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AGRICULTURE SECTOR ASSESSMENT

HAITI

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ACRONYMS

ADO	Agriculture Development Officer
ADS-II	Agriculture Development Support-II Project
A.I.D.	Agency for International Development
AOP	Agroforestry Outreach Project (U.S.A.I.D.)
APA	Agricultural Producers Association
ARC	Administrative Reform Commission
ARDO	Agriculture and Rural Development Office (U.S.A.I.D.)
ASA	Agricultural Sector Assessment
ASF	African Swine Fever
BCA	Bureau de Credit Agricole
BCI	Banque de Credit Immobilier (Private Mortgage Bank)
BCRS	Bureau de Credit Agricole Supervise
BDPA	Bureau de Developpement et Production Agricole
BID	Banque Interamericaine de Developpement
BNC	National Bank for Agricultural and Industrial Development
BNDAI	National Bank for Development of Agriculture and Industry
BRH	Bank of the Republic of Haiti (Central Bank)
CBI	Caribbean Basin Initiative
CAC	Conseil d'Action Communautaire
CCH	Cooperatives Cafeieres d'Haiti
CDSS	Country Development Strategy Statement (U.S.A.I.D.)
CEP	Country Environmental Profile
CEPAL	Economic Commission for Latin America
CIDA	Canadian International Development Agency
CIF	Cost, Insurance and Freight
CIMMYT	International Research Center for Maize and Wheat
CLUSA	Cooperative League of the U.S.A. (currently the National Cooperative Business Center)
CMCID	Consultative Mixed Committee for Industrial Development
CMP	Management and Productivity Center
CMRP	Comite Mixte de Recherche de la Politique
CNC	Comite National de Controle et de Supervision des Entites de Developpement Communautaire
CNG	National Government Council
CONACOS	Comite National de Controle et de Supervision des Entites de Developpement Communautaire
CPI	Consumer Price Index
CPNAP	Commissariat a la Promotion National et l'Administration Publique
CRIES	Comprehensive Resource Inventory and Evaluation System
CRDA	Centre for Agricultural Research and Documentation
DA	Development Assistance Funds (U.S.A.I.D.)
DARNDR	Departement de l'Agriculture, des Ressources

	Naturelles et du Developpement Rural (Ministry of Agriculture)
DATPE.	Direction d'Amenagement du Territoire et de la Protection de l'Environnement (Ministry of Plan)
DEC	Direction d'Evaluation et de Controle (Ministry of Plan)
DSE	Direction des Services Exterieurs (part of SEP)
ESF	Economic Support Funds
FAC	French Fund for Cooperation and Development
FAMV	Faculty of Agronomy and Veterinary Medicine
FAO	Food and Agriculture Organization
FDI	Fonds pour le Developpement Industriel
FONDEV	Fonds du Developpement Rural
FSN	Foreign Service National Employee (U.S.A.I.D.)
GDP	Gross Domestic Product
GIS	Geographic Information System
GNP	Gross National Product
GOH	Government of Haiti
HACHO	Harmonisation de l'Action des Communautés Haitiennes Organisees (formerly Haitian- American Community Help Organization)
HAMPCO	Haitian American Meat Packing Company
HASCO	Haitian American Sugar Company
HAVA	Haitian Association of Voluntary Associations
HDF	Haitian Development Foundation
HIAMP	Export-oriented Regional Agricultural Project for Eastern Caribbean (U.S.A.I.D.)
ICO	International Coffee Organization
IDAI	Institut de Developpement Agricole et Industriel
IDB/BID	Inter-American Development Bank
IHPCADE	Institut Haitien de Promotion du Cafe et des Denrees d'Exportation
IHS[I]	Haitian Institute of Statistics (and Information)
IICA	Institute Interamericano de Cooperacion para la Agricultura
IMF	International Monetary Fund
JWK	A U.S. Consulting Firm
LC	Local Currency Sales Proceeds of PL 480 Commodities
MARNDR	Ministry of Agriculture, Natural Resources and Rural Development
MEDA	Mennonite Economic Development Associates
MOP	Ministere du Plan
MSPP	Ministere de la Sante Publique et de la Population (Minsitry of Health)
MTPTC	Ministere des Travaux Publics, des Transports et Communications (Ministry of Public Works)
NGO	Non-Governmental Organization
OAS	Organization of American States
OCEAH	Office de Commercialisation des Essenals Aromatiques d'Haiti (Haitian Office for Marketing Essential Oils)

ODH	Operation Double Harvest
ODN	Organisme du Developpement du Nord
ODPG	Organisme du Developpement de la Plaine de Gonaives
ODVA	Organisme de Developpement de la Vallee de l'Artibonite
ONAAC	Organisation Nationale d'Alphabetisation et d'Action Communautaire (part of Ministry of Education)
ONEC	National Office of Community Education
OPRODEX	Office for the Promotion of Exports (Office de Promotion des Denrees Exportables)
OPED	Office of Private Enterprise Development (U.S.A.I.D.)
OPVD	Office of Private and Voluntary Cooperation (U.S.A.I.D.)
ORE	Organisation pour la Rehabilitation de l'Environment
PADF	Pan American Development Foundation
P.C.	per capita
PDAI	Project de Developpement Agricole Integre
PID	Project Identification Document (U.S.A.I.D.)
PP	Project Paper (U.S.A.I.D.)
PMC	Mixed Committee for Investment Promotion
PROMINEX	Haitian Export Promotion Board
PSC	Personal Services Contractor (U.S.A.I.D.)
PVO	Private Voluntary Organization
RDO	Rural Development Officer (U.S.A.I.D.)
SAC	Societe de Credit Agricole
SAR	Service d'Animation Rurale
SENACA	Service National de Commercialisation Agricole
SENASA	National Service for Improved Seeds
SEPRRN	Service d'Entretien Permanent du Reseau Routier National
SERA	Services of Rural Research, Ministry of Agriculture
SHM	Self-Help Measure
SODEXOL	Societe d'Exploitation d'Oleagineux
SOFIDHES	Development Finance Corporation
SNEM	Service National des Epedemics Majeures
SNEP	Societe Nationale d'Eau Potable
SRCSF	Strengthening Rural Credit Services Project
STAB	Secretariat Technique a l'Ameragement des Bassins Versants
TWMP	Targeted Watershed Management Project
UNAPEL	Union National des Associations pour la Promotion de l'Elevage
UPAN	Agriculture and Nutritional Planning Unit, Ministry Plan
U.S.A.I.D.	United States Agency for International Development
USDA	United States Department of Agriculture
USDH	U.S. Direct Hire Employee (U.S.A.I.D.)

USND
USN
USOM
USU

National Sugar Company of Darbonne (Leoganne)
National Sugar Company of the North (Citadelle)
United States Overseas Mission
Utah State University

PREFACE

After the fall of the Duvalier regime in February 1986, USAID/Haiti's Agriculture Development Office decided that it was desirable to prepare an update of the agricultural sector assessment, emphasizing institutional, marketing and pricing issues. This was suggested so as to determine whether the existing strategy, developed in 1982, was still appropriate and viable. The areas of emphasis selected at that time (August 1986) were primarily in response to policy changes made by the new National Governing Council (CNG), such as market liberalization and removal of import restrictions, as well as a sharp rise in the influx of contraband food goods.

Subsequently, A.I.D./Washington's review of USAID/Haiti's FY 1988-1989 Action Plan included a recommendation that the Mission should update its agricultural sector analysis in preparation for the next CDSS submission. The decision taken was that:

The strategy will especially examine the potential for increasing agricultural production and ways in which A.I.D. can help realize this potential. This update will also address policy and structural constraints to production (pricing policy, tenure, credit, post-harvest losses, marketing etc.). If analysis indicates the need for more resources for production, the Mission will revise its program accordingly (State 060700 March 3, 1987).

This report is the result of the strategy update exercise undertaken in two phases. Phase I involved work by a team of two agricultural economists, a rural sociologist and an institutional specialist between May 2 and July 3, 1987, both in reviewing and synthesizing documents and doing field work. A review of the resulting draft report, after a key change in staffing of the Mission's ADO, led to revision of the scope of work for a second phase with a different disciplinary mix. In Phase II, a Haitian tropical agronomist, a U.S. senior tropical agronomist and a U.S. watershed management specialist worked for three weeks in Haiti in October-November to synthesize additional data on tropical agricultural production, watershed conditions, forestry, irrigation, and livestock-related questions. The revised draft report was presented in Haiti in early November 1987 and the final draft, incorporating Mission comments, was submitted in late November. The scope of work for both phases is attached as Annex A.

In considering the content of this report, and particularly the recommendations for strategy changes or innovations, it is essential to recognize that the exercise was begun fifteen months into the tenure of the interim government, and ended at the beginning of the month in which national elections for a new government were scheduled to be held. Thus, while there was considerable evidence of the CNG's approach to policy and program implementation in the agricultural sector, there was no way to anticipate what the policy of the new government would be.

The decision to carry out the agricultural sector strategy update at this point in political time differs from some other related decisions. For example, the Title III program may not be redesigned before the new government

is in place, on the assumption that any new government might distance itself from a program negotiated with the CNG. The same is certainly true for a sectoral strategy for agriculture. This is part of the basis for our stress on obtaining as reliable information as possible about the sector, particularly in terms of those areas of emphasis noted above, so as to assist both USAID/Haiti and, ultimately, the newly-elected GOH, to orient agricultural policy and strategy for the next several years, rather than proposing detailed project recommendations at this time.

In an environment in which data are sometimes both sparse and unreliable, this has been a significant task. In some areas, A.I.D. has itself generated data sets which can be relied upon--for example, for the coffee sub-sector. In other areas, such as livestock, data are harder to come by, except for swine and goats, for which there have been recent projects, and are inconsistent at best. There tends, not surprisingly, to be a correlation between those sub-sectors in which A.I.D. has been active over the years, and the amount of data generated. Nevertheless, even in some of those sub-sectors in which A.I.D. has played a major role, good data are hard to come by. The analysis of ADS-II data, due to have been completed by November is now delayed to January, 1988, which is particularly unfortunate given the timing of this assessment.

The team would like to thank the Mission for the opportunity to carry out Phase II of the assessment, and for providing us with their detailed comments on various drafts of this report. We would also like to thank the ADO for their substantive and logistic support to the Haitian Agronomist, who began her work in advance of the arrival of the rest of the Phase II team members.

EXECUTIVE SUMMARY

A. Introduction

This Summary concentrates on the main conclusions and recommendations of the report. These are based on an analysis of the resource base, as far as data would permit, and an assessment of the current state of Haitian agriculture according to the documentation available. The constraints to increased productivity have been examined at farm level as well as from the point of view of market opportunities, government policies, institutional constraints and the general investment climate.

The background to the current assessment is one of political change following the fall of the Duvalier regime, and control by an interim government in anticipation of a democratically elected administration. The change of regime provides a "window of opportunity", as the USAID Mission suggested in its Action Plan, and U.S. funding has risen sharply in support of the post-Duvalier "democratizing" tendency. It is in this light that the recommendations must be viewed. As the report was being finalized, the promised elections were less than a month away; yet, no one seemed sure what the new government would look like if the elections did take place, and there were emerging doubts about the viability of the electoral process itself.

Based on the available data and our analysis, we do not see the development of Haitian agriculture in terms of hillside versus plains farming. As we have tried to illustrate in the report, they are complementary, and are likely to become more interdependent rather than less so. Data on farm types and family incomes are so poor as to make comparisons meaningless. However, it is clear that many hillside farmers are farming impoverished soils for little return, and that returns from many plains areas must also be low, given the poor farming practices.

Haitian farmers are responsive to market stimuli, when and where the opportunity exists. On this basis, the strategy proposed is that A.I.D.'s program should be market-oriented and seek to increase the real demand for the products of both hillside and plains farmers by increasing the revenue generated by the rural sector. The complementarity of the hillside and plains systems is evident in that if the hillside farmers have a real demand for their products, they are more likely to adopt the conservation techniques proposed under the hillside programs targeted for them. This will benefit the plains by slowing erosion and water runoff.

While we stress market improvement, however, and the addition or substitution of various cultigens and improved practices to the hillside and plains farming systems, we are also keenly aware that hillside farm families are risk averse with good reason, and that they are in the first instance producing food for subsistence, although they are also integrated into the local and—with coffee and corn, for example—long distance and/or export markets.

B. Analysis

Our analysis yields the following highlights:

- Since 1980, in real per capita terms, the Haitian economy has declined, as has the agricultural sector. The latter will decline further if the protection for cereals is removed and the decline of the sugar industry continues.
- Agriculture's contribution to export earnings has declined, both as a proportion of total exports and in actual value.
- Land degradation and the fragmentation of land holdings have reached a stage where many farms have become too poor or too small to support a farm family that depends on traditional crops.
- Low rural incomes inhibit investment in new techniques, and lack of real demand inhibits the incentive to adopt these techniques.
- Population increases will continue to force population to migrate from the rural areas.
- Increased population will increase food needs, but without expanded purchasing power the real demand will remain sluggish.
- The domestic marketing system, while seen by some as fiercely competitive, lacks infrastructure and support systems which could reduce production and marketing costs.
- Export markets have been a source of government revenue, exploited for cronyism, or have disappeared in the face of changes in world prices. This has discouraged investment at all levels.
- Government services to agricultural production and marketing are poor or nonexistent.

We reiterate the A.I.D. 1982 Food and Agriculture Sector Strategy's recommendation that the country's goal should be "... food and agricultural self-reliance; that is, the capacity to satisfy the population's food requirements through a combination of production for domestic consumption and importation of food at commercial terms paid from export earnings". The report stressed, however, that this is very different from a goal of food self-sufficiency.

Decelerating the rate of erosion of hillsides is an aim which merits continued strong support by A.I.D. and other donors, especially if combined with a means of increasing saleable crops for the farmers of these marginal lands. However, Haiti faces an urgent problem in that the revenue from its good land is declining very rapidly.

The strategy proposed in this report is aimed at stimulating production--and thus justifying investment in agriculture--by assisting

internal marketing systems to increase their efficiency, thus reducing costs. We recommend that efforts be made to maximize production on the most fertile lands, particularly those now in transition out of sugar cane. The strategy also proposes that a major effort be made to promote commercially intensive agriculture and associated agribusiness processing and transformation industries that are labor-intensive. This can be accomplished via a variety of mechanisms--improving road infrastructure to improve transport and market premises; increasing the access to markets for more farmers; increased utilization of appropriate post-harvest technology to reduce losses and preserve quality; and improved dissemination of information to encourage more rational decision making at all levels. It can also be done by improved water delivery systems and via well-targeted research.

Agricultural processing or raw product marketing, whether for the domestic market or export, requires identification of opportunities and product promotion, an economic climate conducive to investment, technical assistance at agro-industry and farm levels, and access to financing for both. Some elements of this approach have been put in place, with A.I.D. support to PROMINEX, the Agricultural Producers Association, the Haitian Development Foundation, the Development Finance Corporation and the promulgation of investment codes. These activities should be continued and strengthened, particularly in ways that will benefit agriculture. To complement these initiatives, the agricultural development portfolio should provide the backward linkages to Haitian farmers.

USAID/Haiti proposes to continue coffee cooperative funding which has a direct impact on hillside farmers who are cooperative members. In addition, more attention should be given to the broader marketing aspects of coffee exports through the established channels and to improving production on both existing plantations and providing for new plantings. Lessons learned from experience with coffee and cocoa cooperatives should also be replicated gradually to assist in the formation of cooperatives relating to production of other crops. Training in management skills for cooperative members should be made available.

It is difficult at this time to make realistic proposals for the rural organizations other than cooperatives that might implement projects at the base level, and A.I.D. will need to monitor the performance of local government structures as they emerge.

The knowledge base about the role of women in agricultural production is surprisingly poor, given the general recognition that women are important in agricultural marketing as "Madame Saras". This is an area which should receive early attention in terms of A.I.D.-funded studies and project design. Given the probable proportion of female-headed households in Haiti as elsewhere in the Caribbean, and the anecdotal information on the impoverishment of such households at least in the urban and periurban areas, there is a fairly urgent need to improve the data base and then act on the results of careful analysis of development implications. Studies on other agricultural topics that are recommended here should, where possible, disaggregate data by sex.

In the field of rural credit, the crises which both the BNDAI and the BCA face are causing difficulties in terms of access to funding for farmers. A short-term solution, pending decisions on future institutional arrangements, must be found to provide farmers with access to funding.

The Ministry of Agriculture has roles which it must fulfill. Given its history, it is difficult to argue with those who favor using other agencies for the execution of projects. However, certain functions are national in nature and can only be performed by the Ministry. Furthermore, serious discussion is taking place on reform and there is a will to assist the development of Haitian agriculture on the part of many officials. To the extent that serious reform does take place, it must be encouraged if the Haitian administration is to fulfill its proper function.

National agricultural statistics are astonishingly poor. The team spent much longer assembling a justifiable set of data than was anticipated. Clearly, a modern nation cannot continue to develop its agriculture on any rational basis unless it has credible data. The ADS-II project will, hopefully, produce the first national data within the next twelve months. Continuation of the system will produce refinements to the techniques and the quality of the data. Furthermore, time series data are essential. The funding of this activity should be a long-term commitment so that the current investment is not wasted and future needs are satisfied. Further data will also be needed to support planning and project design and evaluation.

The results of our analysis provide the context of the following recommendations:

C. Recommendations:

Natural Resources and Environmental Considerations

1. In order to protect present and planned dams and engineering works, and to insure continued usable river flow and storage for hydropower and irrigation, special emphasis should be given to soil conservation, erosion-reduction, and appropriate agricultural development in the Upper Artibonite Watershed, and in other areas of unique national importance.
2. Emphasis should be placed on cultural systems that will maintain or improve agricultural production on small hillside peasant land holdings, including but not limited to such practices as increased use of tree crops, alley cropping on the steeper cultivated slopes, use of legumes to improve fertility, introduction of improved pasture grasses and legumes, and livestock production for on-farm use (CARTAS d'Haiti, 1987).

3. Results of small scale applied research carried out by DRE and other PVOs should be replicated on a larger scale if they prove sound and adaptive.
4. Increase emphasis on agroforestry and tree planting on private lands to: (a) improve nutrition levels (fruit trees), (b) provide wood products and livestock forage on small farmsteads, and (c) to anchor and stabilize soils in terracing and alley cropping schemes. The efficiency of alley cropping and development of terraces using trees, shrubs, and herbaceous perennials to trap sediment and significantly reduce soil erosion should be verified on small hillside farms. Continued emphasis on this approach to stabilize soils on steep slopes should depend on a rigorous analysis of benefits (and costs) of such systems, and the probable cost in soil degradation of continuing present cropping practices.
5. Increase research efforts to find most appropriate species and varieties (fruit trees and others) for use on different soils, slopes, and rainfall regimes on hillside farms, as well as the related cultural practices for site-specific interventions.
6. Introduce appropriate charcoal production technology for small producers. Before specific technology packages can be provided to producers, however, different charcoaling techniques (type of kilns, firing schedules, wood handling, etc.) should be compared in a short, intensive applied research effort. The goal should be to increase efficiency for small commercial producers in an effort to slow down the large overcutting of limited forest/woodland resources.
7. Consideration should be given to importation, under concessional programs such as Title III, either of fuelwood (e.g. woodchips from Minnesota), or particle board for construction purposes.

Agricultural Production

1. Every food production project assisted by USAID/Haiti should include a bean production component. The PVOs should be encouraged to include demonstrations of improved varieties and inoculants.
2. It is recommended that a modern coffee production program be introduced to Haiti through an A.I.D.-funded program. The plan proposed by the IICA (1987) team is the basic program recommended. This approach would be radically different from both the Small Farmer Coffee Improvement Project of 1975-80 and the Small Farmer Coffee Marketing Project of 1977-82. The emphasis on cooperatives would be increased. A time-frame of 10 years would be required. In the new program, the present coffee cultivar must be gradually replaced in order to remove cultivar constraints. Rust and nematode resistant varieties of C arabia x C robusta parentage should be introduced through variety trials. In order that suitable, site specific interventions may be delivered to growers,

the project should be directed to growers or local cooperatives with one or more hectare in coffee. Cluster (covey) planting would reduce the time between seedling planting and first harvest year. Casual coffee growers who use trees in alley plantings between annual crops should be supplied coffee seedlings of improved selections.

3. A project for development of capabilities to produce crops that yield edible oils for domestic consumption is recommended for the plains.
4. Support systems, including rural education on conservation farming, are the only hope for stabilizing the soil and thus stabilizing production on the hillsides. A vigorous program of information delivery is needed. This extension-type work could function through agricultural cooperatives, private voluntary organizations, or a conventional extension service, but it must be functional within the next decade in order to prevent an increased food deficit in the hillside areas.
5. Improved cultivars of crops adapted to the well-drained portion of the coastal plains land are needed. Crops that will replace imported foods should be introduced. Soybeans for edible oil production are recommended for about 17% of the plains hectareage. Beans, peanuts, and corn are recommended as crops to be grown in rotation with soybeans on the plains.
6. A wide range of tree crops must be established in hillside farming. Alley tree plantings offer some hope for extending hillside tillage a few years. Coffee, cacao, mango, avocados, papaya, pineapples, kiwi, vanilla, black pepper and aloe vera could all be used advantageously in hillside agriculture. Honey production should not be overlooked in either hillside or plains farming systems. All options, from sugar cane for alcohol production to vegetable production for export markets should be investigated. The plains soils are reasonable well drained, moderately fertile, and have adequate moisture in a normal year. Their productivity should be utilized to alleviate the income crisis faced by sugar cane producers. Irrigation systems must eventually be repaired and expanded to sustain productivity on the plains.

Recommended Projects

7. Development program for alternative crops for sugar cane:
 - o introduce photo-period soybean cultivars.
 - o increase edible bean production on the plains.
 - o increase corn production on plains to decrease unit cost of corn in the market.

- o introduce improved rice to reduce unit cost of Haiti-produced rice.
- o increase cotton production to level required to make the Gonaives gin an economical unit.

8. Program development for hillside agriculture:

- o increase emphasis on hillside farming techniques that include conservation elements such as alley cropping and terrace development.
- o introduce improved forage grasses and legumes into mixed farming to improve livestock production while significantly aiding in protection and rehabilitation of depleted soils.
- o increase emphasis on leguminous trees and shrubs (Leucaena, Calliandra, Desmodium) for livestock forage as well as conventional wood products.
- o develop less destructive harvesting techniques for vetiver and other root crops using strip harvest schedules or other means.

(2) Continue Coffee Project Plans

In order to maintain export trade:

- utilize cooperatives for dissemination of site specific technical interventions;
- replace C. arabica with adapted cross between C. robusta and C. arabica;
- utilize confederation of cooperatives to establish minimum market quality standards and to perform marketing function.

(3) Establish a Training Program for Cooperatives Management

- Develop cooperatives to serve these functions for crops or areas where they do not already exist, building on experience gained with coffee cooperatives:
 - . input supply,
 - . packages of technology delivery to producers,
 - . credit for processors and producers,
 - . marketing, grading, storing,

oversight of packaging, shipping and quality control.

- Develop and/or enhance management expertise for cooperatives in:
 - . coffee for export and domestic sale,
 - . cocoa for export,
 - . cotton for fiber, oil, meal,
 - . soybeans for edible oil,
 - . sugar cane for alcohol.
- (4) Initiate a detailed study of research needs and organizational demands in crops. Consider the following research needs and modify the priority rankings below (A is most urgent, etc):
- Crop varieties and cultivars for plains: beans, cotton, soybeans, sorghum.
 - Hillside crops and alley cropping species for maximum return to the farmer.
 - Quantify benefits of conservation practices (alley cropping, agroforestry, etc) compared to traditional hillside farming.
 - Soils research on salinity, alkalinity, fertility, rhizobium, and mychorriza.
 - Post-harvest losses to insects, rodents, and diseases.
 - Develop packages of technology for delivery to farmers through cooperatives, PVOs and extension.
 - Pre-harvest collection of grain and sugar cane leaves for livestock feed.
 - Aquifer characterizing and monitoring to avoid salinization of pumped irrigation water supply.
 - Pest research.
- (5) Initiate a detailed study of research needs and organizational needs for livestock.
- swine health needs,
 - swine nutrition,

- improved goat performance through breed improvement, and better nutrition and health care,
- cross-breeding cattle to tropical breeds,
- helminth prevention.

(6) Initiate a feasibility study of a systematic soil survey of the plains and hillsides.

9. While some work has been done, additional information is needed on proper use of local feedstuffs, as well as an economic analysis on cropping systems that can benefit pig raising. Cropping strategies both on plains areas and hillside farms could be designed to benefit swine through lower feed costs and better nutrition.
10. Extension efforts should be continued to keep small producers aware of methods and techniques in animal health, nutrition and marketing needs. Some training for Haitian extension personnel should be made available out of country.
11. Feed trials should be made and oriented toward more use of local feed resources. Feeding trials using low-cost rations in gestation and lactation periods are especially critical. This work should be carried out under the supervision of an animal nutritionist.
12. Demand for wheat shorts and rice bran already for outstrips anticipated supply. Feasibility of importing feed grains (especially feed sorghum) for both swine and poultry should be considered.
13. Use of soybean meal should be considered in swine rations, provided a local soybean industry develops on land being withdrawn from sugar cane production.
14. A fully operational veterinary diagnostic laboratory is a critical need for Haiti. This should logically be contained within the framework of MARNDR and FAVM, with inputs as needed from the international community.
15. Market research should focus on: (a) feed supply, and its effect on production costs and constraints and (b) the impact of imported pork and its effect on pork production in Haiti.
16. An economic study is needed on production and marketing systems appropriate to the new breed of pigs in Haiti, with special reference to the small producer.

17. Breed improvement efforts should be continued through MARNDR and FAVM (Faculty of Agronomy and Veterinary Medicine), including dissemination of breeding stock to cooperators throughout the country.
18. Extension efforts should be continued to bring techniques and management expertise to the attention of goat raisers.
19. Strengthen the associated breeding centers by providing adequate improved breeding stock and regular technical support (extension) through MARNDR, FAVM, or other appropriate agency.
20. Distribution of breeding stock should be tied to mandatory training sessions. Cooperators receiving animals should be required to keep adequate records to evaluate success of the program.
21. Continue work on forage trials to determine long-term response of grass-legume association plantings, especially those incorporating Leucaena and siratro (Macroptilium atropurpureum).
22. Evaluate planting methods and grazing and cutting methods on small hillside holdings to minimize soil loss.
23. Make follow-up studies to evaluate economic potential and impact of the improved goat breeds. This should be continued for a 3 to 5-year period.

