil conservation was a major focus of the ADS II project in the two sites in the South and Southeast departments of Haiti. It took many meetings with individual farmers and farmer groups and many demonstration trials to be able to begin work with farmers in establishing living hedgerows and rock walls. It was not all smooth sailing after it got started. The question of farmer compensation working on his own farm and incentives became an issue for the project to contend with.

Similarly, the strategy for soil conservation was a major consideration. After many meetings and consultations with the farmers, living hedgerows were promoted in Fond-des-Freres, Les Cayes and rock walls in Haut Cap Rouge, Jacmel, with some variations within each kind.

The introduction of living hedgerows at Les Cayes did not address adequately the integration of animals in the system. There is no doubt that animals will continue as a component of the farming systems in the area. Hence their integration in any innovation is necessary. Until farmers learn how to manage hedgerows with respect to the need of animals, maintenance of the hedgerows will always pose some problems. Furthermore, promotion of a particular type of animal becomes a concern. It would be more logical to encourage the integration of large ruminants (cattle) with the hedgerows, but not goats, at least until the farmer learns to manage his hedgerows.

There were other observations concerning ADS II and its aftermath that must be considered, notwithstanding the need for a more formal and in-depth investigation. The farmers interviewed expressed a need for technical guidance in order to maintain their farms and expand the use of hedgerows and rock walls. This leads to the issue of continuing extension services. Perhaps more could have been achieved by the project in terms of sustainability if the technical assistance had been withdrawn at a more appropriate time or if the government's extension services had covered these areas

upon termination of the project. The proper time of withdrawal with respect to the stage of farmer adoption for a particular technology should be examined. It may vary with a number of factors that include the following:

1. Complexity of technology with respect to the current practices, i.e., readiness of the farmer to adopt the technology;

2. availability of inputs, including credit, at the right time and at the right place;

3. level of farmers' training and experience; and

4. availability of appropriate technologies and all their components.

If ADS II had another two or three years to operate and barring any abnormal condition, the results may have been more positive.

B. Socio-Economics

Both PDAI and ADS II had an economic component. As expected, ADS II had a broader economic component. The two projects considered the socio-economic aspects of farming as important to understanding farming circumstances - the farmer, his family, his farming operation, etc. This understanding is essential for better planning strategies to introduce better innovations. Considerable socio-economic data and information were generated by the two projects covering the South and the Southeast.

The methodologies employed and some of the data gathered should be examined more closely by PLUS to avoid duplication and, thus, save time and resources (see lists of publications in Appendix A and B). ADS II also evolved a methodology for establishing an agricultural information system which eventually led to the development of a national information system. Unfortunately, the hardware established for the purpose was lost in a fire that gutted the room where they were installed some years ago. The system was lost completely.

C. Institutional Collaboration/Linkages

The PDAI and ADS II projects demonstrated the importance of institutional collaboration and maintaining linkages to facilitate research and extension work and also to provide the necessary backstaffing under certain circumstances. Research is not only expensive, but it is also a long process. By adopting a strategy of borrowing technologies, much time (and funds) was saved through introduction of improved varieties from national and international

centers. In addition, resource persons were provided for certain training at the expense of international centers, not of the project.

However, this does not imply that development can proceed indefinitely without an internal research and extension structure. Borrowed technologies have to be modified to fit local conditions and should be combined with internally-generated technologies.

Internally, PDAI and ADS II had the chance to have functioning collaborative work. Within each project, linkages with both government and NGO organizations were realized as important in facilitating the dissemination of technologies.

D. Research and Extension Approach

ADS II adopted the FSR/E philosophy in the pursuit of its objectives. Such a strategy produced results in the end. The introduction of soil conservation strategies was greatly facilitated by directly involving the farmers in making that decision prior to any actual field work. The process put the farmers in the picture right from the start. Such an approach has been demonstrated to be effective in many parts of the world.

VII. CONCLUSIONS AND RECOMMENDATIONS

Experiences from PDAI and ADS II relate very closely to the goals and objectives of PLUS. Such experiences are particularly relevant in the areas of project management and project implementation. The research and extension approaches employed by ADS II with respect to the introduction of its interventions to the Haitian farmers are worth examining. At least as important are the technologies - varieties, hedgerows and rock walls - verified and developed by the earlier projects.

Benefits from soil conservation efforts are only realized in the long term, whereas the costs to households are incurred with the initial establishment of conservation structures. This presents several problems for soil conservation projects, as was experienced by ADS II. These were cited in its documentation of activities and accomplishments:

1. Traditional farming systems in Haiti are concerned with the minimization of risk rather than the maximization of production. New practices are inherently risky and will thus be met with resistance from farmers. This is exemplified by the non-adoption of just any high yielding varieties that do not meet all the requirements of the farmer.

2. Farmers are required to invest limited resources in the conservation projects. Hence, the benefits of soil conservation must be clearly demonstrated to farmers before adoption takes place. This was proven more in Haut Cap Rouge than Les Cayes. In the latter case, the introduction of hedgerows was completely strange to the farmers. In Jacmel, rock walls were not a great departure from traditional practices. Their introduction was not entirely a new farming strategy but merely consisted of rearranging the piles of rocks that the farmers were already making into rock walls.