Agro-Industry

The USAID should immediately review the infrastructure impediments to development, not only of agro-industry but of internal marketing as well, and urgently devise a strategy, with other donors if necessary, to alleviate those constraints. The strategy should include roads, ports, airports and telecommunications.

An in-depth study should be made of existing agro-industries to determine what the constraints are to their expansion (aside from infrastructure). Possible reasons include poor presentation, lack of contact with larger markets, lack of suitable local products, and lack of the desire to expand. Assistance should be given to those which can be expanded and those which offer Haitian farmers an outlet for their produce. As much as possible to receive support, agro-processing industries should be labor-intensive and located outside Port-au-Prince where this is economically and logistically feasible.

Assistance should also be provided to PROMINEX to investigate and assess the projects for agricultural exports. This organization's agricultural capacity on a long-term basis should continue to be supported.

Agricultural Institutions

1. Rural Organizations

A.I.D. should continue to explore project implementation modalities that effectively combine private and public sector skills and services, but which are most likely to be able to effectively deliver benefits to rural beneficiaries as directly as possible. Questions of institutionalizing such delivery capacity should be carefully addressed in design and implementation. The models presented by the AOP and TWMP should continue to be closely monitored.

Projects that are to be implemented through local government structures, whatever these may be called when the projects reach the implementation stage, should be designed so as to ensure that the reality of base-level control and participation is commensurate with the appearance and rhetoric. In order to do this, A.I.D. should continue to fund well-defined studies which describe and analyze social and institutional behavior in the rural sector.

2. Credit

The GOH, A.I.D. and the IDB should examine the options and design an agricultural credit strategy for the long-term based on sound banking practice, but which respects the needs of the small farmer who is seldom considered a good risk by the traditional banking community. From the point of view of A.I.D. management, it might be preferable to have a project manager with banking experience. Immediate accessibility to credit by one means or another will have to be provided, given the current paralysis in both the BCA and the BNDAI. It is also imperative that BCA deposit-holders have confidence that their funds are secure.

3. Assistance to MARNDR

Title III local currency generations should continue to go toward the financing of key MARNDR activities which are, by their nature, national in scope. This could include increased funding for applied agricultural research, for extension training—which could be a course at the Faculty of Agriculture—and for costs associated with the development of water user associations in connection with irrigation schemes traditionally managed by MARNDR. Related self-help measures and fiscal reforms should, however, be maintained as preconditions for the disbursement of these funds.

4. Extension

A.I.D. should refrain from funding efforts to establish a nationwide extension capability through MARNDR. It should, however, provide funding for increased and improved training of extension agents, whether they will ultimately be hired by public or by private sector organizations.

5. National Agricultural Statistics Program

- a. Interim funding be assured by A.I.D. for the area sampling frame, national statistics portion of ADS-II, and its companion CRIES project until the end of FY 1988.
- b. An evaluation of the two systems be undertaken immediately, coupled with a redesign of the project for another phase.

The purposes of such an evaluation would be to focus on the technology that is now being employed by ADS-II and to assess the quality of the programs and the data being generated. Having accomplished this, the same team should then determine what, if any, changes in program design are needed and the length of time required to assure that the program is firmly in place. Finally, they should determine what is the proper repository of the data gathering and analysis system, and make recommendations to A.I.D.

6. Marketing

The post-harvest technology employed in Haiti should be the subject of a study, with particular attention paid to the cost/benefit of any suggestions made. The study should include an examination of the curriculum for the course in post-harvest technology to be offered by the Faculty of Agriculture; assistance to strengthen this course, if necessary, should be provided. The person(s) engaged to undertake this study should have practical experience in marketing in other Caribbean islands. The most obvious first commodities would appear to be meat and fruit and vegetables.

The desirability of introducing control of weights and measures for a wider range of products should be examined.

The current commodity price collection systems should be examined to determine their effectiveness and appropriateness; and that the possibility of broadcasting a wider range of price information be determined. A.I.D. should consider making funds available for both activities.

An inventory of domestic market and storage premises, both urban and rural, should be prepared and funding made available for their upgrading where appropriate. Any proposals should respect traditional trading and marketing systems.

Public versus Private-Sector Funding

Convincing efforts at administrative reform should be a precondition for increased A.I.D. funding through public-sector institutions. However, A.I.D. should, where appropriate, assist the Commissariat a la Promotion National et l'Administration Publique to develop an effective system for

registering and monitoring PVOs and their development activities. Such a system should provide the GOH with appropriate information about what these PVOs are doing, but at the same time, should not be so cumbersome that it will add substantially to the management burden and recurrent costs of the Commissariat, nor add substantially to the overhead portion of funding for PVO-sponsored activities.

The proposed OPVD-funded study of the comparative cost-effectiveness of working through the public sector and through the PVOs should be implemented. Based on its conclusions, more or less funding should be allocated by A.I.D. for support to PVO consortia that can interact effectively with the appropriate GOH agencies for project planning, implementation and evaluation, as well as for sectoral program development.

Mission Organization and Staffing

USAID/Haiti should seriously consider a reorganization of the Mission's structure and related staffing implications given the importance of the rural sector to its program. This would include a reallocation of staff resources such that projects and programs relating to agriculture, agro-industry and rural development would be managed in a single, multi-disciplinary unit. Alternatively, bridges should be built and maintained among the various Offices whose projects affect and are affected by agriculture and rural development.

CHAPTER I

MACROECONOMIC OVERVIEW OF HAITI

A. Macroeconomic Performance Since 1976.

1. Economic Growth and the Role of Agriculture.

Haiti's economy is believed to have stagnated since 1976 in real per capita terms. Although some growth appears to have taken place between 1976 and 1980, most of those gains have since been lost. The World Bank reported that in 1985 per capita income was still 9 percent below that of 1980. (World Bank: Haiti, Public Expenditure Review, Vol. I, p.1) The overall effect was that per capita GDP in real terms increased only 5.5% over the decade (Table 1). Several factors contributed to this situation. First, due to the limited domestic market afforded them by the limited population and the low purchasing power of that population, the import substitution industries, including food, could not sustain growth rates established earlier in the decade. Second, the export assembly industry appears to have reached a plateau, and has even shown signs of decline in real terms, as can be noted in Table 2, probably mainly due to investor concern about the political situation in Haiti over recent years, but also due to cooling of the international economy and protectionist talk in the United States. Third, tourism--never as important in the Haitian economy as some of the neighboring Caribbean countries but showing possibilities for growth--has been devastated by alarmist association of the AIDS disease with Haiti as the result of a widely publicized discovery of AIDS in the Haitian community in Florida.

Finally, agriculture has declined over the past decade in per capita terms. Although it has probably not declined as badly as the World Bank's estimates, the agricultural sector has not provided the domestic savings many thought it should to stimulate the modern sector. Yet as discussed below, the agricultural sector may be both a more significant and a more positive contributor to the national economy than was previously thought. Several factors lead one to speculate that the sector will decline over the next several years, however and could become an even greater drag on the economy. These factors include the demise of some industries such as sugar; the removal of formal or informal methods of protection for traditional crops, such as corn and rice; limitations to the absorptive capacity of the countryside for population growth; and the steadily declining productive capacity of the land. On the positive side are the removal of conditions favoring monopsonies for political friends and allies of the governing power, the restructuring of export taxes so as to favor the producers of crops like coffee, and increased investment in infrastructure which will eventually increase market shares to producers.

TABLE 1

GROSS DOMESTIC PRODUCT AND GDP PER CAPITA
(U.S. \$ AT FACTOR COST)

		FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
CURRENT VALUE	(US \$ MILLION)	1061.1	1162.4	1253.2	1514.4	1974.1	2172.8	2245.3	2339	2569.6	2591.7
CURRENT VALUE GROWTH	(PERCENT)		9.6	7.8	20.8	30.4	10.1	3.3	4.2	9.9	0.9
CURRENT VALUE PER CAPITA	(US \$)	228.7	247.3	262.7	312.9	402.1	436.3	444.6	456.8	495.1	483.5
CONSTANT FY 76 PRICES	(US \$ MILLION)	1061.1	1071.3	1146.4	1237.7	1373.1	1346.2	1313.5	1334.3	1357.6	1294.3
CONSTANT VALUE GROWTH	(PERCENT)		1	7	8	10.9	-2	-2.4	1.6	1.7	-4.7
CONSTANT VALUE PER CAPITA	(US \$)	228.7	227.9	240.3	255.7	279.7	270.3	260.1	260.6	261.6	241.5
CONSTANT VALUE P.C. GROWTH	(PERCENT)		-0.3	5.4	6.4	9.4	-3.3	-3.8	0.2	0.4	-7.7

Source: Laurent & Levitt, Draft, 1986.

TABLE 2

GROSS DOMESTIC PRODUCT BY SECTOR IN FY 76 PRICES
(U.S. \$ MILLIONS)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82 *	FY 83	FY 84	FY 85
AGRICULTURE	449.0	426.3	445.3	463.2	467.8	457.3	479.0	459.0	493.2	461.2
FORESTRY, FISHING, HUNTING	52.4	53.2	54.0	54.9	55.8	56.7	46.2	47.1	48.0	48.7
MINING & EXTRACTION	16.7	16.1	14.5	14.0	13.3	11.4	14.1	0.9	1.0	1.2
MANUFACTURING	132.7	144.3	154.5	170.2	195.3	171.1	168.4	177.5	167.2	156.7
OF WHICH										
FOOD PRODUCTS	42.5	44.8	40.6	34.2	57.5	57.3	49.6	62.6	54.6	54.0
BEVERAGES	3.0	3.2	3.7	4.6	4.3	4.1	4.1	4.5	4.2	4.0
TOBACCO	5.1	5.5	6.5	7.0	7.8	7.4	6.8	6.6	6.5	5.4
ELECTRICITY, WATER, SEWAGE	4.6	5.0	5.9	6.7	7.2	7.6	8.1	8.4	8.9	8.8
CONSTRUCTION & PUBLIC WORKS	45.2	46.8	50.9	56.1	57.7	59.7	53.9	57.2	58.2	65.5
COMMERCE	161.6	165.8	173.9	196.9	244.5	260.4	241.4	262.9	251.4	247.9
RESTAURANTS, HOTELS	15.3	17.2	31.6	35.1	35.2	31.8	32.0	31.0	27.6	28.9
TRANSPORTATION, COMMUNICATIONS	29.2	33.5	33.0	38.1	36.6	38.9	36.4	39.4	36.1	34.6
BANKING, INSURANCE	1.9	2.0	2.7	2.8	2.7	2.8	2.9	3.2	3.2	1.7
REAL ESTATE	46.5	48.2	49.9	51.7	53.6	55.5	57.5	59.6	61.7	64.0
SERVICES	94.3	98.9	112.4	124.9	136.6	152.6	134.3	148.5	163.5	166.8
GOVERNMENT SERVICES	30.7	31.9	38.8	46.2	57.5	56.1	59.5	54.6	59.5	63.3
GDP AT FACTOR COST	1080.1	1089.2	1167.4	1260.8	1363.8	1362.1	1333.7	1349.3	1379.5	1349.3
NET INDIRECT TAXES	56.5	63.0	65.7	61.9	69.5	53.1	55.4	66.0	65.1	57.6
GDP AT MARKET PRICES	1136.6	1152.2	1233.1	1322.7	1433.3	1415.2	1389.1	1415.3	1444.6	1406.9

Source: Laurent & Levitt, Draft, 1986.

TABLE 3

GROSS DOMESTIC PRODUCT BY SECTOR IN CURRENT PRICES
(US \$ MILLIONS)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
AGRICULTURE	449.0	483.3	462.2	567.6	711.8	715.0	695.4	740.1	884.8	869.5
FORESTRY, FISHING, HUNTING	52.4	38.6	43.0	28.1	58.1	51.3	60.6	50.4	51.8	53.1
MINING & EXTRACTION	16.7	18.2	16.8	19.7	24.0	19.1	23.6	1.8	2.0	2.4
MANUFACTURING	132.7	150.0	192.6	235.2	286.4	308.9	361.0	367.2	386.9	405.7
OF WHICH										
FOOD PRODUCTS	42.5	47.2	54.9	46.5	92.0	106.3	109.2	154.3	155.5	177.6
BEVERAGES	3.0	3.2	5.1	7.4	7.6	8.8	10.9	11.4	11.9	12.8
TOBACCO	5.1	5.8	8.5	9.8	8.4	9.4	9.0	10.5	11.7	11.1
ELECTRICITY, WATER, SEWAGE	4.6	4.0	7.6	9.3	11.0	14.9	15.7	16.2	18.5	19.6
CONSTRUCTION & PUBLIC WORKS	45.2	45.2	58.6	66.4	67.1	64.0	79.1	66.0	67.0	75.4
COMMERCE	161.6	177.3	181.0	231.7	339.0	401.9	398.3	478.3	478.9	511.4
RESTAURANTS, HOTELS	15.3	18.6	40.3	44.5	48.7	51.1	61.8	60.5	60.4	70.8
TRANSPORTATION, COMMUNICATIONS	29.2	36.7	33.8	48.3	58.2	82.0	83.2	109.3	120.4	138.8
BANKING, INSURANCE	1.9	2.2	3.5	3.5	4.1	4.7	5.7	5.5	5.7	3.2
REAL ESTATE	46.5	51.9	63.8	65.6	81.9	91.3	113.6	103.0	111.2	120.0
SERVICES	94.3	119.9	133.6	166.9	227.1	299.9	273.4	266.0	300.2	313.9
GOVERNMENT SERVICES	30.7	34.6	42.4	56.6	82.6	90.6	101.6	95.7	112.7	126.8
GDP AT FACTOR COST	1080.1	1180.5	1279.2	1543.4	2002.0	2194.7	2273.0	2360.0	2600.5	2710.6
NET INDIRECT TAXES	56.5	68.3	71.8	75.7	99.9	85.7	94.7	115.7	123.3	115.4
GDP AT MARKET PRICES	1136.6	1248.8	1351.0	1619.1	2101.9	2280.4	2367.7	2475.7	2723.8	2826.0

Source: Laurent & Levitt, Draft, 1986.

It is unlikely, however, that agriculture can do any more over the next decade than hold its own in terms of per capita food production and income generation.¹ It is clear that Haiti's resource base cannot support its population growth rate without a shift in emphasis away from agricultural production purely for the supply of the Haitian population. It is generally agreed that current arable farming practices on the the hillsides are accelerating the degradation of the environment, and that there must be a general acceptance of conservationist farming systems. It is not likely, however that these systems will be adopted unless the economic motivation is strong enough.

It is also generally agreed that there are virtually no wholly subsistence farmers in Haiti. That being so, they all have a greater or lesser dependence on the market. Given falling per capita incomes the demand for farmer's production will command lower prices over time. Concurrently, the contribution of agriculture to the declining economy has become proportionately less, which implies that the spending (and investment) capacity of the rural sector has declined and will do so more sharply if the support to cereals and sugar is withdrawn.²

Just as we regard the dichotomy of hillside agriculture versus plains agriculture as a false one, we see market dependency as affecting all farm families, and so propose market development programs as necessarily complementing production initiatives. Some farm families will derive more direct benefit from improvements in domestic marketing and others from exports. All, however can only suffer if rural and urban buying power continue to decline. In Haiti both hillside and plains farmers produce crops which have export potential, with coffee (a hillside crop) by far the most important and the most developed. There are market development strategies which can impact positively on both domestic and export trade and this is the direction which Haitian agriculture should take. We recommend seeking markets for high-value crops that are maximally labor-intensive, so as to retain the maximum of value added through processing in Haiti. These should be crops for which there is export demand or that substitute for imports. Finding such productive commodities, however, will not be easy. First, this sort of emphasis would require a level of sophistication in research and development that is not currently exhibited in any public or private institution. Second, the supporting infrastruc-

1. Some might argue that this in itself would be an accomplishment worthy of support. However, that means one accepts the position that the lot of the rural peasant in Haiti must be one of little more than survival with no hope of improvement.

2. The effects of the current policy of permitting the smuggling of rice and sugar, and of the mounting costs of the sugar support policy are discussed in Chapter III page 34 ff.

ture of roads, warehousing, utilities, repair shops or parts and equipment depots is not currently available. Nor are the institutions in credit, banking, quality control and inspection, weights and measures, grades and standards and communications efficient enough to attract and hold investors. Fourth, the level of management is not sufficient to support and direct this kind of production. In the competitive environment surrounding these types of production, whether it be cut flowers, processed mushrooms, tropical fruits, spices or winter vegetables, the ability to adjust rapidly to changes in market opportunities will dictate success or failure. We have not seen that type of management thinking exhibited in either the government or the private sector in Haiti.

Some countries have bypassed the development of these internal institutions and systems by seeking out foreign investors who can bring with them the research, standards and management that are lacking in the country. However, Haiti, with no large land holdings available to foreign investors, could have a hard time attracting firms willing to make these commitments even were such an approach desired. The alternative of contracting with numerous small farmers will require not only enforcement of contractual obligations, but most likely the establishment of extension and quality control systems by investors. Taking on such a heavy obligation would only be likely if such investors were assured security and tenure, which is equally unlikely as the basis for this is not readily apparent in Haiti. This is not to say that establishing contracts with local growers would not be possible. In fact, Haiti has a long record of production by contract growers, and this is an option that merits future exploration.

The future economic health of Haitian agriculture will most likely be linked to improving its capacity to promote and sell its products. Under one set of assumptions this could mean increasing numbers of foreign managers and investors and all that scenario's attenuated problems. Even under a set of assumptions stressing food self-reliance and a mixture of production for domestic and for export, certain premises still remain. That is, jobs must be created through off-farm employment in rural and urban settings in order to allow for a relative balance between population and land resources on the hillsides. Improved access to markets must be provided for those who remain in hillside and plains agricultural production. At the policy level, agricultural self-reliance must replace the unrealistic rhetorical target of food self-sufficiency, allowing a more rational approach to importation of food. These assumptions also imply a policy that reduces, if not eliminates, support for those crops that are too costly to produce on Haiti's limited land base, such as sugar, corn, sorghum and probably rice. Such a policy will permit Haiti to import other countries' subsidized produce, while at the same time recognizing that she does not have an economic comparative advantage in production of these crops.

Programs for reclaiming the hillsides must also be designed with the potential economic return evaluated only in the light of real market opportunities for the proposed increases or changes in production since this is the only thing which will induce people to adopt the proposed techniques. The long-term control of erosion, improved water retention properties and decline in siltation rates of downstream irrigation systems are their additional benefits not immediately evident to farmers attempting to maintain their families in the short-term. It should also be remembered that some of the techniques can only be regarded as experimental actions in the Haitian context, designed to test methods of reforestation and erosion control, and not as engines for growth in the economy. The major contributions that the hillsides can be expected to make will lie in the area of forest products and tree crops. The question then becomes "where does one put scarce investment dollars?"

2. The Structure of the Economy

As is seen in Tables 4 & 5, agriculture's share of GDP in constant 1976 prices has dropped from 41.6% in 1976 to about 34% in 1985; from 41.6% to about 32% in current prices. Meanwhile, manufacturing has been increasing its shares of the GDP from 12.3% to 15% in current prices while holding about even in constant 1976 prices, although it had peaked at 14% in 1980. Commerce has increased its share of the GDP from 15% to 18.9% in constant prices over the period. Transportation has also maintained its share at about 2.5%, while services have shown gains of about 3.5 percentage points to 1985's level of 12.4%.

This structural change is more clearly illustrated in Table 6, which gives the relative changes over the period for each sector and the economy as a whole due to price changes. The uneven price inflation among sectors leads to a change in the terms of trade between sectors. As can be seen, agriculture has lost out to manufacturing, commerce, and transportation. While prices in transportation have risen 301% over their 1976 prices and manufacturing has increased 159% during the same period, agricultural prices have increased only 88%. In fact, while the economy as a whole has shown price increases of 100% over the decade, agriculture has lost 12% against the total economy. Although negative terms of trade developing against agriculture is not unusual in most economies, particularly those of the lower income, non-industrial group of nations, the fact that this development occurred in Haiti is less easy to explain. Haiti has, over the past three decades, protected its primary agricultural producers with import restrictions through tariffs and quotas. As a consequence Haiti's agricultural products have generally been priced above the world market prices. Even with this artificially high price structure of agricultural commodities, the terms of trade have still turned against the Haitian farmer. As policies are restructured toward opening the Haitian market, the terms of trade will adjust

TABLE 4

GROSS DOMESTIC PRODUCT BY SECTOR IN FY 76 PRICES
(PERCENT OF TOTAL)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
AGRICULTURE	41.6	39.1	38.1	36.7	34.3	33.6	35.9	34.0	35.8	34.2
FORESTRY, FISHING, HUNTING	4.9	4.9	4.6	4.4	4.1	4.2	3.5	3.5	3.5	3.6
MINING & EXTRACTION	1.5	1.5	1.2	1.1	1.0	0.8	1.1	0.1	0.1	0.1
MANUFACTURING	12.3	13.2	13.2	13.5	14.3	12.6	12.6	13.2	12.1	11.6
OF WHICH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD PRODUCTS	3.9	4.1	3.5	2.7	4.2	4.2	3.7	4.6	4.0	4.0
BEVERAGES	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
TOBACCO	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICITY, WATER, SEWAGE	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7
CONSTRUCTION & PUBLIC WORKS	4.2	4.3	4.4	4.4	4.2	4.4	4.0	4.2	4.2	4.9
COMMERCE	15.0	15.2	14.9	15.6	17.9	19.1	18.1	19.5	18.2	18.4
RESTAURANTS, HOTELS	1.4	1.6	2.7	2.8	2.6	2.3	2.4	2.3	2.0	2.1
TRANSPORTATION, COMMUNICATION	2.7	3.1	2.8	3.0	2.7	2.9	2.7	2.9	2.6	2.6
BANKING, INSURANCE	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
REAL ESTATE	4.3	4.4	4.3	4.1	3.9	4.1	4.3	4.4	4.5	4.7
SERVICES	8.7	9.1	9.6	9.9	10.0	11.2	10.1	11.0	11.9	12.4
GOVERNMENT SERVICES	2.8	2.9	3.3	3.7	4.2	4.1	4.5	4.0	4.3	4.7
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP AT FACTOR COST	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NET INDIRECT TAXES	5.2	5.8	5.6	4.9	5.1	3.9	4.2	4.9	4.7	4.3
GDP AT MARKET PRICES	105.2	105.8	105.6	104.9	105.1	103.9	104.2	104.9	104.7	104.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Laurent & Levitt, Draft, 1986.

TABLE 5

GROSS DOMESTIC PRODUCT BY SECTOR IN CURRENT PRICES
(PERCENT OF TOTAL)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
AGRICULTURE	41.6	40.9	36.1	36.8	35.6	32.6	30.6	31.4	34.0	32.1
FORESTRY, FISHING, HUNTING	4.9	3.3	3.4	1.8	2.9	2.3	2.7	2.1	2.0	2.0
MINING & EXTRACTION	1.5	1.5	1.3	1.3	1.2	0.9	1.0	0.1	0.1	0.1
MANUFACTURING	12.3	12.7	15.1	15.2	14.4	14.1	15.9	15.6	14.9	15.0
OF WHICH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD PRODUCTS	3.9	4.0	4.3	3.0	4.6	4.8	4.8	6.5	6.0	6.6
BEVERAGES	0.3	0.3	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5
TOBACCO	0.5	0.5	0.7	0.6	0.4	0.4	0.4	0.4	0.4	0.4
ELECTRICITY, WATER, SEWAGE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION & PUBLIC WORKS	0.4	0.3	0.6	0.6	0.5	0.7	0.7	0.7	0.7	0.7
COMMERCE	4.2	3.8	4.6	4.3	3.4	2.9	3.5	2.8	2.6	2.8
RESTAURANTS, HOTELS	15.0	15.0	14.1	15.0	16.9	18.3	17.5	20.3	18.4	18.9
TRANSPORTATION, COMMUNICATION	1.4	1.6	3.2	2.9	2.4	2.3	2.7	2.6	2.3	2.6
BANKING, INSURANCE	2.7	3.1	2.6	3.1	2.9	3.7	3.7	4.6	4.6	5.1
REAL ESTATE	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.1
SERVICES	4.3	4.4	5.0	4.3	4.1	4.2	5.0	4.4	4.3	4.4
GOVERNMENT SERVICES	8.7	10.2	10.4	10.8	11.3	13.7	12.0	11.3	11.5	11.6
GOVERNMENT SERVICES	2.8	2.9	3.3	3.7	4.1	4.1	4.5	4.1	4.3	4.7
GOVERNMENT SERVICES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDP AT FACTOR COST	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NET INDIRECT TAXES	5.2	5.8	5.6	4.9	5.0	3.9	4.2	4.9	4.7	4.3
GDP AT MARKET PRICES	105.2	105.8	105.6	104.9	105.0	103.9	104.2	104.9	104.7	104.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Laurent & Levitt, Draft, 1986.