3. Benefits from soil conservation usually cannot be shown in just one or two seasons. Demonstration efforts require long-term strategies. Consequently, organizations and projects must commit to a reasonably long-term partnership with the farmer. This requisite is clearly demonstrated in the Fond des Freres site where many farmers discontinued to manage and maintain their hedgerows because they were deprived of the much needed technical assistance too early. Finding even just part of the original hedgerows still remaining on the site four or five years after the project terminated is quite encouraging. On top of that, the area was never visited by any agronome since. It is recommended that PLUS consider restoring the area, replacing what may have been lost or repairing what may have deteriorated in the original hedgerows if this soil conservation measure falls within the strategy of PLUS.

4. Sustainability of successful interventions is partly dependent upon how well the clientele understand the interventions and are able to make alternative decisions under changing circumstances. Consequently, training of clientele is a necessity in preparation for the eventual withdrawal of technical assistance. Again, this was clearly demonstrated by the improper maintenance or, worse, abandonment of some of the hedgerows after the termination of ADS II project in Fond des Freres, Les Cayes.

Both ADS II and PLUS independently recognized that a one-dimensional strategy such as tree planting does not address the fundamental problems of Haitian peasants living in the countryside, particularly those farming the hillside. To succeed, any intervention must take into account the constraints of the existing farming system.

Within the context of the experiences of PDAI and ADS II, as defined by the scope of work, the following are recommended in conjunction with soil conservation strategies:

A. Introduction of Improved Varieties

While soil conservation is recognized by the hillside farmer as important, he is more concerned about his immediate need - food. Therefore, the extension of recommended soil conservation practices must be accompanied by the introduction of better production techniques and improved and higher yielding crop varieties that are acceptable to farmers. This will also help households to overcome initial shortfalls in production resulting from the establishment of the hedgerows. This points out the need of a good market component in the PLUS project.

If necessary, additional promising lines should be obtained from international centers for local adaptability test, should the PDAI recommended varieties prove unacceptable to the local farmers.

B. Adoption of a Functional Seed/Plant Material Production Program

Availability of planting materials is usually a big problem at the initial stage of promoting a technology, whether it is the food crop that will be produced on the strips or the species that will be used for the hedgerows. The program must include an adequate source of planting materials at the time when they are needed, otherwise this can become a major setback in the progress of the project. For food crops, steps must be taken to ensure that the farmers have a source of the right variety every growing season. A lesson learned from ADS II is that one or more seed growers should be identified in each site.

C. Adoption of Sound Research and Extension Strategies

The soil conservation work of the project required numerous group animation meetings in both mountain sites to encourage farmers to organize themselves to protect their slopes. ADS II adopted the FSR/E approach in the implementation of its intervention. At the start, ADS II made a decision not to use food-for-work incentives and not to pay farmers to improve their land. However, this was not exactly adopted when it encountered a problem during the implementation stage. The project realized that it was essential that there be some type of program contribution to the activities performed to at least cover part of the cost of noon lunch/drinks most Haitian traditional working groups expect from their hosts.

Moreover, the project realized that water/soil conservation work of this kind would benefit not only the particular farmer, but in a macro-environment sense, the entire watershed region. The effect of hedgerows on individual farms should be viewed only as the initial stage in the overall soil conservation scheme. Eventually, reckoning of achievement must be based on watershed

units and how much they have contributed to the reduction of siltation of the lowlands, improving water supply and quality, sustainability of crop production, etc.

There was no doubt that the management structure of ADS II contributed a great deal in the implementation of the project. The extension work was properly equipped with a research component, although limited to applied research. Extension cannot be sustained without a good research backup. Consequently, PLUS must incorporate a continuing backup research that is focused and clientele-oriented, ready to respond to the needs coming from the extension arms of the project. Some of the suggested on-farm verification trials are in the following areas:

1. Livestock (cattle) integration in contour cropping with hedgerows;

2. Cost and benefits from adoption of innovations, e.g., adoption of Tamazulapa black beans;

3. Hedgerow/rock wall/gully plug management.

D. Investigate and Develop Credit Assistance Scheme for Haitian Farmers

As explained by the farmers, expansion of soil conservation work could not be implemented because they did not have resources to pay for additional labor. Even with neighbors' help, money is needed to buy them one meal as compensation. Admittedly, they all recognized the value of the technology.

Based on these circumstances, a proposal for a credit assistance scheme should be considered as an important element in the project. Credit assistance should be viewed in a manner that does not necessarily conform to the traditional banking system. It must be something that fits the financial capacity of the Haitian farmers.

E. Maintain Institutional Collaboration/Linkage with External Sources of Technologies

Linkages are important considerations in any long-term development program. A country like Haiti, where research is not well organized and established, must depend upon external sources of technologies for adoption in the country. The source can be another project within the country or organizations such as international research centers outside the country. Such a strategy enabled PDAI and ADS II to accomplish so much within their respective time frame. Normally, it would take 15 to 20 years to develop a variety. PDAI did not start from scratch. Its strategy

was to obtain promising materials from international research centers. Still, the four years that PDAI worked was not sufficient to make general recommendations under every specific farming condition in Haiti. Eventually, ADS II picked up from where PDAI stopped, which resulted in some specific recommendations.