TABLE 6
GROSS DOMESTIC PRODUCT PRICE INDICES
(1976 = 100)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
AGRICULTURE	100.0	113.4	103.8	122.5	152.2	156.3	145.2	161.2	179.4	188.5
FORESTRY, FISHING, HUNTING	100.0	72.6	79.6	51.2	104.1	90.5	131.2	107.0	107.9	109.0
MINING & EXTRACTION	100.0	113.0	115.9	140.7	180.5	167.5	167.4	200.0	200.0	200.0
MANUFACTURING	100.0	104.0	124.7	138.2	147.7	180.5	214.4	206.9	231.4	258.9
OF WHICH										
FOOD PRODUCTS	100.0	105.4	135.2	136.0	160.0	185.5	220.2	246.5	284.6	328.9
BEVERAGES	100.0	100.0	137.8	160.9	176.7	214.6	265.9	253.3	283.3	320.0
TOBACCO	100.0	105.5	130.8	140.0	107.7	127.0	132.4	159.1	180.0	205.6
ELECTRICITY, WATER, SEWAGE	100.0	80.0	128.8	138.8	152.8	196.1	193.8	192.9	207.9	222.7
CONSTRUCTION & PUBLIC WORKS	100.0	96.6	115.1	118.4	116.3	107.2	146.8	115.4	115.1	115.1
COMMERCE	100.0	106.9	104.1	117.7	138.7	154.3	165.0	181.9	190.5	206.3
RESTAURANTS, HOTELS	100.0	108.1	127.5	126.8	138.4	160.7	193.1	195.2	218.8	245.0
TRANSPORTATION, COMMUNICATIONS	100.0	109.6	102.4	126.8	159.0	210.8	228.6	277.4	333.5	401.2
BANKING, INSURANCE	100.0	110.0	129.6	125.0	151.9	167.9	196.6	171.9	178.1	188.2
REAL ESTATE	100.0	107.7	127.9	126.9	152.8	164.5	197.6	172.8	180.2	187.5
SERVICES	100.0	121.2	118.9	133.6	166.3	196.5	203.6	179.1	183.6	188.2
GOVERNMENT SERVICES	100.0	108.5	109.3	122.5	143.7	161.5	170.8	175.3	189.4	200.3
GDP AT FACTOR COST	100.0	108.4	109.6	122.4	146.8	161.1	170.4	174.9	188.5	200.9
NET INDIRECT TAXES	100.0	108.4	109.3	122.3	143.7	161.4	170.9	175.3	189.4	200.3
GDP AT MARKET PRICES	100.0	108.4	109.6	122.4	146.7	161.1	170.5	174.9	188.5	200.9

Source: Calculated from Tables 2 & 3.

rapidly, causing a major jolt to the system. This is apparently what is happening at the present time. The end result will be in favor of the urban worker and against the rural farmer.

3. Government Budget

a. Revenue and Expenditure Trends

Over the past decade the overall public sector deficit has increased fairly consistently, showing declines only in recent years. At the same time, the amounts of grants-in-aid to the government have increased, so that the public sector deficit without grants shows an even greater increase; foreign aid is helping to keep the budget revenues in line with expenditures. Actual government revenues may have been somewhat higher in the 1977 to 1981 period, but it is not clear if transfers from the major public enterprises--flour mill, telecommunications and electricity in particular--were made. These transfers are sizable, in the range of 75 million Gourdes in the 1982 to 1985 period. Table 7 gives the breakdown of the sources of government revenues for the period 1977 to 1985. Three things have happened to the structure of these revenues during the period. First, the percentage of revenue generated from foreign trade has declined from over 40% to under 30%.³ Although the absolute value of revenues from trade have been maintained, the percentage has declined. A main reason for this is that the revenues from export taxes have declined with the discontinuation of bauxite exports, and will continue to decline as export taxes on coffee are reduced. Secondly, restructuring has been effected by export taxes on other goods, particularly from the manufacturing sector, where a general sales tax has replaced a multitude of excise taxes. Finally, tax collections have become more efficient, particularly on income and on a value-added tax. Tax restructuring continues to be implemented and other measures in tax reform are being considered.

Government expenditures are also rising as can be seen on Table 8. This has been attributed to four factors according to the World Bank (Policy Proposals for Growth: 1985). These four factors are: increased spending on defense and security, the maintenance requirements of Haiti's new economic infrastructure, the operating requirements of its new social infrastructure, and extra-budgetary expenditure. Haiti has moved away from a fairly secure fiscal position of balanced budgets to an increasing current account deficit.

3. An exception was in 1980 when over 60% of revenues were derived from trade. This was primarily due to an exceptional year for coffee exports which contributed over 18% of government revenues.

TABLE 7
GOVERNMENT REVENUES, 1977 TO 1985

	1977	1978	1979	1980	1981	1982	1983	1984	1985
TAX REVENUE									
GENERAL SALES TAX							87.2	108.0	185.5
TAX ON NET INCOME AND PROFIT	65.0	74.0	78.0	88.0	115.8	123.3	128.4	141.3	154.4
TAXES ON PROPERTY	8.0	10.0	10.0	10.0	12.2	12.5	12.4	14.7	
TAXES ON GOODS AND SERVICES	67.0	72.0	83.0	96.0	143.6	183.8	195.8	215.9	249.3
TAXES ON INTERNATIONAL TRADE	275.0	288.0	295.0	403.0	285.0	289.8	295.3	292.5	305.2
PERCENT OF REVENUES	43.0%	39.8%	40.0%	62.8%	43.2%	38.7%	34.9%	32.0%	27.1%
OF WHICH:									
IMPORT DUTIES	162.0	170.0	196.0	239.0	236.7	206.5	221.9	235.6	247.8
COFFEE EXPORT TAX	77.0	81.0	50.0	116.0	42.5	45.6	69.2	52.0	57.4
BAUXITE EXPORT TAX	35.0	35.0	46.0	43.0	3.2	33.8			
OTHER EXPORT TAX	1.0	2.0	3.0	5.0	2.6	3.9	4.2	4.9	
OTHER TAXES	27.0	29.0	34.0	44.0	33.1	35.4	36.4	37.0	
UNIDENTIFIED AND NONTAX REVENUES	197.0	251.0	237.0		70.1	104.5	91.0	103.9	229.8
TOTAL REVENUES	639.4	724.4	737.4	641.6	660.2	749.7	846.8	913.6	1124.5

Source: 1977 to 1980 from the 1982 Agricultural Sector Assessment adapted from IMF; 1981 to 1985 from World Bank Public Sector Review.

Note: The 1985 data were incomplete in detail, and extrapolations for line items have been made. However, a large residual was allocated to unidentified.

The figures given here for the 1977-1980 period are considerably higher than those shown as current revenue on Table 8. It is probable that those differences are net transfers from public enterprises to government which are absent on Table 6.

TABLE 8

OVERALL PUBLIC SECTOR ACCOUNTS FY 1977 to FY 1986
(GOURDES IN MILLIONS AT CURRENT PRICES)

	1977	1978	1979	1980	1981	1982	1983	1984	1985
GENERAL GOVERNMENT									
CURRENT REVENUE	516	549	570	691	639.6	749.3	846.5	914.1	1124.2
CURRENT EXPENDITURE	-411	-469	-544	-728	-825.6	-829.3	-950	-1122.8	-1263.1
CURRENT ACCOUNT									
SURPLUS OR DEFICIT (-)	105	80	26	-37	-166	-80	-103.5	-208.7	-138.9
NET TRANSFERS FROM									
MAJOR PUBLIC ENTERPRISES						75.1	74.4	90.9	73.2
SURPLUS OF DEFICIT AFTER TRANSFERS	105	80	26	-37	-166	-4.9	-29.1	-117.8	-65.7
CAPITAL EXPENDITURE	-416	-441	-418	-552	-744.6	-682.4	-596.2	-697.9	-611.1
TOTAL SURPLUS OR DEFICIT (-)	-311	-361	-392	-589	-910.6	-687.3	-625.3	-815.7	-676.8
GRANTS-IN-AID	163	196	239	230	236.5	285	280.5	310	263.1
GENERAL GOVERNMENT OVERALL									
SURPLUS OR DEFICIT (-)	-148	-165	-153	-359	-674.1	-402.3	-344.8	-505.7	-413.7
PUBLIC ENTERPRISES									
CURRENT REVENUE					505.2	528	658.9	839.3	876.7
CURRENT EXPENDITURE					-408	-381.9	-469.8	-582.2	-618.4
CURRENT ACCOUNT SURPLUS OR DEFICIT	40	67	53	68	97.2	146.1	189.1	257.1	258.3
NET TRANSFERS TO GENERAL GOVERNMENT						75.1	74.4	90.9	73.2
SURPLUS OF DEFICIT AFTER TRANSFER	40	67	53	68	97.2	71	114.7	166.2	185.1
CAPITAL EXPENDITURE	-152	-129	-110	-103	-144.4	-102.6	-224.8	-255.4	-186.8
MAJOR PUBLIC ENTERPRISES									
OVERALL SURPLUS OR DEFICIT (-)	-112	-62	-57	-35	-47.2	-31.6	-110.1	-89.2	-1.7
NONCONSOLIDATED PUBLIC SECTOR									
SURPLUS OR DEFICIT	18	-18	-13	15	6.1	37.6	-27.5	-23.6	35.7
CAPITAL EXPENDITURE	18	-18	-13	15	6.1	37.6	-27.5	-23.6	35.7
TOTAL SAVINGS									
CAPITAL EXPENDITURE	145	147	79	31	-68.8	66.1	65.6	48.4	119.4
GRANTS-IN-AID	-550	-588	-541	-640	-882.9	-747.4	-848.5	-976.9	-762.2
TOTAL SAVINGS	163	196	239	230	236.5	285	280.5	310	263.1
OVERALL PUBLIC SECTOR									
SURPLUS OR DEFICIT (-)	-242	-245	-223	-379	-715.2	-396.3	-462.4	-618.5	-379.7

Source: 1977 to 1980 from 1982 ASA adapted from IMF, 1981 to 1985 from World Bank Public Sector Review, 1986.

Note: Transfers from the public enterprises are unknown for the 1977-80 period. Total revenues given here are considerably lower for the 1977-80 period than are reported on Table 7, no explanation was found for the discrepancy.

This has been partially, but not totally, offset by transfers from profitable public enterprises. Additionally, capital expenditures have increased as the government attempts to increase public investment through the development budget.

b. Investment

Table 9 (Public Expenditure Review, page 86) gives the sectoral allocation of public investment for the last three Plan periods. The percentage allocations by sector show an increase for the productive and social sectors and a decline in economic infrastructure over the period. Table 10 shows the government's actual expenditure from treasury and other domestic sources as well as from foreign donors for the 1984 and 1985 years and the budgeted amount for 1986. While agriculture has been the largest recipient of foreign donor investment funds, high investment expenditures in transportation, urban and regional development, energy and industry constitute the largest investment sectors for the government.

Comparing planned with actual expenditures for 1984 and 1985, we see that industry and energy investment expenditures were considerably higher than planned. On the other hand, urban development expenditures were about one-half of those planned, agricultural expenditures on investment were slightly below plan targets and "other" expenditures were about two-thirds of planned expenditures. In the latter category, under-investment in regional and integrated development programs accounts for the major part.

Generally, planned donor-financed expenditures are not achieved for a variety of reasons. First, planning processes and project approval processes often take longer than estimated by the donor organization. Second, start-up times are often later than the project designers anticipate. Third, adequate local resources are often not available, or are not delivered as planned, including counterpart funds and local staff commitments.

c. Recurrent Costs

Most project evaluations have concluded that, at best, projects in Haiti work as long as donor funding continues, but seem to collapse as soon as donor involvement ends. The major criticism is the lack of funds committed by the GOH to operate the projects. This may be due to inadequate allocations by government to project operations and maintenance (O&M), under-charging or under-collection of user fees, or diversion of O & M funds to other uses. Most donors are reluctant to fund recurrent costs, and do so only through

TABLE 9

SECTORAL ALLOCATION OF PUBLIC INVESTMENT FY 72-85 AND
BUDGET 86 (PERCENT)

	AVERAGE FY72-76	AVERAGE FY76-81	AVERAGE FY82-85	BUDGET FY86
AGRICULTURE	9.7	17.3	15.6	18.5
INDUSTRY	2.9	5.0	7.5	11.1
ENERGY	8.6	15.3	19.2	15.0
TRANSPORTATION	37.4	29.2	15.6	10.5
TELECOMMUNICATIONS	10.4	3.8	6.1	5.7
URBAN DEVELOPMENT	0.3	0.9	9.1	5.4
WATER SUPPLY	4.0	1.2	2.6	6.0
HEALTH	6.7	7.4	7.4	10.5
EDUCATION	5.2	7.6	4.4	5.8
OTHER	14.8	12.3	12.5	11.5
TOTAL	100.0	100.0	100.0	100.0

Sources: Direction d'Evaluation et de Controle, MP
 Direction de la Cooperation Externe, MP
 World Bank, Haiti: Policy Proposals for Growth, 1985
 IMF

TABLE 10

PUBLIC AND DONOR INVESTMENT BY SECTOR FOR 1984-85 AND BUDGETED 1986
(G. MILLION AT CURRENT PRICES)

	-----TOTAL-----		-----TREASURY-----				-----DOMESTIC (2)-----				-----EXTERNAL DONORS (3)-----					
	FY84-85 AVE INVESTMENT EXPENDITURE	%	BUDGET FY86 INVESTMENT EXPENDITURE	%	FY84-85 AVE INVESTMENT EXPENDITURE	%	BUDGET FY86 INVESTMENT EXPENDITURE	%	FY84-85 AVE INVESTMENT EXPENDITURE	%	BUDGET FY86 INVESTMENT EXPENDITURE	%	FY84-85 AVE INVESTMENT EXPENDITURE	%	BUDGET FY86 INVESTMENT EXPENDITURE	%
ENERGY	193.1	20.77%	167.1	15.01%	1.1	1.02%	-	-	116.6	33.83%	46.5	16.36%	76.5	13.07%	120.6	14.55%
AGRICULTURE	155.5	16.72%	205.9	18.50%	14.7	13.69%	20.8	15.29%	14.7	4.26%	20.8	7.32%	140.8	24.06%	165.1	22.30%
TRANSPORTATION	119.4	12.84%	116.5	10.47%	12.3	11.45%	8.6	6.32%	22.8	6.61%	19.7	6.93%	38.6	6.60%	53.6	6.47%
OTHER (1)	100	10.76%	128.7	11.56%	36.9	34.36%	60.9	44.78%	36.9	10.70%	60.9	21.43%	22.6	3.86%	58.9	7.11%
HEALTH	80.9	8.70%	116.3	10.45%	7.7	7.17%	14.9	10.96%	7.7	2.23%	14.9	5.24%	73.2	12.51%	101.4	12.24%
TELECOMMUNICATION	80.7	8.68%	62.9	5.65%	0.4	0.37%	1.9	1.40%	68.4	19.84%	31.9	11.22%	51.1	8.73%	49.5	5.97%
URBAN DEVELOPMENT	69.9	7.52%	60.5	5.44%	18.7	17.41%	11	8.09%	18.7	5.43%	11	3.87%	63.1	10.76%	67.6	8.18%
INDUSTRY	68.4	7.36%	123	11.05%	5.2	4.84%	3.5	2.57%	45.8	13.23%	64.1	22.55%	96.7	16.53%	96.8	11.68%
EDUCATION	43.2	4.65%	65	5.84%	4.6	4.28%	11.4	8.36%	4.6	1.33%	11.4	4.01%	12.3	2.10%	31	3.74%
WATER SUPPLY	18.7	2.01%	67	6.02%	5.8	5.40%	3	2.21%	8.5	2.47%	3	1.06%	10.2	1.74%	64	7.72%
TOTAL	929.8	100.00%	1112.9	100.00%	107.4	100.00%	136	100.00%	344.7	100.00%	284.2	100.00%	585.1	100.00%	826.7	100.00%

Source: World Bank; Public Expenditure Review; 1986.

- Notes:
- (1) Other consists of community development, other administrations, mining, regional actions commerce, statistics and information, tourism, social affairs and youth and sports.
 - (2) Domestic investment expenditure includes treasury funds and public enterprises own resources but excludes USAID PL 480 counterpart funds which the government classifies as domestic resources.
 - (3) Donor investment expenditure includes USAID PL 480 counterpart funds.

extension of project funding periods for continuation of the investment period. During the investment period, the fund allocations often contain hidden "recurrent" cost items. Because these are not broken down and identified for continual funding requirements, government budget plans do not retain allocations for operating the projects after donor funding is discontinued. The result is that the country effectively "spends its capital" in that it lets capital built during project investment periods deteriorate, so that eventually another donor "investment" project rebuilds or refurbishes plant and equipment.

This finding is almost always true for irrigation projects in Haiti. User fees are drastically under-charged and under-collected. Hauge, for example, found that the real cost of operating most irrigation systems in Haiti should be around \$90 per hectare. Even this figure is probably low. It is currently estimated to cost about \$2,500 per hectare to develop irrigation in Haiti, and at bank interest rates of 14%, interest charges alone would be \$350 per hectare. In fact ODVA annual operation and maintenance costs were estimated at \$94 per hectare annually. Charges to water users were set at 9.61 Gourdes per hectare (\$1.92 per hectare), excluding the Artibonite, but, on average only about 50% was ever collected. For the Artibonite irrigation system, starting in 1952, and prior to 1975-76, water user tax collections were over 30% in only two years. In nine out of twenty-one years for which there were reports, collections fell below 10%. Since 1976 the collections have been between 40 and 50% of assessments; only since 1984 have collection rates approached 100% (Hauge: 1984). Tax levels were set in the Artibonite in the 1950s at about \$11 per hectare and have not been increased since, even though many areas have been improved to allow for triple cropping of the land. It is questionable whether the low rates actually collected even cover the costs of collecting the taxes.

In a few instances donor funding is used to pay recurrent costs, as is the case with PL 480 local currency sales proceeds (LG) and ESF funds. Hauge reports that between 1975 and 1982 all maintenance funds for irrigation districts came from PL 480 LC generations. Parts of these fund allocations are used to pay operations, maintenance and, frequently, salaries. In fact, in Haiti, the government does not consider PL 480 local currency to be foreign funding. Non-Governmental Organizations (NGOs) are another source of outside, off-budget, funding. Working throughout the country these organizations carry out a large number of development projects. Although much of their funding goes for investment purposes, long-term commitments by these organizations often contain large allocations for salaries, repairs, maintenance and user costs. These commitments by NGOs may delay

recurrent cost problems of the government, but they will not eliminate them.

The major problem is that many of the foreign-financed and domestically-financed development projects either generate no visible economic flows (and/or government or private revenues) to cover recurrent costs, or the lag time is so long that costs often outstrip revenues. If development is taking place—that is, if investments are being made to increase the economic and social well being of the country—then recurrent costs will naturally rise. However, in no project design documents reviewed during the assessment were recurrent cost analyses ever even attempted. In fact, analyses in other areas of the world would indicate that recurrent costs should be between 15% and 50% of investment budget expenditures.

d. Government Employment

One of the major components of the recurrent cost budget is government employees' salaries and wages. Table 11 gives the relationship of total recurrent costs to salaries. For the period of 1982 to 1985, salaries constitute approximately 50% of total recurrent costs. Salaries budgeted for 1986 show a drastic decline to 35% of recurrent costs, which is also reflected in Table 11. This is supposedly due to the elimination of "phantom" employees from government agencies where payments had been made to non-existent employees, and to streamlining of some Ministries.

Overall government employment shown on Table 12 by Ministry or Department for the period 1971 to 1986, rose from 16,058 to 32,399 an increase of 202 percent. As is seen on Table 13, the percentage of total employment for the category of general public administration was consistently between 10 and 12% while the percentage for social services rose from 60.1% to 67.1% in 1986. Economic services dropped drastically, from 29.0% to 20.1% over the period.

e. Agricultural Services Government Employment

Table 12 shows that education has the most employees, with 38.8% of the total in 1986 followed by health with 22.7%; agriculture is a distant third with 7.4%. On closer examination of the tables it is noted that the large percentage drop in governmental employment in the economic services category occurred primarily in agriculture. While the category as a whole showed increased employment in absolute terms, agriculture showed a decline in numbers. Although overall employment in the government doubled from 1971 to 1986, government employment in agriculture dropped by about 650 persons, from 3,022 to 2,381.

TABLE 11

GOVERNMENT EMPLOYMENT AND SALARIES AS
RELATED TO RECURRENT EXPENDITURES
(MILLIONS GOURDES)

	1981	1982	1983	1984	1985	1986 BUDGET
TOTAL CURRENT EXPENDITURES	741.9	817.1	886.8	988.8	979.1	1312.9
AGRICULTURE	31.5	29	27.8	31.4	32.2	37.5
PERCENT AGRICULTURE	4.25%	3.55%	3.45%	3.46%	3.29%	2.86%
TOTAL EMPLOYEMENT	29318	29764	29318	32385	32441	32339
AGRICULTURAL EMPLOYMENT	3104	2252	2255	2222	2408	2381
PERCENT AGRICULTURE	10.59%	7.57%	7.69%	6.86%	7.42%	7.36%
TOTAL SALARIES		401.7	417.8	491.5	528.7	462.9
AGRICULTURAL SALARIES		25.5	26.6	29	30.5	34.8
PERCENT AGRICULTURE		6.35%	6.37%	5.90%	5.77%	7.52%
SALARIES AS A % OF CURRENT EXPENDITURES						
% AGRI OF AGRIC CURRENT		87.93%	95.68%	92.36%	94.72%	92.80%
% AGRI OF TOTAL CURRENT		3.12%	3.38%	3.19%	3.12%	2.65%
% SALARIES OF TOTAL CURRENT		49.16%	51.78%	54.08%	54.00%	35.26%
APPARENT AVE. SALARY (1)		11661	12291	12863	14251	14327
APPARENT AGRI SALARY (2)		11323	11756	13051	12666	14616

Source: World Bank; Public Sector Review.

- Note: (1) The average salary does not include the total wage bill or the number of employees for the armed forces or legislative chamber.
- (2) The average wage is based on total agricultural wage bill.

Data for 1981-85 From Expenditures; 1986 From Budget.

TABLE 12

GOVERNMENT EMPLOYEES BY MINISTRY, FY 71 TO FY 85 AND BUDGET FY 86

	1971	1973	1975	1978	1980	1981	1982	1983	1984	1985	1986 BUDGET
MINISTRY											
GENERAL PUBLIC ADMINISTRATION											
JUSTICE	1119	1118	1180	1249	1303	1308	1306	1284	1247	1357	1357
INTERIOR AND NATIONAL DEFENSE	370	445	459	557	521	546	563	561	565	802	802
INFORMATION AND PUBLIC RELATIONS					780	986	923	844	743	760	760
PRESIDENCY OF THE REPUBLIC						190	191	110	341	352	352
FOREIGN AFFAIRS (1)	238	253	249	265	300	327	328	332	340	340	340
LEGISLATIVE CHAMBER					203	202	203	204		206	206
RELIGION - CULTS (1)					67	69	64	55	56	55	55
ARMED FORCES	n/a										
TOTAL PUBLIC ADMIN	1727	1816	1688	2071	3174	3628	3578	3390	3292	3672	3872
ECONOMIC SERVICES											
AGRICULTURE	3022	3155	2980	3613	3157	3104	2259	2255	2222	2408	2381
PUBLIC WORKS, TRANSPORT											
COMMUNICATIONS	707	765	802	1020	1493	1599	1398	1401	3594	2017	2017
COMMERCE AND INDUSTRY (2,3)	514	515	397	548	579	587	834	811	954	855	855
ECONOMY AND FINANCE (2,4)	423	483	491	555	559	615	602	658	667	600	600
PLANNING					389	403	471	460	570	578	563
MINES AND ENERGY RESOURCES (3)					207	227	233	214	221	219	219
SUPERIOR COURT ACCOUNTS										144	144
TOTAL ECONOMIC SERVICES	4666	4918	4670	5736	6384	6535	5797	5799	8228	6821	6779
SOCIAL SERVICES											
NATIONAL EDUCATION & CULTURE (5)	4956	5095	5588	8764	10672	11259	11835	11841	12292	12572	12572
STATE UNIVERSITY OF HAITI (5)										578	578
HEALTH	4521	4466	4347	5518	5725	5737	6521	6941	7274	7367	7367
SOCIAL AFFAIRS	188	172	183	656	1781	1786	1624	951	903	831	831
YOUTH AND SPORTS					320	373	409	396	396	400	400
TOTAL SOCIAL SERVICES	9665	9733	10118	14938	18498	19155	20389	20129	20865	21748	21748
TOTAL GOVERNMENT EMPLOYEES	16058	16467	16676	22745	28056	29318	29764	29318	32385	32441	32399

- (1) The number of employees under Foreign Affairs from FY 71 to FY 78 includes the employees in the Religion Ministry also.
- (2) The budget for industry was moved from Commerce and Industry to Economy and Finance starting in FY 85.
- (3) The number of employees under Commerce and Industry from FY 71 to FY 78 includes the employees in the Mines and Energy Resources Ministry also.
- (4) The number of employees in the Finance and Economy Ministry for FY 85 does not include the Customs Section.
- (5) The State University of Haiti was part of the Ministry of National Education and Culture before 86.

TABLE 13

GOVERNMENT EMPLOYEES BY MINISTRY, FY 71 TO FY 85 AND BUDGET FY 86
(PERCENT OF TOTAL)

	1971	1973	1975	1978	1980	1981	1982	1983	1984	1985	1986 BUDGET
MINISTRY											
GENERAL PUBLIC ADMINISTRATION											
JUSTICE	6.97X	6.79X	7.08X	5.49X	4.81X	4.46X	4.39X	4.38X	3.85X	4.18X	4.19X
INTERIOR AND NATIONAL DEFENSE	2.30X	2.70X	2.75X	2.45X	1.86X	1.86X	1.89X	1.91X	1.74X	2.47X	2.48X
INFORMATION AND PUBLIC RELATIONS	0.00X	0.00X	0.00X	0.00X	2.78X	3.36X	3.10X	2.88X	2.29X	2.34X	2.35X
PRESIDENCY OF THE REPUBLIC	0.00X	0.00X	0.00X	0.00X	0.00X	0.65X	0.64X	0.38X	1.05X	1.09X	1.09X
FOREIGN AFFAIRS (1)	1.48X	1.54X	1.49X	1.17X	1.07X	1.12X	1.10X	1.13X	1.05X	1.05X	1.05X
LEGISLATIVE CHAMBER	0.00X	0.00X	0.00X	0.00X	0.72X	0.69X	0.68X	0.70X	0.60X	0.60X	0.64X
RELIGION - CULTS (1)	0.00X	0.00X	0.00X	0.00X	0.24X	0.24X	0.22X	0.19X	0.17X	0.17X	0.17X
ARMED FORCES	n/a										
TOTAL PUBLIC ADMIN	10.75X	11.03X	11.32X	9.11X	11.31X	12.37X	12.02X	11.56X	10.17X	11.94X	11.95X
ECONOMIC SERVICES											
AGRICULTURE	18.82X	19.16X	17.87X	15.88X	11.25X	10.59X	7.59X	7.69X	6.86X	7.42X	7.35X
PUBLIC WORKS, TRANSPORT COMMUNICATIONS	4.40X	4.65X	4.81X	4.48X	5.32X	5.45X	4.70X	4.78X	11.10X	6.22X	6.23X
COMMERCE AND INDUSTRY (2,3)	3.20X	3.13X	2.38X	2.41X	2.06X	2.00X	2.80X	2.77X	2.95X	2.64X	2.64X
ECONOMY AND FINANCE (2,4)	2.63X	2.93X	2.94X	2.44X	1.99X	2.10X	2.02X	2.24X	2.06X	1.85X	1.85X
PLANNING	0.00X	0.00X	0.00X	0.00X	1.39X	1.37X	1.58X	1.57X	1.76X	1.78X	1.74X
MINES AND ENERGY RESOURCES (3)	0.00X	0.00X	0.00X	0.00X	0.74X	0.77X	0.78X	0.73X	0.68X	0.68X	0.68X
SUPERIOR COURT ACCOUNTS	0.00X	0.44X	0.44X								
TOTAL ECONOMIC SERVICES	29.06X	29.87X	28.00X	25.22X	22.75X	22.29X	19.48X	19.78X	25.41X	21.03X	20.92X
SOCIAL SERVICES											
NATIONAL EDUCATION & CULTURE (5)	30.86X	30.94X	33.51X	38.53X	38.04X	38.40X	39.76X	40.39X	37.96X	38.75X	38.80X
STATE UNIVERSITY OF HAITI (5)	0.00X	1.78X	1.78X								
HEALTH	28.15X	27.12X	26.07X	24.26X	20.41X	19.57X	21.91X	23.67X	22.46X	22.71X	22.74X
SOCIAL AFFAIRS	1.17X	1.04X	1.10X	2.88X	6.35X	6.09X	5.46X	3.24X	2.79X	2.56X	2.56X
YOUTH AND SPORTS	0.00X	0.00X	0.00X	0.00X	1.14X	1.27X	1.37X	1.35X	1.22X	1.23X	1.23X
TOTAL SOCIAL SERVICES	60.19X	59.11X	60.67X	65.68X	65.93X	65.34X	68.50X	68.66X	64.43X	67.04X	67.13X
TOTAL GOVERNMENT EMPLOYEES	100.00X										
AGRICULTURE EMPLOYMENT GROWTH		104.40X	98.61X	119.56X	104.47X	102.71X	74.75X	74.62X	73.53X	79.68X	78.79X
TOTAL EMPLOYMENT GROWTH		102.55X	103.85X	141.64X	174.72X	182.58X	185.35X	182.58X	201.68X	202.02X	201.76X

Source: Table 12.

Of the total current expenditure for 1982-85 and budgeted for 1986, as was noted above, the portion used for salaries was consistently at or slightly above 50%. For agriculture the proportion of current budget expenditures spent on salaries was consistently higher than all other government departments, even exceeding education in every year except 1982.

One of the major reasons for the high share of salaries in current expenditure in agriculture going for salaries is that the majority of investment expenditure in agriculture comes from donor sources. Fully 23% of donor funding over the 1984-1986 period was allocated to agriculture. This is out of an average donor-financed share of the development budget of 63% in 1984-85, and 74% in the 1986 budget. This means that in the last 2 years 15.7% of donor funds went to agriculture, as opposed to about 15% from all domestic sources. In general the GOH and public enterprises cover a lesser portion of investment costs in agriculture as compared with other Ministries and Departments. Because donor-financed projects often include components that would normally be listed under the Ministry's current budget, a large part of the MARNDR's current expense is off-budget. Therefore, salaries constitute a higher portion of total current expenditures. Finally, many projects funded by and operated by NGOs are completely out of the government and therefore all recurrent costs are excluded from government budgets and are included in project costs. However, the MARNDR allocations which are so heavily skewed toward salaries leave almost no moneys for recurrent expenditures in operations and maintenance.

B. Agriculture's Role in the Economy

1. Agriculture's Contribution to GDP

Although agriculture continues to represent the largest sector in the economy of Haiti, its share of GDP has shown a steady decline in both current values and real terms (constant 1976 prices) over the past decade. This decline is shown in **Figure I-1** and in **Table 14**. There has been some question as to the level of GDP, particularly portions deriving from certain sectors. In 1986, Laurent and Levitt, consultants for the World Bank, undertook an analysis of the derivation of GDP numbers. Although their report was only available in draft and is not official, it appears to be the most thorough analysis of the recent situation in agriculture available in Haiti. After a fairly thorough examination of the agricultural sector, they concluded that the sector's contribution to GDP was understated. The relationship of Laurent and Levitt's GDP estimates to those currently used by the World Bank is shown in **Figure I-2**. Converting to constant 1976 prices, Laurent and Levitt show agricultural GDP rising slightly through the 1976 to

FIGURE I-1

AGRICULTURAL VALUE ADDED AS A % OF GDP

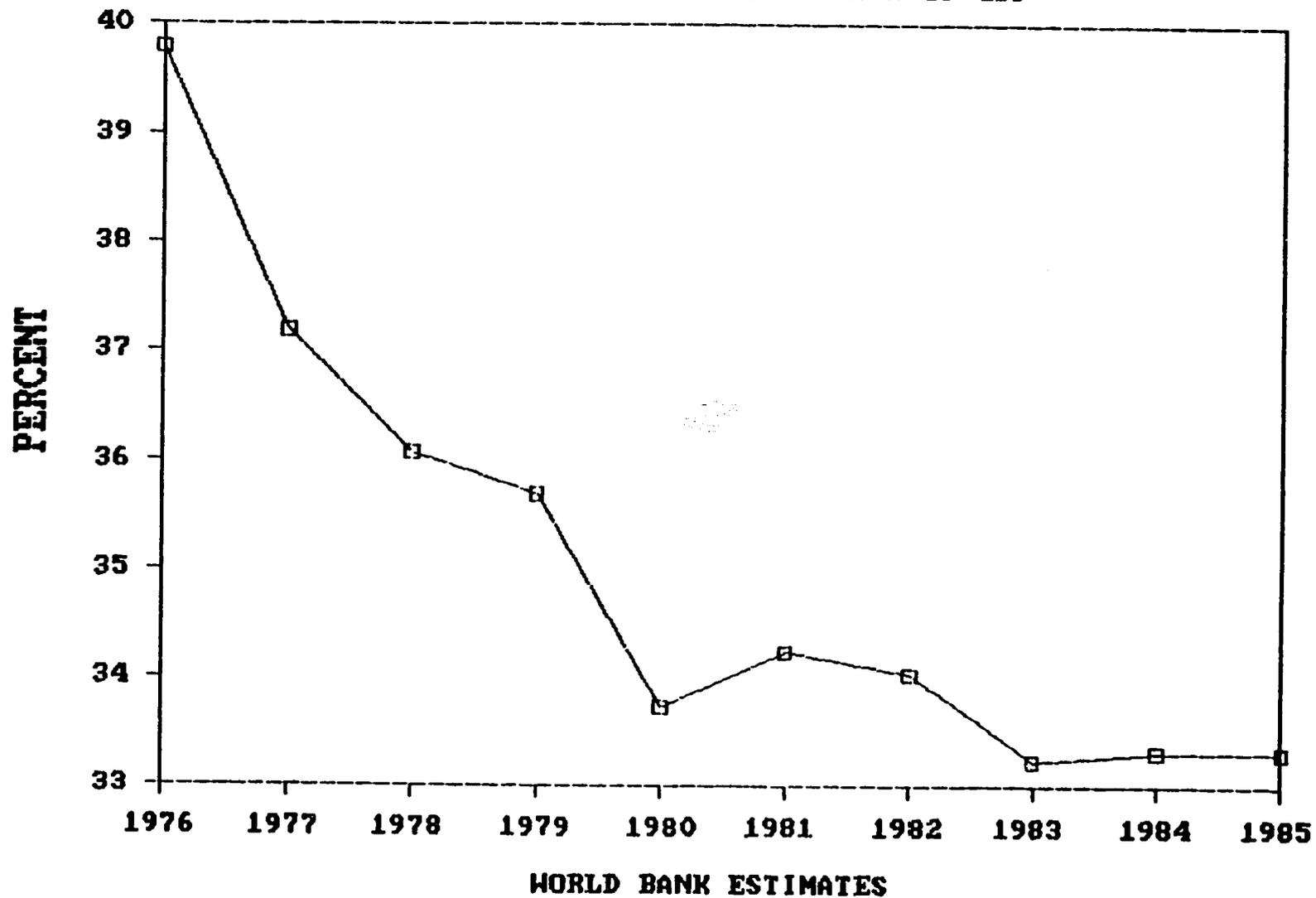


TABLE 14

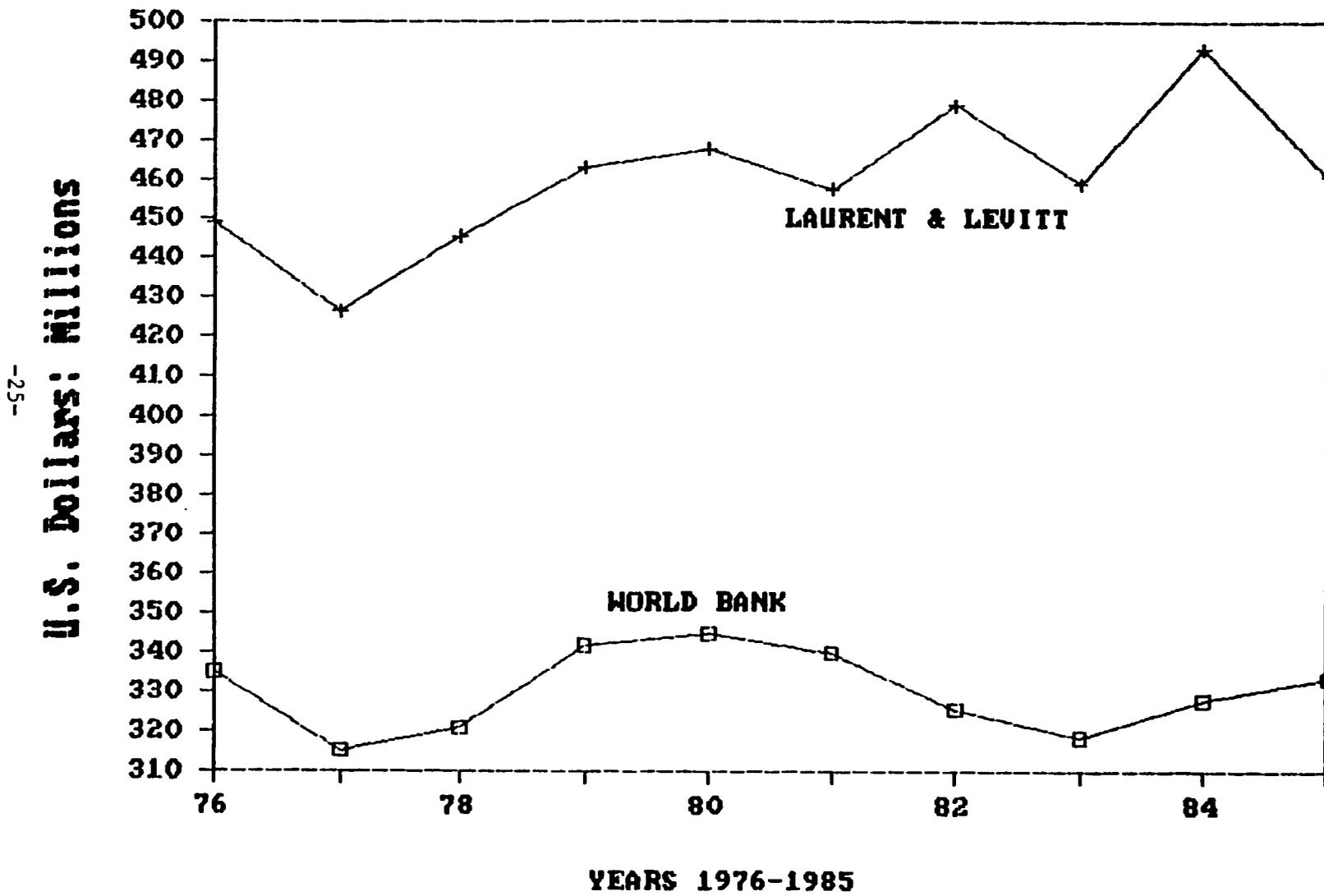
AGRICULTURAL GDP FY 1976 - 1985
(G MILLION AT FY 1976 PRICES)

	FY76	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85
AGRICULTURE	1413	1309	1334	1433	1444	1415	1396	1356	1398	1422
LIVESTOCK	262	266	270	275	279	284	231	235	240	244
TOTAL SECTOR GDP	1675	1575	1604	1708	1723	1699	1627	1591	1638	1666
GDP AT FACTOR COST	4210	4235	4447	4786	5108	4961	4780	4788	4916	5001
AG & LIVESTOCK AS % OF TOTAL GDP	39.79%	37.19%	36.07%	35.69%	33.73%	34.25%	34.04%	33.23%	33.32%	33.31%
POPULATION (000)										
TOTAL	4613	4678	4743	4810	4877	4965	5054	5145	5237	5332
RURAL	3801	3835	3870	3905	3940	3975	4011	4047	4084	4120
PER CAPITA AGRICULTURE & LIVESTOCK GDP (GOURDES)										
OVERALL	363	337	338	355	353	342	322	309	313	312
RURAL	441	411	414	437	437	427	406	393	401	404
PER CAPITA GDP (GOURDES)										
OVERALL	913	905	938	995	1047	999	946	931	939	938

Source: World Bank.

FIGURE I-2

AGRICULTURAL GDP AT 1976 PRICES



1985 period as opposed to the World Bank's figures which show agricultural GDP as stagnant. This is seen in Figure I-2, which summarizes the contribution of agriculture to GDP from the two sources. Laurent and Levitt concluded that the main problem was that the estimate of GDP in the base year, 1976, was greatly underestimated, and that the use of fixed sector coefficients and a GDP deflator distorted the GDP estimates. Laurent and Levitt recalculated GDP in agriculture using current price values to incorporate the impact of structural changes within the economy. Their GDP estimates indicate a higher value throughout the period, ranging from 134% to over 150% of World Bank estimates, as seen in Figure I-3 and Table 14. The low rate of growth in both series set against a fairly high population growth rate indicates that the per capita GDP in the agricultural sector has declined even further than the absolute GDP figures. At the same time, the growth in the other large sectors of the economy-- manufacturing, commerce, services and transportation--has been positive over the period (Figure I-4).

2. The Structure of the Agriculture Sector

Tables 15-17 show the relationship between current and constant values for several agricultural commodities, as well as for the sum of the commodities representing the sector as a whole. Among the major cereals--corn, rice and millet (sorghum)-- corn has clearly shown a positive advantage in the terms of trade among cereals except for 1979 and 1980. This situation would tend to favor the expansion of corn production over other cereals unless the production cost factors were extremely favorable to the other cereals.⁴ With the exception of coffee, most tree crops have shown quite favorable positions. This includes mangoes, cocoa and citrus. Coffee on the other hand has shown a dismal performance, which has probably contributed to the decline in plantings as noted by some observers. The tubers--cassava, sweet potato and yam (along with taro or malanga on the tables)--have been generally favored, with prices rising about 45% higher than for the sector as a whole. Unfortunately, the large subsector given by Laurent and Levitt as "other" is not defined by the authors. We are given neither the contents of this subsector nor any explanation of its performance and size. Livestock have not been included under this "subsector" by Laurent and Levitt. Therefore, we have made estimates of livestock numbers and the contribution they make to GDP.⁵

4. This is in fact the situation that many observers believe has happened as protectionist policies have kept the price of corn far above the world market price. The result, the argument goes, expanded the production of corn on the hillsides and further exacerbated the erosion problem.

5. The World Bank personnel consulted informed us that livestock had not been included in the study.

FIGURE I-3

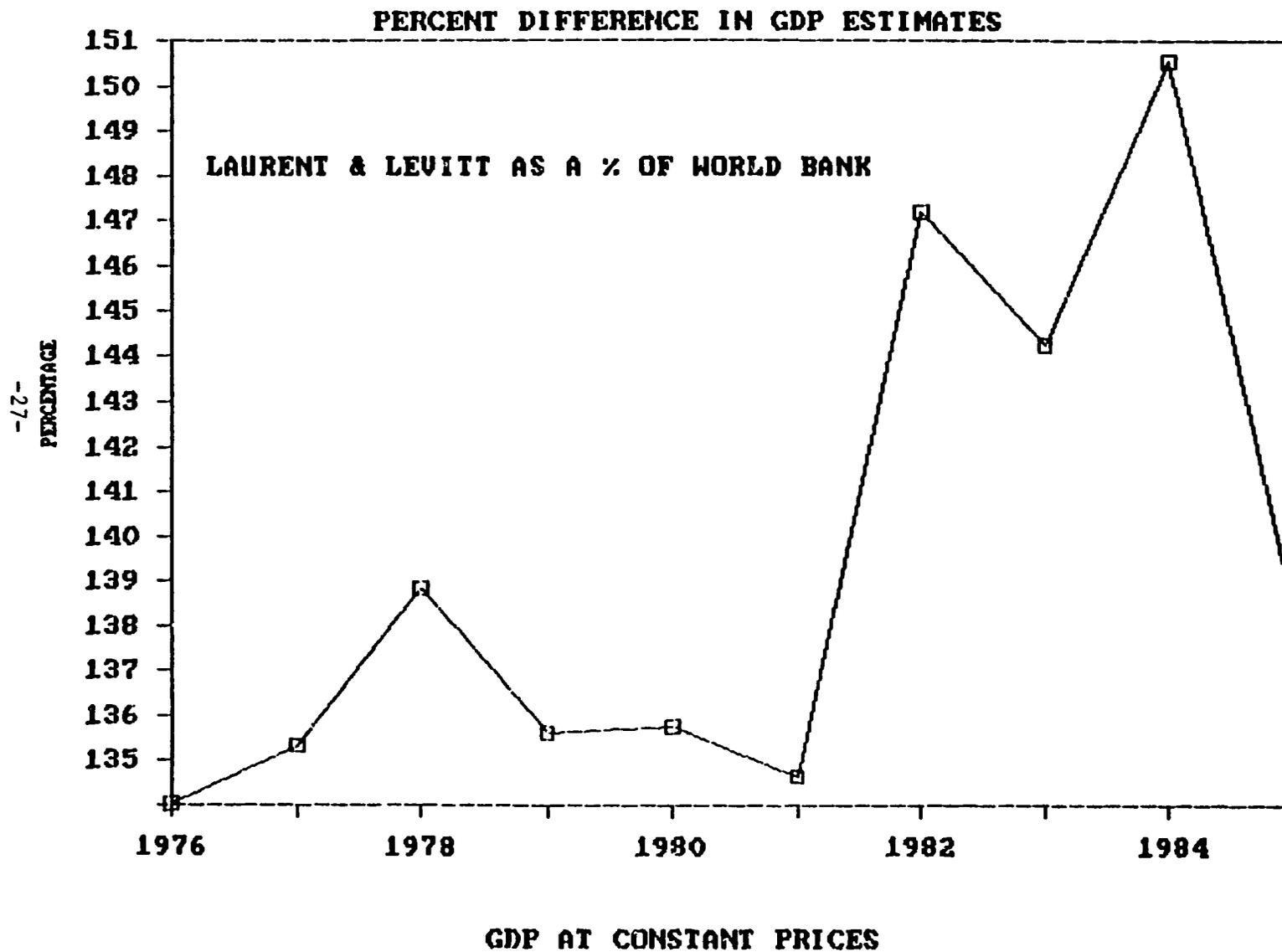
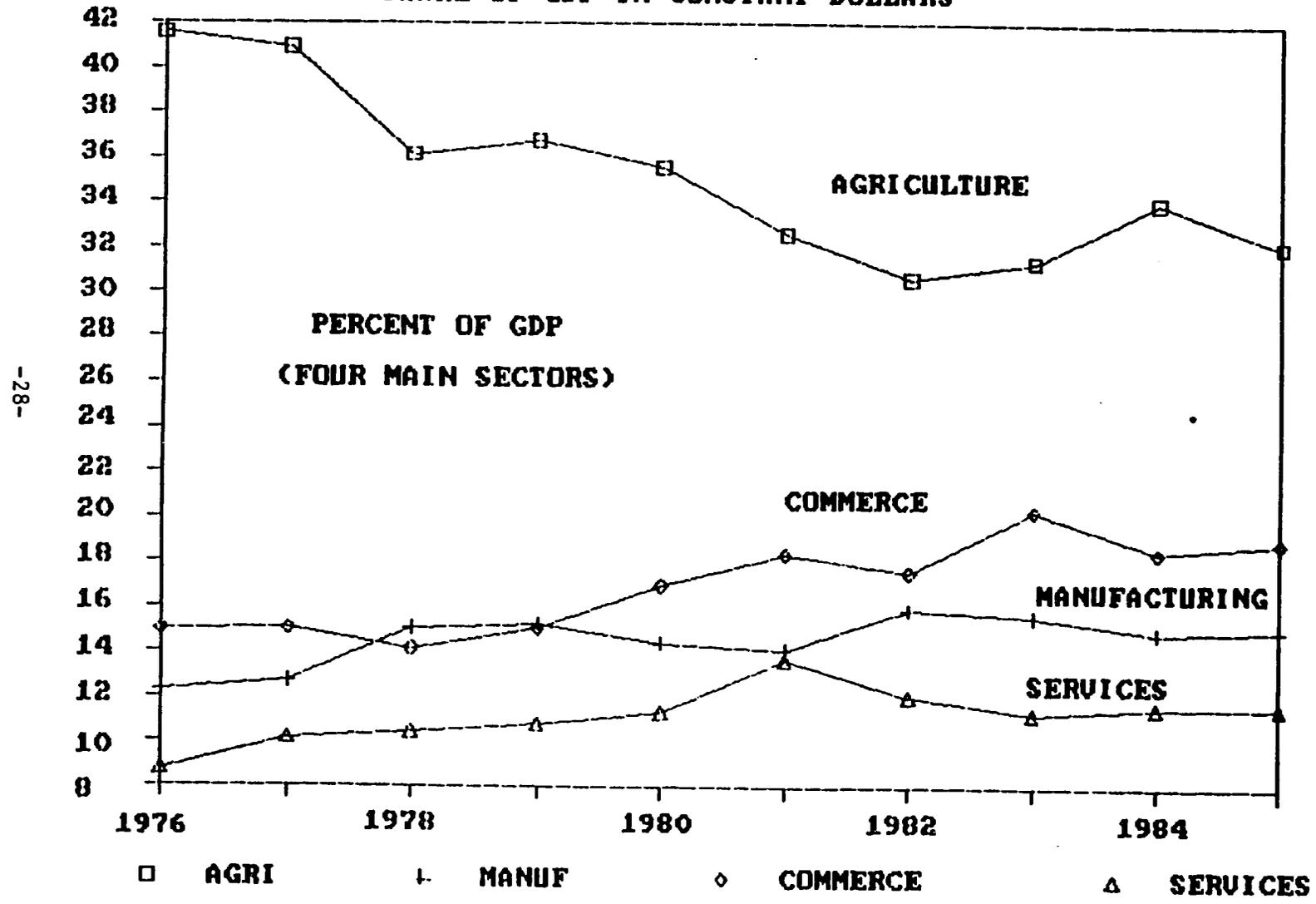


FIGURE I-4

SHARE OF GDP IN CONSTANT DOLLARS



FROM LAURENT & LEVITT

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TABLE 15

VALUE ADDED OF AGRICULTURAL COMMODITIES
(U.S. \$ Thousands at Current Prices)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
CORN	20,827	25,200	17,710	21,960	30,690	36,695	29,920	38,698	43,710	39,245
RICE	60,160	52,920	57,348	66,400	94,400	109,416	90,640	88,088	104,800	91,120
MILLET/SORGHUM	15,680	20,535	14,500	22,755	28,750	30,600	20,060	18,190	25,620	27,260
BEANS	39,296	43,745	38,709	51,051	72,305	59,823	52,913	52,734	72,930	69,577
BANANAS	41,850	31,061	24,257	40,429	65,651	73,388	51,694	66,747	104,076	100,000
CASSAVA	18,750	20,625	22,688	24,956	27,452	30,197	33,217	36,538	40,192	44,212
SWEET POTATO	33,000	40,656	48,874	47,224	54,500	59,950	73,194	89,002	99,034	108,937
YAM/MALANGA	33,975	37,373	41,110	45,221	49,743	54,717	60,189	66,208	72,828	80,111
COFFEE	43,400	77,760	51,687	66,165	79,394	43,956	43,538	40,284	45,018	40,060
COCOA	1,172	2,315	2,997	3,398	2,263	1,838	3,174	2,778	4,460	6,261
ESSENTIAL OILS	8,249	6,440	9,700	7,459	5,406	4,615	5,680	7,468	5,648	4,369
MANGOES (FOR EXPORT)	92	346	308	395	619	970	1,520	2,382	2,647	2,689
SUGAR CANE	19,000	18,000	26,000	29,000	28,000	22,000	28,000	21,000	31,000	29,000
COTTON	545	329	493	637	826	1,062	489	658	792	792
SISAL	2,720	2,046	3,198	1,564	2,772	1,116	3,400	348	450	950
TOBACCO	1,965	2,643	2,880	3,049	3,388	3,964	4,540	5,218	5,480	7,392
MANGOES	21,080	21,590	25,406	35,416	37,527	39,764	42,134	44,646	45,488	46,201
ORANGES/GRAPEFRUIT	20,496	13,725	13,725	27,450	34,221	47,946	65,548	65,548	65,548	65,548
OTHER	66,754	65,967	60,624	73,033	93,937	93,015	85,588	93,557	114,259	97,734
TOTAL (US \$)	449,011	483,276	462,214	567,562	711,844	715,032	695,438	740,092	884,780	869,458
TOTAL (GOURD)	2,245,055	2,416,380	2,311,070	2,837,810	3,559,220	3,575,160	3,477,190	3,700,460	4,423,900	4,347,290

Source: Laurent & Levitt, Draft, 1986.

Note: Totals differ slightly from Laurent & Levitt due to rounding. Conversion at 5 Gourdes equal 1 U.S. dollar. Sugar Cane in the draft report was given in thousands instead of millions. Sorghum is given as millet in most of the statistical reports.