Based on ADS II and PDAI experience, it is apparent that maintaining linkage with international research centers and other research organizations is vital in a continuing agricultural development program. Research is not only expensive but also a long process before results can be used by the clientele. Taking advantage of results from other agencies can save a lot of project funds and time in the development process.

This is not to say that a program should remain dependent upon external sources of technological innovations because, sooner or later, local conditions have to be taken into account in the formulation of a long-term local development plan. There is a limit to what can be borrowed or transferred. Borrowed technologies have to be modified to suit local conditions. Sooner or later, there will be a need to conduct certain research projects to address local problems.

Appendix A

PDAI Publications

1. Cheaney, R.L., M.C. Fuqua, M.R. Villanueva and M.J. Taylor. 1982. Annual Report - Research and Extension. Integrated Agricultural Development Project. Ministry of Agriculture/ USAID Haiti. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti

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3. _____. 1984. Annual Report - Research and Extension. Integrated Agricultural Development Project. Ministry of Agriculture/ USAID Haiti. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti.

4. _____. 1985. Terminal Report - Research and Extension. Integrated Agricultural Development Project. Ministry of Agriculture/ USAID Haiti. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti.

5. Cheaney, R.L. and M.J. Taylor. 1984. Factors to Consider in Recommending Cropping Systems for Haitian Farmers. Ministry of Agriculture/USAID Haiti. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti.

6. Taylor, M.J. and R.L. Cheaney. 1984. Guide for Developing an Effective Extension Program for Haitian Farmers. Ministry of Agriculture/USAID Haiti. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti.

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9. _____. 1984. A strategy for the multiplication and dissemination of root and tuber crop planting materials. Integrated Agricultural Development Project. USAID Project No. 521-0078-C-00-1010-00. Port-Au-Prince, Haiti.

Appendix B

Summary of Reasons Given by Farmers for Adopting or Not Adopting PDAI/ADS II Varieties

		Percent of Household Growing	
A.	**Corn**	**Local**	**Recommended**
	1. Higher yield	80	18
	2. Grows faster	20	0
	3. Lower yield	0	52
	4. Too much flour	0	3
	5. Difficult to mill	0	3
	6. Ear too big	0	24
B.	**Sorghum**		
	1. Higher yield	13	95
	2. Good-size panicle	0	2.5
	3. Good stem strength	6	0
	4. Lower yield	52	2.5
	5. Animal losses too high	16	0
	6. Plant too short	13	0

Appendix C

ADS II Publications

Document #

1A. ADS-II Technical Assistance Proposal, presented to USAID, April 1983 (English)

1B. Swanson, Richard and G. Werleigh. 1984. Survey Questionnaire Form (51 pp) for Reconnaissance Survey. ADS II, Port Au Prince, Haiti.

2A. Swanson, R. and E. Dupont. 1984. Implementing a Farming Systems Research Program: A Case Study in Haiti. CRDA/FAMV, ADS II. Haiti.

2b. Swanson, R. 1984. Emploi de Nouvelles Cultures par le Projet ADS II. CRDA/FAMV. Haiti. (French)

3. Chatterjee, Amal. 1985. Introduction of a Technological Package for Rice in the Zone of Les Cayes. ADS II. Haiti.

4. _____. 1984. Le Role des stations recherche experimentale dans la recherche et vulgarization des systemes de production. CRDA/FAMV. ADS II. Haiti.

5. Pierre, J. N. 1984. Les Grandes lignes du volet vulgarisation Agricole du Projet ADS II. FAMV/CRDA. Haiti.

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19. Pognon, Chopak and R. Swanson. 1986. Elaboration de Comptes d'Exploitation Agricole: Les Cooperants du Bassin-Versant Morija, Haut Cap Rouge, Jacmel. ADS II. Haiti.

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21. Bertelsen, M., E. Dupont and R. Swanson. 1986. The pilot agricultural survey in the Department du Sud: Methodology and Conclusions. ADS II/MARNDR. Haiti.

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24. Preliminary Results of the Second Agricultural Survey in the Department Du Sud, Haiti, - First Agricultural Season (February - July 1986). ADS II/MARNDR. Haiti.

25. Brown, Doug. 1987. Atlas Statistique du District Agricole Les Cayes. ADS II/MARNDR. Haiti.

26. Agricultural statistics for the Department du Sud. Year 1985-1986: Second Season 1985 - First Season, 1986. ADS II/MARNDR. Haiti. April 1987.

27. Bertelsen, M., et al. 1987. A geographical atlas of the Department du Sud: Comparison of Strata for the National Agricultural Survey ADS II MARNDR. Haiti.

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30. Bertelsen, M., et al. 1987. The value of information from a national agricultural survey: Inferences from extension of FSR/E recommended practices in Haiti. ADS II. Haiti.

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33. Bilan d'une annee d'activites du Projet ADS II, 1986. ADS II/MARNDR. Haiti.

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