TABLE 16

VALUE ADDED OF AGRICULTURAL COMMODITIES
(U.S. \$ Thousands at Constant Prices)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
CORN	20,827	19,320	18,515	21,045	21,045	20,585	20,240	20,229	21,390	19,205
RICE	60,160	55,272	66,552	62,416	62,416	72,944	77,456	68,432	75,200	63,920
MILLET/SORGHUM	15,680	17,760	16,000	19,680	19,680	19,200	18,880	17,120	19,520	18,560
BEANS	39,296	40,150	39,296	44,421	44,421	43,567	42,713	40,150	46,984	43,567
BANANAS	41,850	30,987	36,731	38,680	38,680	35,650	42,020	31,568	38,125	37,810
CASSAVA	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750
SWEET POTATOE	33,030	36,960	40,392	35,480	35,480	37,224	41,316	45,672	46,200	46,200
YAM/MALANGA	33,975	33,975	33,975	33,975	33,975	33,975	33,975	33,975	33,975	33,975
COFFEE	43,400	44,800	39,115	50,207	50,207	46,620	45,150	50,400	52,150	50,400
COCOA	1,172	728	1,167	1,160	1,160	1,034	1,807	1,852	1,896	2,035
ESSENTIAL OILS	8,249	6,574	7,774	7,024	7,024	4,799	5,849	8,374	5,274	3,850
MANGOES (EXPORT)	92	337	256	235	235	514	760	1,124	1,227	1,227
SUGAR CANE	19,000	18,000	21,000	23,000	22,000	16,000	20,000	15,000	22,000	21,000
COTTON	545	307	460	558	558	826	380	512	616	616
SISAL	2,720	2,640	3,280	1,840	1,840	720	2,000	211	273	576
TOBACCO	1,965	1,965	1,965	1,965	1,965	1,965	1,965	1,965	1,786	1,786
MANGOES	21,080	21,080	21,080	21,080	21,080	21,080	21,080	21,080	21,080	21,080
ORANGES/GRAPEFRUIT	20,496	20,496	20,496	20,496	20,496	20,496	20,496	20,496	20,496	20,496
OTHER	66,754	56,162	58,534	61,209	66,823	61,536	64,119	62,047	66,283	56,136
TOTAL (US \$)	449,011	426,263	445,338	463,221	467,835	457,485	478,956	458,957	493,225	461,189
TOTAL (GOURD)	2,245,055	2,131,315	2,226,690	2,316,105	2,339,175	2,287,425	2,394,780	2,294,785	2,466,125	2,305,945

Source: Laurent & Levitt, Draft, 1986.

Note: Totals differ slightly from Laurent & Levitt due to rounding.
Conversion at 5 gourdes equal 1 U.S. dollar.
Sugar cane in the draft report was given in thousands instead of millions.
Sorghum is given as millet in most of the statistical reports.

TABLE 17

GROSS DOMESTIC PRODUCT INFLATION FACTORS
(INDEX: 1976 = 100)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
CORN	100.00	130.43	95.65	104.35	145.83	178.26	147.83	191.30	204.35	204.35
RICE	100.00	95.74	86.17	106.38	151.24	150.00	117.02	128.72	139.36	142.55
MILLET	100.00	115.63	90.63	115.63	146.09	159.38	106.25	106.25	131.25	146.88
BEANS	100.00	108.95	98.51	114.93	162.77	137.31	123.88	131.34	155.22	159.70
BANANAS	100.00	100.24	66.04	104.52	169.73	205.86	123.02	211.44	272.99	264.40
CASSAVA	100.00	110.00	121.00	133.10	146.41	161.05	177.16	194.87	214.36	235.80
SWEET POTATOE	100.00	110.00	121.00	133.10	153.61	161.05	177.16	194.87	214.36	235.79
YAM/MALANGA	100.00	110.00	121.00	133.10	146.41	161.05	177.16	194.87	214.36	235.79
COFFEE	100.00	173.57	132.14	131.78	158.13	94.29	96.43	79.93	87.86	95.36
COCOA	100.00	317.99	256.81	292.93	195.09	177.76	175.65	150.00	235.23	307.67
ESSENTIAL OILS	100.00	97.96	124.77	106.19	76.96	96.17	97.11	89.18	107.09	113.48
MANGOES (FOR EXPORT)	100.00	102.67	120.31	168.09	263.40	188.72	200.00	211.92	215.73	219.15
SUGAR CANE	100.00	100.00	123.81	126.09	127.27	137.50	140.00	140.00	140.91	138.10
COTTON	100.00	107.17	107.17	114.16	148.03	128.57	128.68	128.52	128.57	128.57
SISAL	100.00	77.50	97.50	85.00	150.65	155.00	170.00	164.93	164.84	164.93
TOBACCO	100.00	134.50	146.56	155.17	172.42	201.73	231.04	265.55	306.83	413.89
MANGOES	100.00	102.42	120.52	168.01	178.02	188.63	199.88	211.79	215.79	219.17
ORANGES/GRAPEFRUIT	100.00	66.96	66.96	133.93	166.96	233.93	319.81	319.81	319.81	319.81
OTHER	100.00	117.46	103.57	119.32	140.58	151.16	133.48	150.78	172.38	174.10
TOTAL (US \$)	100.00	113.38	103.79	122.53	152.16	156.30	145.20	161.26	179.39	188.53
TOTAL (GOURD)	100.00	113.38	103.79	122.53	152.16	156.30	145.20	161.26	179.39	188.53

Source: Calculations from corrected data from Laurent & Levitt.

The World Bank's estimates for livestock in current terms are fairly constant at about \$50 million per year over the period. However, it is likely that these values were derived from FAO data which seem to be generally inflated as regards Haitian agriculture. We have attempted to estimate livestock's contribution to GDP in Chapter III. These values, in current terms, suggest a value added for the subsector starting at \$30 million in 1976 and rising fairly evenly to \$107 million in 1986. Unfortunately, the sectoral assessment did not permit the full investigation of price data needed to determine the structural shifts that might be occurring between livestock and other farm production.

The overall review of the components of the agricultural sector reflects some of the problems it faces. First, the major export crops of coffee and sugar cane have seen unfavorable terms of trade develop over the last decade relative to other crops. Secondly, the favorable terms of trade for corn should stimulate expanding acreage of this crop. Given that a large portion of the corn crop is grown on the hillsides, a structural shift that favors corn will also increase cultivation on the hillsides. In Haiti's recent situation it may have meant increasing corn production at the expense of tree crops such as coffee and cocoa, which are better suited to reduce environmental degradation of hillsides. Thirdly, the terms of trade among cereals have not favored rice. The reason for this is not totally clear. It may be that rice has been more heavily consumed in the urban areas where it is in more clear competition as a foodstuff with wheat products such as breads and pastas. Another reason may be that as production of rice has increased with the expansion of irrigation and the introduction of better yielding varieties, the supply has increased. Also, prices may have risen relatively slowly because much of the investment expenditures and operating costs in irrigation have been subsidized so that farmer costs per unit of production have not risen as fast as production costs of other crops that might be grown. In fact, this was found to be true in analyses done by the World Bank for their agricultural sector study in 1985 (World Bank: 1985), where irrigated rice was considered to have an economic profit⁶ second to improved banana production in the selection amongst maize, rice, bananas, coffee and sugar cane. Finally, the locally consumed crops have been isolated from the world market to a large extent while the export crops have been subject to world market price fluctuations. Again this was borne out in the World Bank Agricultural Sector Study, which showed that corn and rice had the highest ratio of producer price to border price.⁷ Thus, while world prices of agricultural

6. The economic profit measure combines production cost data and border price estimates to yield economic profit per hectare.

7. The World Bank noted that this ratio was somewhat unreliable because accurate producer prices were hard to obtain.

products have not risen very much, or, in some cases have fallen in the past decade, prices of local foodstuffs have been able to rise. Export-oriented crops such as coffee and sugar cane, on the other hand, must meet prices of export buyers. Unfortunately, data on all the crops are not available to test this analysis.

The protection of the local market either through the use of import quotas, duties or monopolies has certainly caused some distortions in the local markets. These distortions are probably being translated into decisions about production by local farmers. Exactly what those impacts are cannot be easily deciphered because adequate data on areas in crop, yields and market prices are lacking. Unfortunately, this lack of analysis also makes actions for policy adjustment almost impossible to implement. Not knowing exactly what the implications of policy shifts will be also means that distortions cannot be easily corrected without the risk of significant social cost to some segments of the populace.

3. Exports Derived from the Agricultural Sector

Haiti's exports of agricultural commodities have shown inconsistent values over the past decade. The reasons for this include stiff competition in international markets; high cost of production of traditional export crops; shifts in international demand; unfavorable government policies and population growth. Having grown fairly steadily through the late 1970s, agricultural exports have shown a tendency to decline in the 1980s. In real terms, the impact was more pronounced as the cost of imported items has generally risen faster than the value of exports. Table 18 gives the value of exports for 1965, 1970 and 1975 to 1986. Within the agricultural sector, none of the traditional exports except cocoa has maintained its value level in the period since 1980. As can be seen in Table 19, coffee, the largest agricultural export, has shown a decline to barely one-half the value level of that achieved in 1980.⁸ This is partly due to the drop in unit values of exports but also due to volume declines, which is much more pronounced with sugar. Essential oils have just remained constant, sugar exports have ceased altogether, and sisal is not far behind. While agricultural exports are declining, the value of manufactured goods being exported has been rising steadily. The result has been that agriculture has slipped from providing 70% of the nation's exports in earlier years to its 1986 position as supplying only about 42%, while manufactured exports have risen to 58% of total value. Meanwhile, exports of minerals have stopped completely since 1982, and there is no hope that they will reappear on the export list. These relationships are illustrated in Figure I-5.

8. The zero values on Table 19 for 1987 are somewhat misleading. The values given are those available at the time of the sector assessment. Some exports, such as coffee, apparently were not yet recorded.

TABLE 18
HAITI EXPORTS
(Million U.S. \$)

	1965	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
AGRICULTURAL EXPORTS															
COFFEE	19.4	15.2	18.4	44	63.6	62.3	39.3	90.9	33.1	35.9	32.5	45.8	48.6	52.1	52
ESSENTIAL OILS	1.2	2.7	4.9	8.2	6.5	9.7	7.5	5.4	4.9	5.7	7.7	5.6	4.3	4.12	3.88
SUGAR	2.4	2.8	8.3	1.8	2.3	2.3	6.4	6.4	3.4	2.2	4.7	4.56	6.92	4.82	5.42
COCOA		1.1	1.4	2.1	4.1	5.5	6.8	4.5	3.4	2.2	4.7	4.56	6.92	4.82	5.42
MEAT	1	0.5	0.5	1	1.5	1.7	3.1	1.8	4.2	1.7	0.6	0.36	0	0	0
SISAL	2.5	1.8	2.8	1.5	1	1.5	2.7	9.5	7.3	9.6	5.3	0.18	0.38	0.3	0.24
OTHER	0	1.3	11.9	7.7	11.5	11.5	5.7	10.2	9.1	20	22.3	55.92	37.3	20.1	28.38
MINERALS															
BAUXITE	3.9	5.6	10.5	18.2	17.3	17.2	18	19.6	16.6	21.3	0	0	0	0	0
COPPER	2.4	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0
CEMENT	0	0	0	0	0	0	0.7	0.7	0	0	0	0	0	0	0
INDUSTRY															
ASSEMBLY FROM DOMESTIC	0	2.8	9	12.2	14.7	21.1	30.6	43.2	50.6	65.4	69	64.2	82.3	65	91.4
	5	8.2	12.5	15.2	17.2	21.7	25.5	34	37.6	42.1	49.1	42.3	46.6	47.3	50.8
TOTAL EXPORTS															
NET EXPORTS	37.8	43.2	80.2	111.9	137.4	154.5	139.9	226.2	166.8	203.9	212.9	219.42	226.4	193.74	212.12
AGRICULTURAL EXP	26.5	25.4	48.2	66.3	88.2	94.5	65.1	128.7	62	75.1	94.8	112.92	97.5	81.44	69.92
MINING	6.3	6.8	10.5	18.2	17.3	17.2	18.7	20.3	16.6	21.3	0	0	0	0	0
MANUFACTURE & IN	5	11	21.5	27.4	31.9	42.8	56.1	77.2	88.2	107.5	118.1	106.5	128.9	112.3	142.2

NOTE: THE FIGURES FOR OTHER EXPORTS DO NOT AGREE WITH THOSE GIVEN BY THE DOUANES
AS REPORTED BY THE WORLD BANK IN THE 1985 AG SECTOR ASSESSMENT ANNEX G TABLE 83.

	(IN PERCENT OF EXPORTS)														
TOTAL NET EXPORT	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
AGRICULTURAL EXP	70.11%	58.80%	60.10%	59.25%	64.19%	61.17%	46.53%	56.90%	37.17%	36.83%	44.53%	51.46%	43.07%	42.04%	32.96%
MINING	16.67%	15.74%	13.09%	16.26%	12.59%	11.13%	13.37%	8.97%	9.95%	10.45%	0.00%	0.00%	0.00%	0.00%	0.00%
MANUFACTURE & IN	13.23%	25.46%	26.81%	24.49%	23.22%	27.70%	40.10%	34.13%	52.88%	52.72%	55.47%	48.54%	56.93%	57.96%	67.04%

Source: USAID/Haiti from Central Bank and Customs.

TABLE 19

VOLUME, UNIT PRICE AND VALUE OF PRINCIPAL AGRICULTURAL EXPORTS

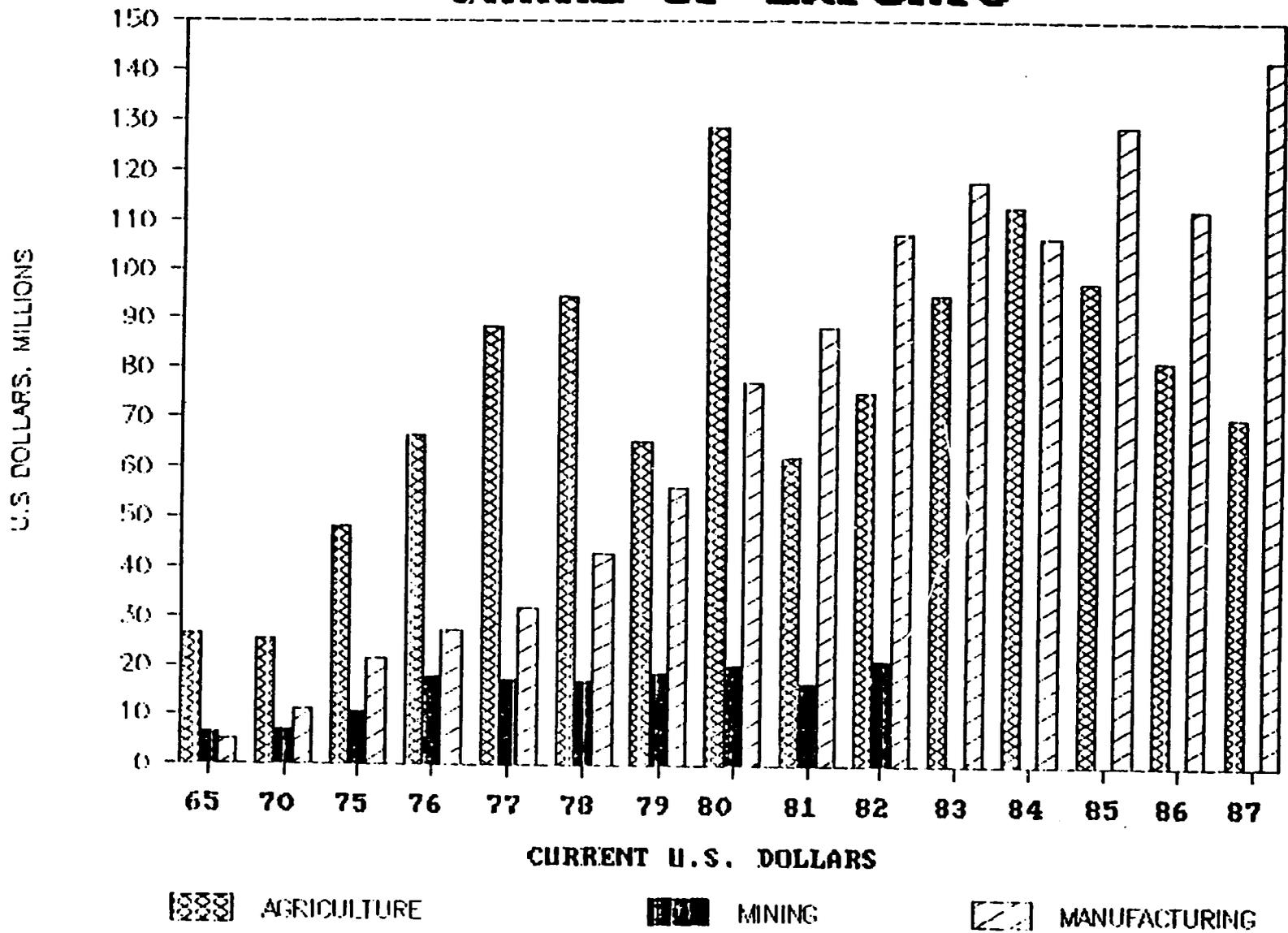
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
COFFEE														
VOLUME (MILLION KILOS)	18.7	17.8	26.8	15.9	19.1	13.5	24.9	13.5	14.7	24				
UNIT PRICE (PER KILO)	\$1.28	\$1.03	\$1.64	\$4.00	\$3.25	\$2.90	\$3.65	\$2.45	\$2.44	\$2.34				
VALUE (MILLIONS U.S.\$)	\$23.94	\$18.33	\$43.95	\$63.60	\$62.08	\$39.15	\$90.88	\$33.08	\$35.87	\$56.16	\$45.80	\$46.60	\$52.10	\$0.00
SISAL														
VOLUME (MILLION KILOS)	12.2	5.6	3.4	3.3	4.2	2.2	3.3	0.8	2.5	3				
UNIT PRICE (PER KILO)	\$0.38	\$0.57	\$0.40	\$0.31	\$0.39	\$0.34	\$0.42	\$0.62	\$0.68	\$0.66				
VALUE (MILLIONS U.S.\$)	\$4.64	\$3.19	\$1.36	\$1.02	\$1.64	\$0.75	\$1.39	\$0.50	\$1.70	\$1.98	\$0.18	\$0.38	\$0.30	\$0.24
SUGAR														
VOLUME (MILLION KILOS)	7.7	25.3	6	0	5.3	0	19.2							
UNIT PRICE (PER KILO)	\$0.22	\$0.38	\$0.25	\$0.00	\$0.44	\$0.00	\$0.33							
VALUE (MILLIONS U.S.\$)	\$1.69	\$9.61	\$1.50	\$0.00	\$2.33	\$0.00	\$6.34	\$0.00	\$0.00	\$1.70	\$0.50	\$0.00	\$0.00	\$0.00
COCOA														
VOLUME (MILLION KILOS)	1.2	0.3	2.9	1.6	2.9	2.8	2.3	2.6	1.5	2.5				
UNIT PRICE (PER KILO)	\$1.01	\$0.94	\$0.80	\$2.56	\$2.07	\$2.39	\$1.95	\$1.27	\$1.46	\$1.72				
VALUE (MILLIONS U.S.\$)	\$1.21	\$0.28	\$2.32	\$4.10	\$6.00	\$6.69	\$4.48	\$3.30	\$2.19	\$4.30	\$4.56	\$5.92	\$4.82	\$5.42
ESSENTIAL OILS														
VOLUME (MILLION KILOS)	0.4	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2				
UNIT PRICE (PER KILO)	\$16.40	\$21.60	\$25.00	\$24.50	\$31.20	\$26.60	\$27.00	\$24.50	\$28.50	\$29.00				
VALUE (MILLIONS U.S.\$)	\$6.56	\$4.32	\$7.50	\$4.90	\$9.36	\$7.98	\$5.40	\$4.90	\$5.70	\$5.88	\$5.60	\$4.30	\$4.12	\$3.88
MEAT														
VOLUME (MILLION KILOS)	0	0	0.8	0.6	0.8	1.5	0.8	1.5	0.7	0.7				
UNIT PRICE (PER KILO)	\$0.00	\$0.00	\$1.35	\$2.63	\$2.12	\$2.06	\$2.25	\$2.70	\$2.43	\$2.42				
VALUE (MILLIONS U.S.\$)	\$0.00	\$0.00	\$1.08	\$1.58	\$1.70	\$3.09	\$1.80	\$4.05	\$1.70	\$1.69	\$0.36	\$0.00	\$0.00	\$0.00

Source: 1974 to 1983 World Bank, Ag Sector Study, May, 1985. From CCSA 1982: 1974-79; IBRD 1983: 1980-83 1984-1987 USAID/Haiti.

Note: The zero figures in 1987 are somewhat misleading. The values are those reported by customs and the Central Bank. In some cases (i.e., coffee) values had not yet been reported.

FIGURE I-5

SHARE OF EXPORTS



CHAPTER II

AGRICULTURAL LAND RESOURCES AND LAND USE

A. Land Area and Land Use

The total land area of Haiti is 2,770,000 hectares, or 27,700 square kilometers. Much of the land is mountainous, with steep slopes and rugged terrain restricting agriculture and movement of people and products. Only 29% of the land has slopes of less than 10%; 63% of the area has slopes greater than 20%, and should not be farmed. Such lands, when cleared and planted, typically yield a meager crop for only one or two seasons. The shallow soil rapidly erodes, becomes unproductive and is then abandoned. Soil loss occurs quickly in Haiti's high rainfall hilly and mountainous areas. FAO estimates that 6,000 ha of "farmland" is lost to erosion each year, a loss that land-poor Haitians can ill afford.

USDA has developed a class designation system indicating land suitability for various uses, including agricultural production. It is based on soil depth, slope, texture, and other factors directly related to potential use for crops. Primarily because of Haiti's rugged terrain, only 11.3% of its land area falls within Class I, land suitable for farming with few restrictions (equivalent to USDA Class I and II). An additional 31.7% falls in Class II, not suitable for sustained cropping because of erosion hazard. This land is appropriate for tree crops and pasturage, and if put in annual crops, requires heroic measures against erosion and loss of soil fertility. Almost 55% of the land area is so denuded or steep that it is only suited for forestry or limited pasture use (Table 20).

Most of the hillside soils developed over limestone. consequently, some of the dark colored, shallower soils (degraded Mollisols of minimal depth) are more fertile than would be expected in the humid tropics. Nitrogen is the nutrient that is most often deficient. Potassium is the second most deficient nutrient in these soils.

The thickest hillside soil types include deep, well-drained soils of dark red color (Oxisols with 10R color). Red-yellow soils with lower infiltration rates and less permeable sub-surface horizons (Ultisols) are associated with the deep, well drained red soils (Oxisols). Numerous intergrades of young soils over indurated limestone, such as soils developing in recent local alluvium (Inceptisols), and shallow, dark colored soils (Entisols), are common in the hillsides.

The population of Haiti in 1982 was 5,053,791, with an estimated growth rate of 2.2%. This population density (the highest in the western hemisphere; 182 persons per km² total area, and 617 persons per km² of cultivated area, (see Table 21), causes intense pressure to cultivate unsuitable lands, merely for survival. As a result, 42.2% of Haiti's land area is cultivated, while only 11.3% is really suited to continuous

cultivation. In fact, the CEP team estimated only 204,700 ha, or 7.4% of the total land area, to be suitable for agriculture with little chance of resulting environmental degradation. By this account, more than 4 out of every 5 ha cropped in Haiti should be placed in forest, tree crops, or permanent pasture. Because of the high proportion of the population dependent on agriculture and its expected growth, it is unrealistic to think this is even a remote possibility. (See Chapter IV for more detailed discussion of population resources.)

TABLE 20
AGRICULTURAL LAND USE SUITABILITY - 1985¹

POTENTIAL USE	LAND AREA Ha	PERCENT DISTRIBUTION %
I. Good soils, few restrictions on use. USDA Class I and II	305,450	11.3
II. Good soils, some restrictions due to erosion and topography, appropriate for pasture and forest. Requires extra soil conservation measures if cropped. USDA class III, IV, and VI.	857,180	31.7
III. Mediocre, swampy, poorly drained, suitable for rice with drainage and/or irrigation. USDA class V.	63,600	2.3
IV. Soils suited to forestry, tree crops and pasture. Steep slopes, severe potential erosion. USDA class VII and VIII.	1,481,860	54.7
TOTALS	2,708,0902	100.0

1) DATPE 1984.

2) Presumably excludes metropolitan areas, reservoirs and lakes.

TABLE 21

ACTUAL AGRICULTURAL LAND USE IN HAITI, 1978

	Ha	%
Cultivated lands	870,000	31.4
Shifting cultivation within pastures	300,000	10.8
Grazing lands	530,000	19.2
Forest lands	250,000	9.0
Non-cultivated lands	820,000	29.6
TOTAL	2,770,000	100.0

Source: CEP, 1985, Table IV-2.

A singular feature of Haitian agriculture is the small size of land holdings, and the fact that one person's land may be divided among several parcels. Holdings or ownerships below one hectare comprise 59% of the total, while only 3.8% are above 5 ha (Table 22). If holdings up to three hectares are considered, the statistics are even more striking. These lands comprise 91% of all holdings, support 88% of the rural population and occupy 62% of all cultivated lands (CEP). This feature of Haitian agriculture colors all phases of land use systems, of farming, crop selection, cash flow, risk-tasking, livestock ownership, etc.

Haiti is divided into nine Departments. For statistical purposes, and because of certain shared physiographical characteristics, these may be aggregated into 4 regions (Fig. II-1). These regions are further divided into the following 3 "Domains", based on present occupation and use, not on land potential: (1) agricultural domain, (2) agro-pastoral domain, and (3) silvo-pastoral domain (Table 23).

Despite the obvious variation in topography, rainfall, geology and soils, certain demographic characteristics common to all regions become evident. For example, percent of land presently occupied as "agricultural domain" varies within rather narrow limits—from a low of 42.66% in the West region to 55.80% in the North region. This might indicate a similar distribution of "arable" lands, or conversely, it might merely indicate the upper limit of possible cultivation under a "highest population pressure" scenario. We suspect the latter to be the case.

Specialized crops are grown on only 6.4% of the land, but these occupy 20.7% of land within the agricultural domain (Table 24). Similarly, the "silvo-pastoral" domain, as presently conceived, occupies some 5,344 km², or about 20% of the total land area. The "agro-pastoral" domain comprises 49.4% of the total land area. A substantial part of the most severely eroded cropped land lies within this domain.

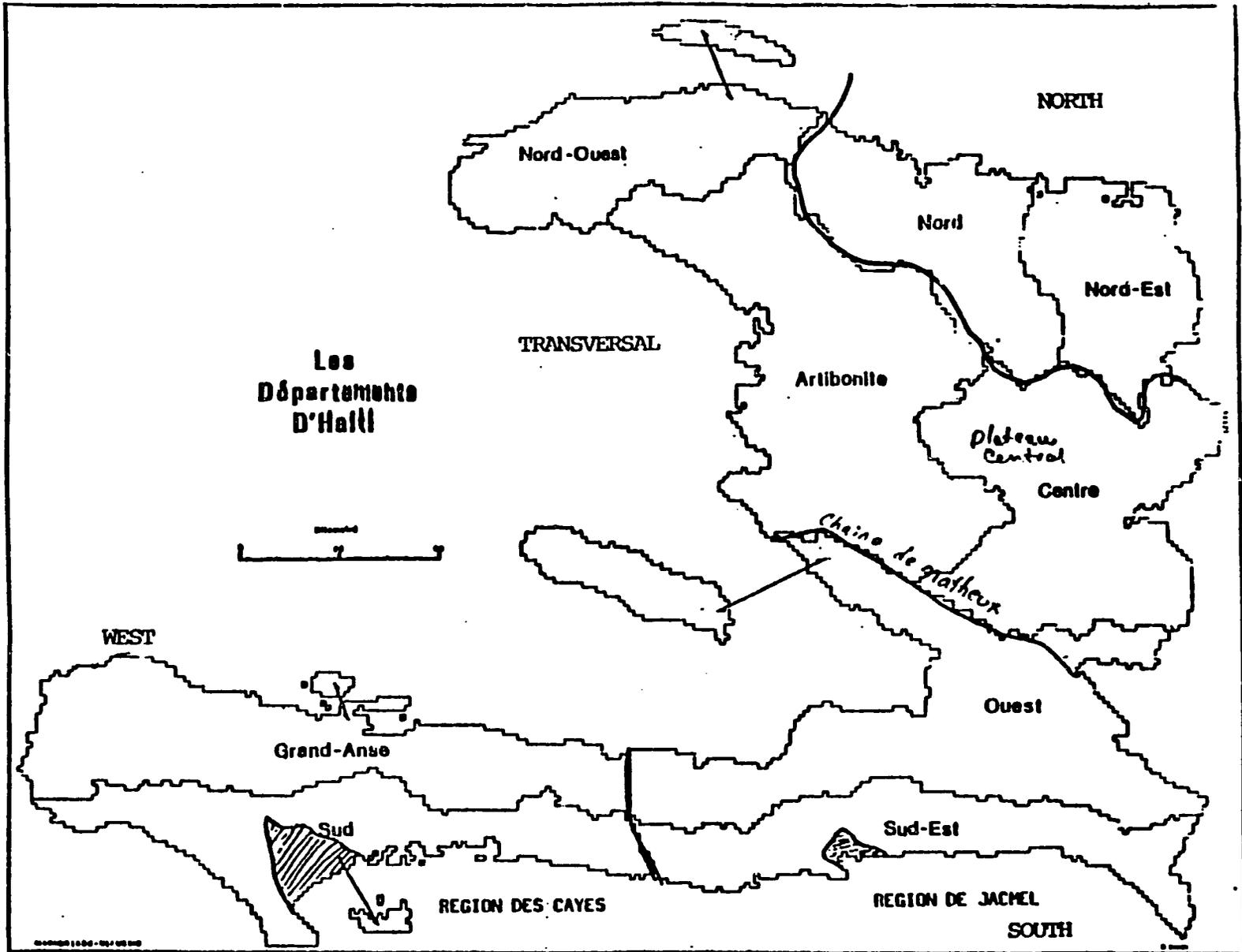
TABLE 22
SUMMARY STATISTICS ON AGRICULTURAL HOLDING (1971)

Land Holdings (by hectare)	No. of Holdings	No. of Parcels	Total Land Ha	Population	Average # of parcels per holding	Average Parcel Size (Ha)	Average # of persons per holding	Per holding size
1ha & below	361,985	530,480	184,843	1,498,020	1.46	0.34	4.15	0.51
1 to 2ha	141,930	275,510	211,940	666,180	1.94	0.76	4.69	1.49
2 to 3ha	53,600	130,400	137,359	279,990	2.43	1.05	5.22	2.56
Cumulative %	91%	84%	62%	88%				
3 to 4ha	27,370	74,390	96,762	143,800	2.71	1.30	5.25	3.54
4 to 5ha	6,440	39,340	36,790	48,000	3.47	1.32	5.68	5.71
Above 5ha	23,385	78,110	193,822	143,030	3.34	2.48	6.11	8.29
Total	616,710	1,118,230	863,516	2,779,020	1.81	.77	4.51	1.40

-40-

Source: George Anglade, Espace Haitien, 1974.

FIGURE II-1



-17-

TABLE 23

OCCUPATION OF LAND IN RELATIONSHIP TO TOPOGRAPHY

REGION	VALLEYS & PLAINS		LOW HILLS & MOUNTAINS		MOUNTAINS		PLATEAU		TOTAL	
NORTH	has.	% north	has.	% north	has.	% north	has.	% north	has.	% north
AGRICULTURAL DOMAIN	91,882	84.52%	77,506	53.28%	38,142	31.91%	3,020	91.24%	210,550	55.80%
AGRO-PASTORAL DOMAIN	6,849	6.30%	37,269	25.62%	49,800	41.73%	290	8.76%	94,208	24.99%
SILVO-PASTORAL DOMAIN	10,262	9.44%	30,694	21.10%	31,508	26.36%	0	0.00%	72,465	19.21%
Subtotal	108,993	100.26%	145,470	100.00%	119,530	100.00%	3,310	100.00%	377,303	100.00%
TRANSVERSAL	has.	% transv.	has.	% transv.	has.	% transv.	has.	% transv.	has.	% transv.
AGRICULTURAL DOMAIN	159,696	76.91%	193,638	41.58%	87,162	30.82%	9,044	17.54%	451,540	44.63%
AGRO-PASTORAL DOMAIN	37,375	18.00%	192,674	40.95%	168,668	59.64%	24,543	47.60%	423,259	41.84%
SILVO-PASTORAL DOMAIN	9,427	4.54%	82,433	17.52%	26,900	9.54%	18,036	34.98%	136,876	13.53%
Subtotal	206,498	99.45%	470,745	100.05%	282,810	100.00%	51,622	100.12%	1,011,675	100.00%
WEST	has.	% west	has.	% west	has.	% west	has.	% west	has.	% west
AGRICULTURAL DOMAIN	63,747	79.15%	78,899	28.50%	110,223	46.59%	30,841	43.34%	283,710	42.66%
AGRO-PASTORAL DOMAIN	10,470	13.00%	111,151	40.15%	100,263	42.38%	16,751	23.54%	238,635	35.88%
SILVO-PASTORAL DOMAIN	6,322	7.85%	86,789	31.35%	26,024	11.00%	23,560	33.12%	142,704	21.46%
Subtotal	80,540	100.00%	276,840	100.00%	236,509	99.97%	71,150	100.00%	665,049	100.00%
SOUTH	has.	% south	has.	% south	has.	% south	has.	% south	has.	% south
AGRICULTURAL DOMAIN	91,882	84.52%	142,919	45.94%	27,683	20.91%	12,129	47.49%	274,619	47.51%
AGRO-PASTORAL DOMAIN	6,849	6.30%	71,709	23.05%	40,150	30.32%	4,120	16.13%	122,827	21.25%
SILVO-PASTORAL DOMAIN	10,262	9.44%	96,472	31.01%	64,581	48.77%	9,291	36.38%	180,607	31.24%
Subtotal	108,993	100.26%	311,100	100.00%	132,420	100.00%	25,540	100.00%	578,053	100.00%
TOTALS	has.	% total	has.	% total	has.	% total	has.	% total	has.	% total
AGRICULTURAL DOMAIN	407,207	80.63%	494,963	41.10%	263,216	34.13%	55,033	36.29%	1,220,419	46.37%
AGRO-PASTORAL DOMAIN	61,543	12.19%	412,303	34.28%	358,960	46.54%	45,703	30.14%	879,009	33.40%
SILVO-PASTORAL DOMAIN	36,274	7.18%	296,389	24.61%	149,093	19.33%	50,895	33.57%	532,651	20.24%
TOTAL HAITI	505,023	100.00%	1,204,155	100.00%	771,269	100.00%	151,632	100.00%	2,632,079	100.00%

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Source: Adapted from Country Environmental Profile, 1985.

Notes: Some of the figures have been adjusted from the original for consistency with those produced in the table on Occupation of Land by Use Category. Discrepancies still remain, however, most notably in the transversal and west regions.

TABLE 24

OCCUPATION OF LAND BY USE CATEGORY
(square kilometers)

TYPE OF LAND USE	NORTH	TRANSVERSALE	WEST	SOUTH	MAITI
SPECIALIZED CROPS	371.1	605.3	318.9	413.4	1700.7
RICE	42.8	316.0	46.8	63.6	469.2
SUGARCANE	126.7		144.5	81.7	352.9
AGRI-CULTURAL DOMAIN	48.4	265.6	28.0	162.4	504.4
ANNUAL IRRIGATED	48.4	265.6	28.0	162.4	504.4
BANANA	0.0	0.9	42.9	12.3	56.1
SISAL	153.2	22.8	56.1	17.6	249.7
VETIVER	0.0	0.0	0.0	72.0	72.0
COCONUT	0.0	0.0	0.6	3.8	4.4
TREE CROPS DOMINANT	413.0	725.9	460.9	396.3	1996.1
FOOD CROPS IN (c)	267.5	168.4	281.5	168.5	900.9
ASSOCIATION	145.5	557.5	179.4	212.8	1095.2
TREE CROPS SPARSE	846.7	1728.6	1094.8	861.0	4531.1
ASSOCIATED FOOD	553.1	1462.9	577.9	535.7	3129.6
CROPS DENSE (a)	293.6	265.7	516.9	325.3	1401.5
TOTAL AGRICULTURAL	1630.8	3059.8	1874.6	1670.7	8235.9
AGRO-PASTORAL DOMAIN	474.7	1629.8	962.5	979.8	4046.8
FOOD CROPS DENSE					
TREE COVER OPEN	474.7	1629.8	962.5	979.8	4046.8
FOOD CROPS MODERATELY DENSE					
IN PASTURE & NATURAL VEGETATION	438.1	1663.2	1437.2	837.3	4375.8
FOOD CROPS DISPERSED					
PASTURE & NATURAL VEGETATION	196.8	1777.8	564.1	319.7	2858.4
ESTENSIVE PASTURE					
HERBACEOUS SPECIES DOMINANT	305.1	1244.9	385.0	27.4	1962.4
TOTAL AGRO-PASTORAL	1414.7	6315.7	3340.8	2164.2	13243.4
SILVO-PASTORAL DOMAIN	183.7	990.0	1053.6	644.1	2879.4
Savannah WITH TREES	183.7	990.0	1053.6	644.1	2879.4
TREES LOCALIZED	44.8	56.1	109.1	124.9	334.9
TREES DENSE	3.0	61.3	12.4	41.6	118.3
TREES SPARSE	12.7	443.3	316.5	219.1	991.6
TREES VERY SPARSE	123.2	437.3	615.6	250.5	1434.6
BROAD LEAF FOREST	397.3	253.6	104.1	1064.8	1819.8
DENSE	13.3	58.6	31.4	116.1	219.4
SPARSE	265.0	29.9	15.0	312.6	620.5
VERY SPARSE	119.0	165.1	59.7	636.1	979.9
PINE FOREST	94.6	74.2	252.4	52.6	473.8
DENSE	9.8	27.9	53.8	0.0	91.5
SPARSE	84.8	46.3	93.5	22.4	247.0
VERY SPARSE	0.0	0.0	105.1	30.2	135.3
MANGROVE	49.1	43.1	17.7	61.6	171.5
TOTAL SILVO PASTORAL	724.7	1368.9	1427.8	1823.1	5344.5
TOTAL ALL DOMAINS	3770.2	10744.4	6651.2	5658.0	26823.8

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Source: CEP; 1985
(c) INDICATES COFFEE PREDOMINANT

Currently, the ADS-II project is developing a national agricultural survey system based on the area sampling frame methodology originally developed by the USDA. The survey utilizes an open-segment area frame methodology to obtain estimates of crop areas and yields, animal numbers and related socioeconomic variables associated with agricultural households (ADS-II, 1987). The stratification scheme used for the national survey relies upon aerial photographic interpretation and delineation of up to seven strata within each Department. The strata used are intensive plain, extensive plain, intensive mountain, extensive mountain, urban, village and water. In addition, the ADS-II program is developing a Comprehensive Resource Inventory and Evaluation System (CRIES). The CRIES uses a Geographic Information System (GIS) which permits digitizing maps so that all types of socioeconomic, natural resource, physical, production, or other data can be evaluated by geographic areas.

The GIS format uses 300 m² cell sizes for the national system and 100 m² cell size for regional mapping. The latter permits blowing maps up to identify primary roads, secondary roads or tracks for example, or to input data on schools, health facilities or irrigation systems. The ADS-II project has used BDPA 1:100,000 maps developed in 1982 to map watersheds, sub-watersheds and elevation contours. Political boundaries are input from IHS 1:50,000 maps. Eventually, this system should provide information on land use, soil potential, elevation, slope and slope direction (aspect) as well as specific socioeconomic information on all areas of the country, i.e., population densities by zone, cultivation intensity, cropping patterns, and livestock production. Unfortunately, at this time (November 1987) the project has only completed the evaluation of the stratification system used to determine land use, soil potential, Holdrige classifications, elevation, slope and aspect for the Department of the South.

The ADS-II project has completed the national survey of agriculture on the four southern Departments of Haiti; Departement du Sud, Departement de la Grande-Anse, Departement de l'Ouest, and Departement du Sud-Est. This survey identifies crop acreage for 22 different food crops both in monoculture and in associated culture, livestock numbers and types and fruit and industrial crops.⁹ Data from the survey show 131,300 hectares of mono-crops in the four departments and 467,900 hectares of crops grown in association. Although it is dangerous to extrapolate to the national level, these preliminary data suggest that the amount of land in cultivation is probably currently greater than the amount which was estimated above.

9. This includes the essential oil vetiver, coffee, cocoa, cotton, tobacco and sisal.

B. Water and Forest Resources

1. Watersheds

Steep slopes, shallow soils and high--often torrential--rainfall combine to cause high flood peaks and low base flows in most Haiti watersheds. Water yield is a combination of overland flow and subsurface or base flow. When rainfall strikes the ground surface, a portion infiltrates the soil surface and permeates the soil mass below. The amount entering and stored in the soil is a function of soil surface conditions, soil permeability and soil depth. The better the cover of vegetation or litter, and the deeper the soil mass, the more water will penetrate and be stored in the rock mantle as groundwater. The amount of rainfall that exceeds the infiltration rate and soil storage capacity is called overland flow.

Most Haiti watersheds exhibit extremely high peak flows and undesirably low base flows--common features of degraded watersheds. For example, Riviere Artibonite at Mirebalais recorded a maximum discharge of 2,500 m³/sec, and a minimum discharge of 8.4 m³/sec during the period 1922-1940, before construction of Peligre dam. Mean discharge was 86.9 m³/sec; thus, peak discharge was almost 29 times mean flow, and almost 300 times low flow--a certain indication that watershed deterioration was well advanced at least 50 years ago (Table 25).

The Upper Artibonite river basin performs two nationally important functions for Haiti. First, it is the major supplier of hydroelectric power to Port-au-Prince and other major population centers since the construction of a 16 megawatt generation facility in 1972. It is now the major source of electrical power, and its replacement with any alternate power source would place a severe strain on the Haitian economy. Second, water stored in Lac de Peligre serves not only for power generation, but for irrigation of the fertile lower Artibonite plain, a major producer of agricultural crops for both export and domestic use. Continuation of both these functions is wholly dependent on successful conservation measures in the watershed basins above Peligre Dam.

Peligre Dam was constructed in 1956. Surface area above the dam is 6,612 km², of which 4,200 km² or 63.5% lies in Haiti. Original storage volume was 607 million cubic meters, of which 469 million was utilizable and 138 "dead" storage. Expected sedimentation was 3,450,000 cubic meters per year, giving an expected life of about 175 years. This figure, however, does not recognize that the facility becomes less effective for power generation and delivery of irrigation water as the reservoir becomes progressively silted up, especially during low river flow periods (dry seasons, droughts) when water delivery is most needed. The basis for this expected sedimentation rate was the period 1925-1926, some 30 years before construction of Peligre.

TABLE 25
RIVER DISCHARGES

RIVER	SOURCE OF DATA	SITE OF CLEARED LANDS	YEARS OF DATA	MEAN DISCHARGE m ³ /sec	MAXIMUM DISCHARGE m ³ /sec	MINIMUM DISCHARGE m ³ /sec
Trois Rivières		Pauline Lacorne	1965-67	13.13	527.00	2.65
		Pont Gros Morne	1923-40; 1962-67	6.95	1500.00	0.30
		Plaisance	1922-40; 1962-67	0.87	193.00	0.01
Rivière Limbe	•	Roche à l'Inde	1922-40	4.29	458.00	0.10
Ude. Rivière du Nord	•	Pont Parois	1922-40	3.41	9.41	-
Rivière MASSACNE	•	Ouananthe	1922-40	5.34	450.00	0.05
Rivière BUYANA	•	St-Raphael	1922-40	3.41	9.41	-
Rivière Guayanoua	•	Hinche	1926-31	25.52	900.00	0.90
Rivière Artibonite	•	Hirebalais	1922-40	86.90	2500.00	0.40
Rivière Artibonite	•	Pont Sonde	1922-40	101.40	850.00	11.10
Rivière Esterc	•	Pont Estere	1965-67	18.76	95.30	1.85
Rivière Fer-à-Cheval	•	Pont Petion	1923-31	11.85	700.00	0.73
Rivière Blanche	•	La Oorge	1922-40	1.97	200.00	0.65
Rivière Grise	•	Am. Bassin Gen.	1919-40	3.97	475.00	0.31
Rivière Pedernales	•	Anse-à-Pitre	1929-30	0.46	0.01	0.06
Rivière Marigot	•	Peredot	1928-30	2.42	79.00	0.07
Rivière de Jacmel	•	Jacmel	1926-31	4.67	800.00	0.12
Rivière Nomance	•	Amont Barrage	1920-40	5.88	420.00	0.60
Rivière Cotes de Fer	•	Cotes de Fer	1928-30	0.27	7.50	0.00
Rivière Cavillon	•	Cavillon	1922-41	9.42	1035.00	0.70
Rivière Islet	•	Charpentier	1923-31	2.52	500.00	0.66
Rivière Torbec	•	Torbeo	1923-31	2.66	100.00	0.39
Rivière Ravine du Su	•	Camp Perrin	1923-35	4.88	350.00	0.20
Rivière Grande Anse	•	Passe Ranja	1925-35	26.85	650.00	0.70
Rivière Voldroque	•	Passe Larque	1928-30	6.07	60.00	0.52
Rivière Limbe	•	Pont Christophe	1922-30	7.10		0.30
Rivière Gallois	•	Orison Garde	1922-31	0.44		-0.07
Rivière Estere	•	Pont Benoit	1922-31	3.95		0.00
Rivière Bois	•	Verrettes	1924-31; 33; 35-40	2.58		0.00
Rivière La Thèse	•	Passe Fine	1923-31	4.76		0.04
Rivière Montrouais	•	Pont Toussaint	1924-30	1.84		0.15
Rivière Torcelle	•	Messaye	1922-41	1.15		0.00
Rivière Courjol	•	Bassin Proby	1922-39	1.23		0.30
Rivière Matheux	•	Archaie	1922-36	1.50		0.40
Rivière Islet	•	Cayes	1923-31	2.60		1.64
Rivière Aoul	•	Carr. Valere	83 est.	3.70		-

Sources of Data: OAS, Haiti-Mission d'Assistance Technique Integree, 1972.
 HARZA, Water Resources Study for Haiti, 1979.
 SHELADIA Associates, Integrated Agricultural Development Project: Dubreuil, 1983. From Country Economic Profile: Haiti, 1985.

Bathymetric measurement of accumulated sediment in Lac de Peligre by 1978 totaled 135 million cubic meters, or 6.6 million cubic meters per year since construction—almost twice the expected rate based on the 1925-26 period. By 1985, sediment load had increased to 184 million cubic meters, or an increase for this seven-year period to 7 million cubic meters per year. Obviously, the annual sediment burden is increasing, and unless something is done immediately, Peligre will be ineffective before the year 2,000 (MARNDR, 1987).

Land use in the Upper Artibonite Watershed is heavily slanted toward food crops—an obvious necessity to support the 485,700 persons estimated to live there in 1986. There is 0.86 ha total land area per person, of which about 0.39 ha is cultivated. Dense food crop cultivation and fruit trees occupy 44.8% of the land, forests only 1.2% (Table 26). Of the 17 sub-watersheds within the Upper Artibonite, 5 are without any forest cover, and 5 contain no dense orchards of coffee or cocoa (Table 26a). At present, 61% of the area is in some kind of tillage (exclusive of cocoa or coffee)—probably double the area suitable for such cropping. This intensity of use, coupled with current (traditional) cropping techniques, has resulted in the present erosion status of the watershed. Current estimates show 65.2% of the basin area to be severely eroded (Table 27). Of the 17 sub-watersheds, percent of land within the severe erosion class varies from a low of 52% (Guayamouc) to a high of 96% (Felician) (Table 27a, 27b).

The Upper Artibonite (above Peligre) is not environmentally unique in Haiti, but is better known because of its vital hydroelectric and irrigation importance. Data on physical factors of the environment, agriculture, rainfall, water yield and, above all, sediment yield are available in some detail. While it is risky to extrapolate erosion problems and sediment yield to other watersheds, it is likely that other similar upper watershed areas of comparable slopes, rainfall, land use and vegetative cover differ only in degree from the Upper Artibonite. Examination of the maximum/minimum discharge ratios of other major watersheds suggests that the Upper Artibonite is, indeed, rather typical (Table 27).

With new dams for sediment entrapment and hydropower planned, fresh emphasis must be placed on agricultural development and concurrent conservation measures on all watersheds above the reservoir. Inclusion of two new control dams on high sediment-yielding sub-watersheds are at best only a temporary stop-gap measure to prolong Peligre's effective life by a few years. Improvement of pastures, with a component of tree and shrub planting, is a likely strategy to reduce current erosion, as some 70% of the area should not be tilled because of slope constraints (Coffey and Lewis, 1984). Meeting this goal, if indeed it is realistic, will require changing some presently-tilled land to pasture and/or tree crops—a difficult task, given the present population pressure on cultiv-

TABLE 26
LEGENDE DES CLASSES D'OCCUPATION DU SOL

Unite de Classification	Description	% de la Surface Totale	Hectares
A	Verger dense avec Cafe et Cacao	10,4	43 535
B	Zones erodees ou paturages	16,6	69 685
C	Polyculture vivriere diversi- ficee dense. Arbres fruitiers abondants	44,8	188 098
F	Foret de Pins et Feuillus	1,2	5 158
P	Paturage	20,5	86 203
R	Delaisse de riviere et affleurement rocheux	6.5	27 391
TOTAL		100,0	420 070

Source: MARNDR, Projet d'Amenagement et de conservation des sols et des eaux dans le bassin du Haut Artibonite, Vol. 1, 1987.

TABLE 20a

OCCUPATION DU SOL PAR SOUS-BASSIN
(en hectares)

No.	Sous-Bassin	A	B	C	F	P	R ¹	Total
1	Bouyaha	14261	10400	36717	1054	11454	6234	80120
2	Libon	8210	5167	1949	1056	7288	0	29670
3	Lociane	806	6496	5143	1084	14509	1132	29170
4	Samana	0	2746	4000	60	5531	1393	13730
5	Canot	3385	16212	45434	227	12481	5591	83330
6	Fond Bleu	8427	1737	3898	347	4028	543	18920
7	Rio Frio	1210	1637	5606	40	1528	129	10150
8	Guayamouc	0	12197	40692	0	5242	8539	66670
9	Nord Artibonite	0	1067	298	0	4722	63	6150
10	Sud Artibonite	0	1432	2338	0	970	0	4740
11	Thomonde	390	2509	12423	0	4258	680	20260
12	Cange	0	1926	1936	20	608	710	5200
13	Felician	0	241	3136	0	1496	97	4970
14	Peligre*	259	2510	9534	31	5342	1774	19450
15	Lascahobas	1206	1279	6167	468	250	0	9370
16	Roche Blanche	1008	436	977	572	260	177	3430
17	Onde Verte	4373	1693	7850	199	6236	329	20680
Total		43535	69685	188098	5158	86203	27391	420070
%		10.4	16.6	44.8	1.2	20.5	6.5	100

* Les 3000 hectares de surface du Lac de Peligre ne sont pas inclus.

1 Les differents modes d'occupation ont ete groupes en six (6) unites qui sont decrites comme suit:

- A. Verger dense avec cafe et cacao. Banane et igname y sont souvent associes. Le cafe et le cacao sont generalement produits dans les zones elevees ou montagneuses; les plantations sont souvent dispersees sur de tres grandes etendues de maniere a profiter au maximum des petites parcelles de sol les plus favorables. Par consequent, ces larges etendues sont classifiees comme zones productrices de cafe et de cacao en tant que principales cultures.
- B. Zones erodees ou paturages. Polyculture vivriere dispersee. Dans ces zones, ravins, petites parcelles en paturages et petites parcelles cultivees sont si etroitement melanges qu'il est quasi impossible de les identifier separement.
- C. Polyculture vivriere diversifiee dense. Arbres fruitiers abondants. Ce mode d'occupation est observe sur les pentes et les sols les plus favorables et represente les zones les plus productives de l'aire du projet. Seulement de petites parcelles dispersees sont en paturage ou en jachere.
- F. Forets de Pins et Freuillus. Ce type de vegetation occupe un peu moins de un pour cent (1%) de l'aire du projet. Les parcelles sont petites, dispersees et pratiquement inaccessibles.
- P. Paturage naturel. Ce sont les terres supportant une vegetation herbacee. Les sols sont generalement peu epais, pauvres en elements nutritifs et impropres meme a une agriculture de subsistance. A l'interieur de ces zones, des petites parcelles eparses, trop petites pour etre delimites, beneficent de conditions favorables a l'accumulation de terre et sont utilisees pour la culture.
- R. Delaisse de riviere et affleurement rocheux. Ce sont des aires situees le long des lits des rivières et celles ou la roche mere affleure.

TABLE 27
LEGENDE DES CLASSES D'EROSION

Classe d'Erosion	Description	% de la Surface Totale	Hectares
N	Legere. Erosion en nappe presente, mais peu importante	10,5	44 060
M	Moderee. Erosion en nappe et en rigole evidente; reseau de talwegs denses	24,3	102 101
S	Forte. Erosion en ravine active; reseau de talwegs tres denses	65,2	273 909
TOTAL		100,0	420 070

Source: MARNDR, Projet d'Amenagement et de conservation des
sols et des eaux dans le bassin du Haut Artibonite,
Vol. 1, 1987.

TABLE 27a

**CLASSES D'EROSION PAR SOUS-BASSIN
EN HECTARES**

No	Sous-Bassins	Classes			Total
		Legere	Moderee	Forte	
1	Bouyaha	14577	18348	47215	80120
2	Libon	480	3370	19820	23670
3	Lociane	1180	2025	25965	29170
4	Samana	637	2666	10427	13730
5	Canot	14836	23382	45012	83330
6	Fond Bleu	0	5407	13573	18980
7	Rio Frio	0	2927	7223	10150
8	Guayamouc	4831	26971	34968	66670
9	Nord Artibonite	173	162	5815	6150
10	Sud Artibonite	154	281	4305	4740
11	Thomonde	850	4528	14882	20260
12	Cange	0	1906	3294	5200
13	Felician	0	212	4758	4970
14	Peligre*	1556	2023	15871	19450
15	Lascahobas	2028	385	6957	98700
16	Roche Blanche	447	894	2089	3430
17	Onde Verte	2231	5614	11235	20680
Total		44060	102101	273909	420070
		10.5	24.3	65.2	100

* Les 3000 hectares de surface du Lac de Peligre ne sont pas inclus

Source: MARNDR, Projet d'Amenagement et de conservation des sols et des eaux dans le bassin du Haut Artibonite, Vol. 1, 1987.

TABLE 27b

APTITUDE A L'EROSION (%)

Sous-Bassins	Legere	Moderee	Forte	Total
Bouyaha	18.2	22.9	58.9	100.0
Libon	2.1	14.2	83.7	100.0
Lociane	4.0	6.9	89.1	100.0
Samana	4.7	19.4	75.9	100.0
Canot	17.9	28.1	54.0	100.0
Fond Bleu	0.0	28.5	71.5	100.0
Rio Frio	0.0	28.8	71.2	100.0
Guayamouc	7.2	40.5	52.3	100.0
Nord Artibonite	2.8	2.6	94.6	100.0
Sud Artibonite	3.3	5.9	90.8	100.0
Thomonde	4.2	22.3	73.5	100.0
Cange	0.0	36.7	63.3	100.0
Felician	0.0	4.3	95.7	100.0
Peligre	8.0	10.4	81.6	100.0
Lascahobas	21.6	4.2	74.2	100.0
Roche Blanche	13.0	26.1	60.9	100.0
Onde Verte	10.8	32.0	57.2	100.0
Total	10.5	24.3	65.2	100.0

Source: MARNDR, 1978.

able land. Improvement of the small units of land in pasture, including especially areas of "Madame Michel" gran (Themeda quadrivalva) with more palatable and productive grasses, offers some possibility, especially in conjunction with the use of crop residues as forage supplements. The large area in tillage (44.8%) must be reduced if possible, or at least be tilled with the most careful conservation practices available to avoid continuing irreparable damage to downstream users.

Recommendations:

1. In order to protect present and planned dams and engineering works, and to insure continued usable river flow and storage for hydropower and irrigation, special emphasis should be given to soil conservation, erosion-reduction, and appropriate agricultural development in the Upper Artibonite Watershed, and in other areas of unique national importance.
2. Emphasis should be placed on cultural systems that will maintain or improve agricultural production on small hillside peasant land holdings, including but not limited to such practices as increased use of tree crops, alley cropping on the steeper cultivated slopes, use of legumes to improve fertility, introduction of improved pasture grasses and legumes, and livestock production for on-farm use (CARITAS d'Haiti, 1987).

2. Irrigated Land

a. Land Currently Under Irrigation

The land under irrigation in Haiti is usually estimated at between 80,000 and 85,000 hectares. These area estimates can only be approximate as several irrigation systems are not surveyed and are not under control of the government services. Even for areas that are supposedly under the jurisdiction of the government insofar as government is responsible for their operation, management and maintenance, the actual land surface irrigated is not always known exactly. In some cases it appears that the land surface is a gross figure that defines a geographical area. However, within that area the net surface under irrigation may be considerably less. In addition to roads, dikes and canals, most areas are dotted with houses and other structures, and many non-irrigable outcrops of rock or high places may exist.

According to Utah State University, a detailed inventory of existing systems was done in 1972 by OAS. This survey, covering the main plains and valleys, listed 106 systems covering about 75,000 hectares. USU noted a 1983 report that showed the Irrigation Service of the Department of

Agriculture controlling 71 of those systems in an area covering 48,000 hectares and serving 36,000 families. In February 1984 another report was quoted as saying that DARNDR controlled 128 systems covering 95,880 hectares serving 80,699 users. USU believed that the irrigated area in Haiti was between 90,000 and 110,000 hectares in 1984.

In a study on the factors in irrigation management and the potential for water users associations, Ann B. Hauge (Hauge, 1984) listed the irrigated areas by agricultural district in Haiti under the supervision of MARNDR for the year 1983-84. These data are given in Table 28. In addition to these areas we need to add the area under the auspices of the ODVA (Office de Developpement de la Vallee de l'Artibonite). According to the director of ODVA, in May of 1987 there were a total of 20,000 hectares under totally controlled irrigation in the ODVA area and 4,000 hectares of land in uncontrolled flood irrigation.

Other areas may also be outside of the jurisdiction of the agricultural districts due to their special status within a development project or authority. For example, the land listed on Table 28 for Gonaives should include the irrigated land of the ODPG (Office de Developpement de Plaine de la Gonaives); however, it is not clear from the reports if this is the case. ODPG controls 2,750 gross hectares irrigated from 39 boreholes, with approximately 2,300 hectares of net irrigated land.

Further areas may be excluded from the agricultural districts' figures because they are farmer-owned and operated. In Jacmel, Hauge reports that there are six small systems of less than a hundred hectares each (op cit.). These may be included in Table 28, but it is not clear. In St. Marc, there are about ten small systems of less than 150 hectares each according to Hauge. These may be included in the agriculture district figures, but again the reports do not specify this. In another case, Hauge reports that in Fer-a-Cheval near Mirebalais farmers built a system of between 1,000 and 1,500 hectares in 1965, after the MARNDR built one for Desvarieux-Gascogne in 1955. Neither of these systems seems to be included in the data in Table 25. There are also irrigated lands in the Plaine du Nord area of unknown hectarage. Apparently, a system existed that irrigated approximately 4,000 hectares from a dam/reservoir. This dam broke in 1979 and the present area irrigated has diminished considerably, with the St. Raphael system irrigating about 2,400 hectares. At the current time the ODPN (Office du Developpement du Plaine du Nord) is constructing one medium-sized system of about 200 hectares.

TABLE 28

IRRIGATED LAND AREAS IN THE DIFFERENT AGRICULTURAL DISTRICTS

District	Number of Habitations	Number of Users	Area in Hectares	Area per User (HA)
Port-au-Prince	18	1,012	1,228.15	1.21
Croix des Bouquest	106	9,600	13,380.03	1.39
Thomazeau	35	3,160	5,140.51	1.63
Arcahie	82	7,845	6,525.19	0.83
Leogane	72	2,658	2,618.89	0.99
Petit Goave	9	567	289.46	0.51
Jacmel	72	2,218	1,151.17	0.52
Gonaives	130	8,984	5,888.86	0.66
St. Marc	52	1,991	1,773.29	0.89
Mirebalais	8	152	229.79	1.51
Cayes	126	4,157	3,791.58	0.91
Totals	710	42,344	42,016.92	0.99

Source: Irrigation Service, MARNDR; from Hauge, 1984.

As a result of these discrepancies and data gaps, from what is known at the current time, we can only give the approximate area irrigated as shown in Table 29. In addition, there are reportedly several other small systems that may not be more than 10 to 100 hectares each, taking their water from springs or small streams. These may be only supplying water under a partly controlled system and may provide irrigation for only one crop. For example, Harza in 1979 noted that 141 hectares were irrigated in the Moustiques Vallee area, which is not shown elsewhere. In the same study, Harza notes that there were 130 areas that had been irrigated or have potential for irrigation, and that in 1978 there were an estimated 75,000 hectares under irrigation.

b. Irrigation Potential

The potential for irrigation depends on the soils and their topography, the source and quantity of water and the cost of developing the area for irrigation. The USU study noted that "the best lands and easy-to-tap water sources have already been developed. Additional areas will become ever more expensive to bring under control" (USU, 1985). The same report also noted that "the hydrologic data have not been defined in potential irrigation terms". On the basis of existing systems, areas irrigated in the past and land potential, an estimate of irrigable area can be made. The USU team cited reports and data from FAO and the DATPE photo interpretation work indicating that 3,974 square kilometers in the plains and valleys areas in Haiti "are utilized for irrigation in some way". What this means exactly is unclear. Certainly, there are not 397,400 hectares of irrigated lands. If this implies lands that receive water in some way other than by direct rainfall, such as flood or flood diversion, spring diversion, formal irrigation or some other method, it might be true. However, it is doubtful. The USU report notes that the two zones (valleys and plains) contain about 3,054 square kilometers of class Ia soils, most of which would have possibilities for irrigation since topography would not be limiting. Most likely, the report meant that 3,974 km² are used for crop production in some way. The USU report gives 1,572 km² in specialized crop production versus about 1,708 km² estimated in the CEP report. According to USU, the DATPE study estimated that about 2/3 of the smaller figure was in irrigated rice or annual crops (about 105,000 hectares). USU further notes that "even high estimates of irrigated area are well below the low estimate of 2,050 km² of Ia land".¹⁰ In no other data sources have we seen any estimates of irrigation in Haiti

10. Clearly the USU report has made a typographical error. Our emphasis.

ever exceeding 140,000 to 180,000 hectares; all of these referred to the pre-independence period and none cited specific sources of measurement or utilization.

A 1975 socioeconomic report and the government's Five Year Plan for 1981-1986 listed total potential for irrigation at 125,000 hectares. A 1984 IICA survey estimated potential as 144,000 in 231 systems, sub-systems and water source locations. It seems safe to say that the potential for irrigation as defined by the various observers is somewhere in the neighborhood of 125,000 to 180,000 hectares. The main criterion for inclusion used in these studies and reports seems to be that land is adequately flat so that it does not require major leveling and is also near a source of water. The main difference in the area estimates, then, is primarily a function of the cost of developing the system.

One thing is clear: the estimates of irrigable land are more constrained by the availability of a reliable source of water that can be directed to the land for a reasonable cost than by the availability of land. Thus, for example, the large areas along the coast in the north from Cap Haitien to the Dominican border are never totally included as having potential for irrigation.¹¹ The second consideration seems to be the ability to develop irrigation as a flood, small basin or furrow system. In no reports have systems using sprinkler, drip or other methods been considered, although this may be the best method to use on sloping, rocky lands with limited irrigation water.

TABLE 29

ESTIMATES OF LARGE IRRIGATION SYSTEMS

<u>Source/Area</u>	<u>Area in Hectares</u>
Agricultural Districts/(Table 26)	42,020
ODVA	
Complete control	20,000
Limited control	4,000
ODPG ? pumped	2,300
Plaine du Nord?	2,400
Fer-a-Cheval?	1,250
Jacmel?	500
St. Marc?	<u>1,250</u>
Total	73,720

Source: Hauge, 1984, Mission Estimates.

 11. For example, the Dauphin farm is a dry, undulating plain covering about 19,000 hectares, which could certainly grow some crops under irrigation, but does not appear to be included in potential areas.

There are several rivers in Haiti which are used for irrigation purposes. Other rivers could possibly have some potential for irrigation in terms of water flow. Table 25 gives a list of some of the major rivers and their discharges. Of these, only the Artibonite basin rivers are impounded, and their live stored water at the Peligre dam is used for irrigation (and hydropower) purposes. As can be noted from the Table, the difference between maximum, mean and minimum discharges of the rivers is enormous. Baseflows, which usually represent the water available for irrigation without storage, determine the amount of land that can be irrigated from a river system. To determine the amount of land that can be irrigated, several factors must be taken into consideration. First, the amount of water available is not necessarily a function of mean or minimum flows in the river. In some of the steep terrain in Haiti, some rivers may experience minimum flows every 24 hours regardless of season. Some may see both maximum flows and minimum flows within the same twenty-four hour period. This is due to the fact that some rivers are extremely short and steep, as can be seen in Table 30. Thus, heavy rains immediately translate into high flow volumes, and volumes drop rapidly when the rain stops. Therefore, the amount of water available during any irrigation period may be considerably greater than indicated in the minimum flows. Secondly, the crop requirements vary considerably throughout the year, depending on crop maturity and evaporation. Flow over a crop season is therefore important in determining potential irrigation area.

Baseflows usually are derived from the water release rate from the soils and aquifers of a watershed. The amount of rainfall that enters the soil and aquifer is dependent upon the permeability of the soil and base material under a watershed, and the length of time that water can be held on the slope in order to infiltrate the soil. Therefore, it is generally true that the amount of water available for irrigation is dependent upon the plant cover on a watershed, as plant cover impedes run-off. Intensive clearing of land for lumber, firewood and crop land have denuded many of the slopes in these watersheds. Thus, it is expected that the run-off is increased. This would have the effect of increasing the maximum discharges and decreasing the minimum discharges shown in Table 25, as those data were mostly collected in the 1920-1940 period. In addition to making the flows of water less reliable, these higher flood flows move sediment and rock down the watercourses, making maintenance of irrigation structures difficult and expensive. This is obvious on the Rivers Grise and Blanche in the Cul-de-Sac, and in the Grand Ravine du Sud where clearing the irrigation

TABLE 30
PRINCIPAL CATCHMENT AREAS OF HAITI

THE MAIN RIVER	AVERAGE RUNOFF (mm/sec)	LENGTH (kms)	CATCHMENT AREA (sq. kms.)
ARTIBONITE	34.0	280	6,862
RIVIERE DE LA GRANDE-ANSE	27.0	90	556
RIVIERE DE L'ESTERE	19.0	?	834
LES TROIS RIVIERES	12.0	102	897
RIVIERE DE CAVILLION	9.0	43	380
GRANDE RIVIERE DU NORD	7.0	70	312
RIVIERE DU LIMBE	6.4	70	312
RIVIERE MOMANCE	6.4	53	330
GRANDE RAVINE DU SUD	3.9	34	330
RIVIERE L'ACUL	3.3	?	290

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Source: CEP, 1985. Data taken from Library of Congress Draft Environmental Report, 1979.

canals of sediment and rubble constitutes a major annual expense.

Another impact of rapid run-off would be reduced amounts of water recharging the deep aquifers that might be tapped for domestic or irrigation uses. Unfortunately, the actual quantity of water available for irrigation from aquifers is not known. The USU study, using data from the 1979 Harza report, estimated that the land that could be irrigated from the 92 aquifers in Haiti could not exceed 4,900 hectares. This figure seems somewhat conservative. We know that at present the Gonaive plain is irrigating a net surface of 2,300 hectares from 39 boreholes in one aquifer. Although the director of the ODPG said that wells they monitor indicate a slight drop in the water table, they felt that a balance with recharge was about reached. In the Cul-de-Sac we know that 19 boreholes serve farmers on about 1,150 hectares. In addition, the HASCO lands drew heavily from the same aquifers. Given the porosity of the parent rocks of Haiti and the heavy rainfall, it seems likely that the aquifer capacity and the recharge should offer a greater irrigation potential than is indicated in the Harza data. The main concern is to prevent reducing the freshwater volume now stored in the aquifer and therefore causing salt intrusion in the lower coastal plains.

Recommendation:

1. Funding should be provided to obtain baseflow data for each of the major rivers of Haiti.
2. There should be an engineering feasibility study of each watershed for which there is considered to be significant irrigation potential.

3. **Forest Resources**

Broadleaf and pine forests (*Pinus occidentalis*) covered 75% of Haiti in areas with more than 1,000mm rainfall in the period before European discovery. The remaining drier areas along the western, southeastern and northeastern coasts and in the Cul-de-Sac probably supported open dry tropical forest (NRC, 1982; OAS, 1972). The original forest cover was divided into 9 life zones by Holdridge (1972), ranging from Subtropical Thorn Woodland, dominated by *Cercidium praecox*, *Prosopis* sp., and cacti (*Opuntia* spp. and *Cereus* spp.) on the driest sites to Subtropical Montane Wet Forest on the slopes of the Massif de la Selle in the south. The majority of subsistence farming probably now occurs within the Subtropical Moist Forest and the Subtropical Wet Forest. Little of the original forest cover remains.

a. Present Status and Trend

Today's over-exploited forest remnants, woodland and scrub bear little resemblance to the pristine forest cover. Commercial harvesting of trees for fuelwood, charcoal, and construction materials reduced the original rich mix of tropical hardwoods and pines. This was accompanied by clearing of the forest for agricultural use. The rapidly expanding human population turned even areas of steep slopes and thin erodible soils to agricultural use, eliminating most remnants of the original forest cover.

The extent of the original forest cover is of course unknown, but it was probably almost complete. By the mid-1950's, estimates of forest cover for the nation varied from 3.6% to 9% (Burns, 1954; Pierre-Louis, 1986). Many remaining stands are very small, often small groups of trees in swales and along watercourses. Some areas are covered by scrub--small multi-stemmed shrubs--rather than trees as in the original "forest". Differences in estimates of forest cover may thus be due to different interpretations of what constitutes a "forest" as well as errors in sampling and evaluation.

Forest cover has suffered an accelerating decline, and cover by 1977-78 was estimated at between 1.4% and 6.7%, the real value lying somewhere between these two values (Figure II-3). As of 1987, it is unlikely that forest cover is more than 2 or 3 percent, based on an assumed reduction of 6.7% per year of the forest cover measured in 1978 (Table 31). Except for a remnant forest in the Fond Verrettes and mangrove forests along the coast, forest cover will be essentially gone from Haiti by 2008 if deforestation continues at the present pace (CEP).

Of the nine Departments of Haiti, Grand-Anse and Artibonite had the greatest forest areas (Table 32). Grand-Anse, with its steep, rugged mountains culminating in Pic Macaya, is the present focus of much tree cutting for fuelwood, charcoal, and other timber products. Scrub woodland and open remnant forests in the drier Departement du Nord-Ouest, despite the dearth of large trees, are also heavily utilized for charcoal production. The high forest cover of the Department of Artibonite consists mostly of mangrove swamp forest in 1987, and will be less affected by deforestation than other forest types. If the 9,500 ha of mangrove are deducted from the Artibonite, the remaining forest cover is expected to disappear by the year 2002 (Table 31).

Development of a National Park at Pic Macaya will protect 5,500 ha of mostly forested area in the Departements du Sud-Ouest and Grand-Anse. Park la Visite, on the crest of the

TABLE 31

FOREST COVER BY MAJOR WATERSHED IN 1978 AND ESTIMATED YEAR THAT
DENSE AND OPEN FOREST IS TOTALLY REMOVED
BY RIVER BASIN

RIVER BASIN	TOTAL REMAINING FOREST AREA (sq km)	BASIN AREA (sq km)	% FOREST AREA REMAINING	YEAR FOREST REMOVED *
PORT de-PAIX/ P. MARGUT	123.8	545	22.7%	1995
LIMBE	16.8	312	5.4%	1986
ZONE CAP HATIEN GRANDE RIVIERE du NORD	21.1	-	-	
ESTERE	10	699	1.4%	1981 (GONE)
UPPER ARTIBONITE	25.8	834	3.1%	1982 (GONE)
LOWER ARTIBONITE	220.1	4300	5.1%	1987
CUL de SAC	431.3	2562	16.8%	2002
FOND VERRETTES	12.8	1250	1.0%	1982 (GONE)
LEOGANE	69.5	190	36.6%	2042
SUD-EST	1.8	650	0.3%	1981 (GONE)
JACHEL	360.7	-	-	
CAVILLON	9.5	1220	0.8%	1981 (GONE)
LES CAYES	51	380	13.4%	1996
TIBURON/ PORT SALUT	163.3	720	22.7%	2008
IROIS/JEREMIE	52.3	540	9.7%	1992
GRANDE ANSE	41.8	365	11.5%	1995
VOLDORUGE/ROSEAUX	117.3	556	21.1%	2007
CURAIL/ ANSE a VEAU	116.8	-	-	
	1	800	0.1%	1980 (GONE)
TOTAL	1,846.7		6.7%	

NOTE: ESTIMATES OF YEAR TREE COVER WILL DISAPPEAR ARE BASED ON AVERAGE DECREASE OF 6.7% PER YEAR No.
TREE COVER GONE MEANS THERE ARE NO STANDS OF DENSE OR OPEN FOREST ACCORDING TO THE DATPE, 1983 CRITERIA
THAT COULD BE DETECTED AT A SCALE OF 1:250,000. TREE COVER IN CLOUMN ONE EXISTED WHEN PHOTOS WERE TAKEN
IN 1978.

SOURCE: ADAPTED FROM COUNTRY ENVIRONMENTAL, PROFILE: HAITI, 1985,
TABLES III-7 AND III-8

TABLE 32
DISTRIBUTION OF FOREST COVER¹ BY DEPARTMENTS²

	1956	- ha -	1977	1987 ³
Ouest	4,400		700	230
Sud-Ouest	3,850		2,500	820
Nord	7,950		6,800	2,240
Nord-Est	2,000		1,800	600
Artibonite	22,300		11,000	10,000
Centre	3,000		2,100	690
Sud	9,600		2,100	690
Grand-Anse	30,800		11,700	3,860
Nord-Ouest	10,950		700	230
TOTAL	100,850		39,400	19,360

- 1 Total forest area includes "forets de feuilles", "forets claires d'epineux", and mangrove forests.
- 2 After Claude C. Pierre-Louis, Haiti 2000: bois et reboisement, Port-au-Prince, Mai 1986.
- 3 Projected values, based on a conservative estimate of 6.7% reduction of the 1977 forest cover, per year. Forest area was reduced 2,900 ha/year between 1956 and 1977, and is assumed to continue at 2,600 ha/year between 1977 and 1987.

Massif de la Selle in the Departement du Sud will ultimately cover 500 to 1,000 ha when developed. These two parks cover some of the highest, steepest, and wettest areas of Haiti and are especially important for protection of source watersheds for the Riviere de la Grand Ravine du Sud, Riviere l'Acul, and Riviere Blanche.

Rapid depletion and virtual elimination of forest cover by the year 2000 can be expected if forest cutting practices and clearing continue as at present. As most of the remaining forest cover occurs on steeper slopes and in higher rainfall areas of the upper watersheds, elimination of these last forest remnants will inevitably result in even higher erosion rates than at present. Peak runoff may be expected to increase as soil (and later, bare rock) is exposed, and it is certain that already low base stream flows will be decreased as a lower percentage of rainfall penetrates into the soil and rock mantle. (For discussion of soil erosion as a constraint to crop production, see Chapter III.)

There is a present and growing awareness among technicians, planners, and the rural community that elimination of forest cover is highly undesirable from both an individual and a regional (and national) viewpoint. The effects of unrestricted cutting are obvious to all. International donor organizations (with a large input from U.S.A.I.D), NGO's and PVO's have attempted to turn this tide by providing technical assistance and tree seeds and seedlings to private individuals on thousands of land holdings. A.I.D.-funded projects, for example, have produced and distributed over 30 million hardwood trees to approximately 100,000 small farmers. Despite this, it is estimated that from 3 to 7 forest trees are cut for each one planted in reforestation efforts (CEP). It is evident that a much more massive effort will be required to slow the present rate of denudation of the steep, highly erosive hillsides. Some experiments with grafting have been carried out over the past two years as an alternative to planting seedlings.

Recommendation:

Results of small scale applied research carried out by ORE and other PVOs should be replicated on a larger scale if they prove sound and adaptive.

Because of the small size of the average peasant land holding, most emphasis on agroforestry has included fruit tree planting for obvious reasons of food production for local consumption--citrus, mangos, avocados. These trees, and species selected for their values for livestock forage, post and pole production, and fuelwood are proposed to farmers as living fences, or in alley-cropping systems to stabilize

slopes and decrease erosion while giving least interference to food crop production.

The most promising species to date for use in planting on small parcels appear to be Leucaena leucocephala, Cassia siamea Acacia spp., Colubrina arborescens, Eucalyptus spp., Azadirachta indica (Nim tree) and Prosopis juliflora. Leucaena, rapid growing and suitable for both wood and livestock forage, is subject to insect damage from psyllids (leaf feeders). Risk from pests may be reduced by avoiding monocultures, and providing a broader mix of adapted species. Prosopis, which is good for fuel and charcoal, grows slowly. Projects in action now will provide information in the near future on appropriate species for different sites and for specific uses.

4. Fuelwood and Charcoal Production

Fuelwood and charcoal production will need to be expanded by reforestation efforts on all available lands to accommodate the continuing demand for energy. Wood consumption for all uses was 7.9 million cubic meters in 1982—a 67% increase over the previous 9 years (Table 33). Approximately 99% of this was for fuelwood and charcoal for either domestic, industrial or agro-industrial use—for bakeries, drying sheds, etc. It is expected that annual use in the year 2000 will be not less than 8 million cubic meters, and probably rather more than that. Pierre-Louis estimated that production in 1985 was only 2 million cubic meters. Plantation-grown wood (on farms and forest plantations) may account for 0.5 million cubic meters. Using a more conservative estimate of 7 million cubic meters use, annual overcutting has amounted to about 4.5 million cubic meters in recent years. He estimated, further, that the overcutting has increased gradually beginning in about 1945, when Haiti's population was 3,000,000.

As the forest capital has been depleted by overcutting, much fuelwood and charcoal production adapts to use smaller and younger stems of any available wood. Obviously, this has increased the cost of production for both domestic and commercial use and contributed to soil degradation and erosion. As much of this deforested land that is barely suitable for even marginal agricultural use is put in temporary or "permanent" cropping, the land area available for production of forest products has dramatically decreased (Table 31). We can thus expect a rapid acceleration of the spread between production and consumption.

TABLE 33
USE OF FOREST PRODUCTS¹

	1973	1982	2000
	-Thousands of m ³ -		
Fuelwood and Charcoal			
a. domestic use ²	3,500	6,446	-
b. industrial and agro-industrial	1,000	1,400	-
Construction			
a. posts and poles	200	43	-
b. lumber (boards, plantes)	45	14	-
TOTAL	4,745	7,903	8,000

1 Adapted from: Haiti 2000: Bois et reboisement, Claude C. Pierre-Louis, Port-au-Prince, 1986.

2 Fuelwood and charcoal for domestic use averaged 1.27 m³ per person per year in 1982. This demand is unlikely to change significantly if wood is available. Energy deficit will probably be filled by use of petroleum products (imported), alcohol, agricultural wastes, or electricity as fuelwood production declines.

Charcoal production (primarily for use in cities and towns) requires about 100 kg of greenwood to produce 30 kg charcoal, or about 8 cubic meters of wood per 1000 kg charcoal. Use of low-density planted hardwoods such as Leucaena leucocephala produces a lower grade and yield of charcoal--about 17% on a dry-weight basis--compared to up to 30% for high-density hardwoods. Actual yield depends on a number of factors including density of wood, moisture content of wood and air during "firing", type of kiln and experience of the charcoal producer. Much charcoal is still produced in low yield earthen pits. Simple charcoal kilns, such as have been used in the southeastern U.S. for many years, could increase yields 20 to 25 percent. A recent (1987) report by AID-supported Operation Double Harvest Haiti shows about a 3 fold advantage for a modified closed pit kiln, as compared to the traditional mound kiln commonly used by charcoalers in Haiti. The pit kiln and the Mark V stul kiln are cumbersome and expensive, and require large amounts of raw wood available at fixed locations to defray costs of construction. There is a great deal of room for improvement in small-scale charcoal production in Haiti. Use of improved technology would in effect decrease the demand for wood for charcoal perhaps as much as 0.5 million cubic meters per year, if generally adopted in the areas of major charcoal production.

Improved designs for farm cooking stoves, such as are produced in West Africa by the Peace Corps, could improve the efficiency of fuelwood use in rural households.

Recommendation:

1. Increase emphasis on agroforestry and tree planting on private lands to (a) improve nutrition levels (fruit trees); (b) provide wood products and livestock forage on small farmsteads; and (c) to anchor and stabilize soils in terracing and alley cropping schemes. The efficiency of alley cropping and development of terraces using trees, shrubs, and herbaceous perennials to trap sediment and significantly reduce soil erosion should be verified on small hillside farms. Continued emphasis on this approach to stabilize soils on steep slopes should depend on a rigorous analysis of benefits (and costs) of such systems, and the probable cost in soil degradation of continuing present cropping practices.
2. Increase research efforts to find most appropriate species and varieties (fruit trees and others) for use on different soils, slopes, and rainfall regimes on hillside farms, as well as the related cultural practices for site-specific interventions.
3. Introduce appropriate charcoal production technology for small producers. Before specific technology packages can be provided to producers, however, different charcoaling techniques (type of kilns, firing schedules, wood handling etc.) should be compared in a short, intensive applied research effort. The goal should be to increase efficiency for small commercial producers in an effort to slow down the large overcutting of limited forest/woodland resources.
4. Consideration should be given to importation, under concessional programs such as Title III, either of fuelwood (e.g., woodchips from Minnesota), or particle board for construction purposes.

CHAPTER III

NATIONAL AGRICULTURAL PRODUCTION

A. Crop Production

1. Overview

As was seen in Chapter II, the area in total crop production is very imprecisely known in Haiti. There are several reasons for this. First, the exact land area within climatic and environmental zones of Haiti is not known for many areas due to the inaccessibility of large parts of the country. Second, detailed mapping has not been done for most areas except for physical features mapped from aerial photos. Third, most acreage under crop production is in mixed plantings or "associations," making it difficult to measure area planted to each crop and; therefore, summing crop types to arrive at national figures is difficult. Fourth, the fields in Haiti are very small, and the holdings of individuals farmers are quite small, and often dispersed. Relatively few large holdings exist, and although there are more than are shown by official figures, even fewer are contiguous land holdings. Further, most of the holdings are of varied geometrical patterns, making them difficult to measure. Fifth, a large proportion of the annual production is consumed at home, and often what is sold is marketed through a small number of intermediaries who often buy produce in small markets or directly at the farmgate. Thus, market channels cannot be readily checked to verify crop production estimates. Finally, the mix and extent of crops varies throughout the year and probably from year to year. For the same reasons, the actual acreage in each individual crop is also not well known. Even production of major crops that enter the commercial market stream such as sugar cane, rice and coffee is not known for certain.

The Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) gives the average area, yield and production of the principal crops as shown in Table 34a. Yield and area in principal crops by agricultural regions are given for crop year 1979 (Table 34b).

The figures given above are generally obtained from FAO data on crop production based on the estimates made from the DATPE and national survey data from 1979. These estimates are believed by some observers to be understated for the agricultural sector as a whole. The production figures used for estimates of GDP in section I.B.1 are taken from preliminary estimates made by Laurent and Levitt. This data series was used as the series was generated from a study that offered the most thorough discussion of probable crop areas and production data available. The report, however, is

TABLE 34a

**Average Yields, Hectarage and Production
Of The Principal Crops in Haiti
1980 to 1986**

Crop	Area in Hectares	Average Yield Metric Tons	Production Metric Tons
Maize	231,250	0.8	185,000
Sorghum	156,250	0.8	125,000
Rice	59,250	2.3	136,000
Beans	89,655	0.6	52,000
Peanuts	45,355	0.8	34,000
Banana	80,645	0.7	500,000
Sweet Potatoes	61,905	0.5	260,000
Yams	22,000	5.0	110,000
Taro	8,665	4.5	39,000
Cassava (1)	28,000	4.0	112,000
Sugar Cane	114,000	50.0	5,700,000
Coffee (2)	132,000	0.3	35,900
Cocoa	10,400	0.3	2,600
Cotton (3)	12,445	0.5	5,600
Total	1,051,820 ¹⁵		

Source: Service de Statistiques Agricoles (MARNDR); 1987.

- (1) Sugar figures from Delatour/CEP (Ref #9).
 (2) Coffee figures from OPRODEX via DATPE.
 (3) Cotton figures from Angland Report/Bureau of Credit, Ministry of Agriculture (Ref #7).

15 This total is different than the totals given in Tables 20, 21, 22 and 23. It is generally higher than the cropped acreages from the first two tables and lower than the totals in Tables 22 and 23. In the former case it is partly due to a ten-year time lapse between estimates. In the latter case, Tables 22 and 23 would give gross acreages measured from aerial photos, while MARNDR estimates will tend to be net, although this is offset somewhat by including double cropping.

TABLE 34b

CROP YIELD AND HECTARES BY REGIONS, HAITI
—CROP YEAR, 1979*—

FOOD CROP	AVG. YIELD, kg/ha					AREA IN HECTARES (000)				
	N	T	W	S	Haiti	N	T	W	S	Haiti
Beans, Dry	718	605	593	475	588	16.1	21.6	28.4	23.6	89.7
Beans, Other	450	355	290	349	360	6.9	14.0	9.8	6.4	39.2
Cassava	4288	3925	4008	5197	4354	14.9	19.4	12.7	15.8	62.9
Maize	658	825	768	888	784	36.3	74.4	53.0	70.0	233.7
Peanut	753	776	699	853	754	12.9	8.9	17.6	7.8	47.1
Pigeon Peas	480	406	342	304	368	7.2	24.8	18.7	18.6	69.4
Sorghum	331	839	965	618	787	10.3	66.7	41.9	38.1	156.7
Sweet Potato	4085	4345	4164	4291	4714	12.2	18.2	15.7	16.4	62.5
Yams	3129	3446	3689	3275	3385	6.8	6.2	11.9	33.6	58.5
Yams, Coco	2342	1773	1753	1907	1845	1.9	8.7	3.4	7.2	21.2

* Primary source of information is CEP.

in draft and does not contain all of the detailed tables and calculations needed to present the authors' findings. Their individual crop GDP data were used, but it was necessary to reconstruct their production data based on their discussion and what were interpreted to be their assumption. Where their discussion has not covered for certain crops, attempts have been made to locate data series on production from other sources.

In presenting the discussion of individual crops below, the reader should be cautioned about several points. One, the data series on individual crops are often created by interpolating distant points of supposedly measured data. In other cases they are extrapolated from reports that gave indications of the magnitudes of production but were not necessarily estimates made by statistical sampling or population summing. That is, they may be reports on marketing of industrial crops, development of cooperatives or credit societies, or micro studies of habitations (communities, valleys, watersheds) or regions of the countries. In these cases statistical methods of expanding data for national estimates have not been employed, and the estimates should be viewed as general magnitudes of production only.

As has been noted, the ADS-II project is in the process of developing a national survey system for agriculture using an area sampling frame methodology. At the time of this sector assessment the project had completed the survey for crops, livestock and tree crops in the four southern Departments of Haiti. Unfortunately,

the survey only covers acreages of individual crops grown both as mono-crops and in association and only preliminary work on yield estimation has begun. However, using the usually accepted yield estimates for Haitian crops, an attempt will be made to cross check other data sources, and to comment on their reasonableness.

It should also be pointed out that estimates of area by crop and the resulting production are based on past studies, some of which are ten years old. It is clear that area planted to each crop has changed. An attempt has been made to incorporate these changes in current estimates, but some changes are so recent that their full impact on cropping patterns has not been determined. For example, recently the sugar cane factories have been building up inventories of sugar produced at high cost. With lower cost sugar being imported the factories have had to cut back on production. Notwithstanding huge subsidies by the government, these factories may have to stop producing sugar entirely. It is likely that only one sugar mill will operate in the current crop year. The result is likely to be a large reduction in the area planted to sugarcane.

Similarly, the lower-priced rice that has been reaching the Haitian consumer market lowered the price for local paddy. How this will affect production is still unknown. Similarly, the cotton producers are facing an uncertain future as the gins and mills have not yet determined if they will buy cotton. Similar forces are working their way through the system in Haiti but the impacts on farmers and production remains unknown to date. Cotton hectareage fell from 12,445 ha in 1979 to 7,974 ha in 1986 (Agland Report, 1987).

2. Cereal Crops

a. Corn (Maize)

Corn production is widespread in Haiti, constituting one of the main staple cereals in the country. Also commonly called maize, corn is grown in all types of soils, topographies, elevations and under a wide variety of conditions, often in association with other crops. The MARNDR estimated that the area planted to corn was 248,373 hectares in 1979 (World Bank, ASA: 1985). The total production from this area was assumed to have been 183,000 metric tons, or 0.737 MT per hectare. Laurent and Levitt indicate that MARNDR considers the annual average acreage to be about 220,000 hectares and that 230,000 was the figure used for 1979, with yields averaging about 0.8 MT per hectare.

The national survey now being conducted by ADS-II recorded 14,000 hectares in mono-cropping of maize for the four southern Departments¹² for the second season of 1986 (late

1986 and early 1987), and 62,000 hectares in association for a total of 76,200 hectares. For the first season of 1986, the survey recorded 62,210 hectares in maize for the Departement du Sud alone, as opposed to 23,600 for the second season in that department. The first season showed 17,530 hectares in mono-cropped corn as opposed to 8,100 for that department in the second season. If data are extrapolated to the four southern departments, i.e. by assuming a direct correlation of crop planted in the first season in the other departments with the ratio in the Departement du Sud, then the total area in corn for the year would yield a three-fold increase over the second season of 1986. Total hectares in the South Region would be 228,000, with 42,000 in mono-crop and 186,000 in association. In gross terms, the data suggest that the crop grown in association would need to be weighted at about 25 to 35 percent of mono-crop to yield the acreage estimates of the MARNDR, and as assumed by Laurent and Levitt.

The validity of this extrapolation should be tested and corrected as the ADS-II survey data becomes available for the four southern departments and for the nation. The regional preliminary report was released in autumn of 1987. The national survey data were reported to be in the analysis stage during the third week of October 1987. The extrapolation and weight assigned for corn planted in association with other crops proved to valid within reasonable margins.

Extrapolation of the crop areas and yields from ADS-II data in the South Region to the other three regions will provide better estimates of area and yield than are now available on hillside crops. Yield estimates based on these extrapolations must be limited to the same season and elevation, however.

Corn prices have been 35 to 50 percent higher in Haiti than the border price (CIF price) for several years. This has resulted from a protectionist policy in Haiti that has not allowed the importation of corn for either human or animal feed. There is reason to believe that this policy will change shortly, and could have the impact of lowering maize prices from about 18 cents to about 10 cents. It is hard to determine what the impact of such price shift will be on production; however, it seems quite certain that it will have a negative impact on farmer income. Two situations could conceivably result. One, the farmers will attempt to

12. These include the Departement du Sud, Departement de la Grande-Anse, Departement de l'Ouest and Departement du Sud-Est, and constitute the South (s) "District Agricole".

expand production in order to maintain farm income. Two, farmers will shift out of corn and into another crop. As sorghum will be equally affected, it will not be an alternative crop to corn for sale. Corn and sorghum production for farm family use in hillside farming is not expected to be reduced. In lower, more humid areas, rice could conceivably replace corn on some lands. Cotton may also be a substitute but that will depend on the purchases by the gins. In the high country, tree crops have some possibility of replacing maize, but the long period of production time works against them. Alternative crops for the plains are discussed in Section 7 of this chapter.

b. Sorghum

Sorghum is the dominant cereal planted during the second growing season followed by corn. The second season is drier than the first and therefore sorghum has a relative advantage, while corn is advantaged in the first season. Where moisture supply is adequate (irrigated plains and lower part of some watersheds) corn will be planted in preference to sorghum in the second season. Legumes including red and black beans are generally planted in association with corn and sorghum in the south of Haiti.

Laurent and Levitt note that sorghum figures follow the same pattern as those for corn, but with production running about 50% below that of corn. In the national survey the four southern departments show the area planted to sorghum to be about 25% above that of corn in the second season of 1986, and about 5% below maize in the first season. Yield data for the Departement du Sud derived by the national survey from farmer recall indicate that sorghum yield is only slightly lower than that for corn. If a similar pattern holds in the north, then the MARNDR production estimates for sorghum are generally too low.

c. Rice

Production estimates for rice vary from lows of 100,000 MT to highs of 250,000 MT according to reports reviewed by Laurent and Levitt. Settling on a figure of about 200,000 MT in 1980, the authors assume a 6% growth in production starting in 1976. We have then shown declines reflecting the lower rainfall in 1985 and the lowering of prices starting in 1986.

The national rice production figures seem low based on area estimated to be in the crop. Most estimates put the Ar-tibonite hectarage as 30,000, but this figure may be high. As is noted in the irrigation section, there are only 20,000 hectares of completely controlled irrigation in the ODVA,

with an additional 4,000 hectares of uncontrolled flood irrigation. The production figures are based on a yield of 2.5 metric tons in two crops. This appears low for the Artibonite.¹³ Given the condition of the fields observed in the area it would appear that 2 tons per crop, or 4 tons per year are more likely. A UNDP/FAO/BID study in the Artibonite calculated production of 150,000 MT based on rice mill output. If this level is correct, then yields would have to equal 5 tons per year on 30,000 hectares, a figure that would not seem unreasonable given two crops per year.

In other areas of the country, rice yields are undoubtedly much lower than in the Artibonite. Two and one-half tons per hectare per year, however, may be about right for Les Cayes. Chatterjee (1985) found yields ranging from 1,000 to 2,400 kilograms per hectare under traditional systems. The national survey estimates indicate that averages for the southern departments on most crops do not exceed one ton per crop in most cases. Observation of fields in that area lends credence to that figure.

If the often-made observations that the Artibonite produces 75% of Haiti's rice are true, then 25,000 hectares would be required for the balance of production in two crops. This figure is fairly close to the estimate of the MARNDR given above. In the four Department reports of the national survey, 13,800 hectares of mono-cropped rice and 5,800 cropped in association were recorded. This means that another 12,000 hectares of rice would need to be produced on the remaining rice areas.

Rice Prices

Currently, the farmers in the irrigated areas depend heavily on subsidies for protection. The rice farmers in the Artibonite Valley are living on smaller and smaller plots, according to the latest cadastral survey undertaken by the ODVA.¹⁴ Furthermore, if the GOH decides to reduce import quotas, effectively permitting Haiti to import other countries' subsidies and discourage smuggling, the rice farmer will suffer a further standard of living reduction.

13. This yield would produce only 1,100 lbs. of paddy per acre, which is an extremely low yield. If the yield figures have already been converted to milled rice then the yield would be about double, still a very low yield.

14. The Director of the ODVA informed the team that the recent survey put holdings at 0.25 to 0.5 hectares as opposed to 1.5 hectares about 30 years ago.

The loss of income to the rice farmers on the irrigated plains will be quite large. Assuming that the rice farmers will continue to produce rice at the same level of about 110,000 tons per year the loss of revenue will be slightly over \$14,800,000 per year. This is based on an assumed 43,600 hectares in rice yielding 2.5 tons per year. Farmgate paddy rice was calculated from Borsdorf (1985) as an average over the last three years of data (1982-1984) as 3.65 Gourdes per marmite. This made paddy prices about \$267 per ton. The average ratio of paddy prices to milled rice prices was calculated from the same price series as 0.408:1. Based on this, and using an average CIF price of imported rice at \$320 per ton, then the paddy equivalent would be \$130.60 per ton. The loss to the farmer will therefore be about \$137 per ton. Of course, it is unlikely that farmers will simply leave this land fallow. They will either continue to grow and accept a lower price for what they sell or seek substitute crops. Nevertheless, they are facing reductions in their standards of living.

3. Roots and Tubers

The production of roots and tubers in Haiti includes cassava, sweet potatoes, yams, taro and Irish potatoes. There are some studies on these crops, but generally data on area planted, yields and production are difficult to find. Irish potatoes are grown primarily for urban consumption and constitute a very small part of the total production of this category. The other crops are discussed briefly below.

a. Cassava (manioc)

Cassava is clearly the major crop in this category. Estimates of production range from 150,000 to 260,000 metric tons yields per year. Estimates are usually based on 4 ton yields and about 60,000 hectares in the crop. National survey data for the four southern departments (as noted above for corn) indicated that there were 4,800 hectares of pure-cropped manioc in the second season of 1986, and 51,600 hectares in associated cropping. Although no figures were given on yield estimates, it seems likely that 2 to 2.5 tons should be a conservative estimate. This would mean a production of 112,000 to 141,000 MT in the four departments in the south. If the higher yields given by MARNDR are accurate (which may be difficult in associated cropping), then the national production is underestimated. It seems certain that the MARNDR hectarage and production figures given above are understated.

b. Sweet Potatoes (patate douce)

Sweet potatoes are either the first or second largest root

crop produced in Haiti, depending on estimates. The few available estimates seen ranged from about 270,000 to 300,000 MT. The yields of sweet potato given as 500 kilograms per hectare by the MARNDR are borne out by the preliminary estimates of yields in the Departement du Sud. However, the area planted may be understated. The national survey data of ADS-II show 11,100 hectares of pure cropped sweet potatoes and 34,700 cropped in association during the second half of 1986. Based on Departement du Sud data only, this may be 25% below the early season. Thus, with over 20,000 hectares of pure crops and 80,000 hectares in association, the southern departments' figures would indicate a significantly higher national production.

c. Yam (igname)

Yam appears to be much less significant as a root crop in Haiti than in other Caribbean countries. This is true both in terms of the area in crop and in the intensity of cultivation. Yams require a deep soil, something not often found in Haiti, as well as good moisture and a reasonable fertility. As cassava has less demanding requirements, better resistance to drought and better keeping qualities it is not surprising to see it out-producing yam in Haiti. The yields given by MARNDR are very low for yam, but given the state of the fields and plants, the estimates probably are not understated. However, it seems likely that the total area in crop may be underestimated. The data from the four southern departments show 2,500 hectares in pure crop and 24,400 in associated crop. Unless the plant density of associated crop is so low that it effectively reduces the "hectares" in crop, then the MARNDR figures are very low.

d. Taro (malanga and mazumbel)

Area and production of this crop are very low by most estimates. Seldom is the crop seen grown as a pure crop which is confirmed by data from the national survey. Only 2,900 hectares in the four southern departments were recorded as pure crop while 19,000 hectares were grown in association. Association, however, is often seen as a few plants grown on field borders or along dikes and canals in irrigated areas as a field marker. Translating this into pure hectares is difficult. Levitt and Laurent indicate that national data may be underestimated, but until further data are produced by the national survey it is difficult to amend the MARNDR's estimates.

4. Bananas (plantains and figues)

The figures for production are usually put in the 470,000 to 550,000 MT range for most years in the time series. Although

banana production has been reduced by hurricane and drought in some years, the rapidity of replanting seems to maintain the national production at around this figure according to most observers. The level of crop area seems to be more or less confirmed by the national survey data at present and any adjustments should await the full survey results.

TABLE 34c

**SUMMARY OF BEAN PRODUCTION IN HAITI
BY DRY AND MOIST HARVESTED BEANS
(SOURCE: CEP 1986, FOR 1979 CROP YEAR)**

<u>DEVELOPMENT STAGE OF SEED AT HARVEST</u>	<u>AREA HECTARES</u>	<u>PRODUCTION MT</u>	<u>YIELD KG/HA</u>
Mature and dry	89,678	52,685	588
Mature but not dry	39,174	14,093	360
Total	128,852	66,788	518

TABLE 34d

**PRINCIPAL FOOD CROPS:
PRODUCTION, AREA PLANTED, VALUE AND RANK ORDER
(SOURCE: CEP 1986; DATA FOR 1979 CROP YEAR)**

CROP	<u>AREA</u>	<u>Rank</u>	<u>PRODUCTION</u>		<u>VALUE</u>	
	<u>Ha</u>		<u>MT</u>	<u>RANK</u>	<u>GOURDES</u>	<u>RANK</u>
Corn	233,749	1	183,331	2	135,664	3
Sorghum/Millet	156,696	2	123,282	3	91,228	5
Beans (All)	128,852	3	66,788	5	105,394	4
Rice	53,996	5	122,116	4	268,655	1
Plantain	97,984	4	301,274	1	225,955	2

5. Beans

Beans are the main source of protein in the diet of most of the Haitian population (Blemur, 1987). They rank second only to cereals as a food crop. Beans are produced in all nine Departments and 15 districts of the nation. The food crop designated as "beans" refers to both beans harvested after they are dry and to beans harvested after the seed is mature but before it is dry ("roasting ear" stage). Note that Table 34 includes dry beans only. According to DATPE as cited by the CEP (1985), beans rank third after corn and sorghum in area planted and fourth in both value and total production tonnage (Table 34c & 34d).

a. Beans in Plains and Hillside Agriculture

Among the four agricultural regions of Haiti, bean hectareage ranges from 23,000 ha in "North" region to 38,000 in "West" region. Production areas and yields of principal crops are included in Tables 34a & b. Red beans are the traditional and the most commonly planted beans in Haiti. Black, white and many mixed colored beans are produced for the market. Beans are grown in the irrigated coastal plains, non-irrigated plains, and mountains as a monoculture and in crop associations (see calendar for crops, Figures III-2&3).

The growing season for beans on the plains is from November to March. Because of disease pressure from the golden mosaic disease, bean production shifts to the mountains during the April to June growing season. Beans are planted in association with corn, sorghum, pigeon peas and, occasionally, tree crops in the mountains. Another growing season for monoculture beans in the mountains is early September to November. These beans are largely used as seed for planting in the plains. (This is a clear example of the relationship between agriculture in the mountains and in the plains). Black beans which have resistance to golden mosaic have been introduced in Haiti from the ICTA germ plasm collection. This successful introduction of the "Tamazulapa" cultivar of black beans is discussed below.

b. Bean Culture in Departement du Sud.

Specific information on crop culture patterns has been gathered by ADS-II (1986, #23) in the Department du Sud. The relationships of annual legumes to cereals, root crops and plantain are explained in the ADS-II report. Table 34e below includes the data and explanations of data on crop associations. The black bean "Tamazulapa" is rapidly gaining acceptance in this Department of Haiti. Data from the second planting season of 1985 and the first season of 1986 are presented.

TABLE 34e

RELATIVE IMPORTANCE OF PRINCIPAL CROPS IN
 DEPARTEMENT DU SUD, 1985 - 1986
 (MODIFIED FROM ADS-II, 1986, REPORT #23)*

CROP	HECTARES CULTIVATED 2ND SEASON	HECTARES CULTIVATED 1ST SEASON	% in ASSOCIATION	% FOUND IN ALL ASSOCIATIONS
Corn	14,900	47,300	85 (1)	27 (2)
Sorghum **	58,900	-	47	32
Rice	5,900	5,100	38 (3)	7
Bitter Manioc	10,500	-	95	26
Sweet Potatoes	18,800	13,500	85	37
Yams	10,600	-	97	28
Plantain	8,800	-	91	20
Pigeon Peas	20,400	-	98	38
Black Beans	9,300	4,700	64	17
Red Beans	2,800	2,000	99	12
Cowpeas	300	3,800	92	2
Peanuts	500	5,000	96	8
White (Lima Beans)	100	100	100	1
Pois Sinistsre (4)	100	100	100	2

- (1) Interpret this as: 85% of all parcels surveyed containing corn were found to be in association with one or more other crops.
- (2) Interpret this as: 27% of all parcels surveyed in the Department found to include more than one crop included corn. One of every four parcels in association contains corn.
- (3) The "associated crop" referred to here is taro (mazumbel), grown as a border crop in about 38% of all rice plots.
- (4) This bean (literally "disaster bean") represents an assortment of varieties originating from food grain relief aid following various hurricanes over the past few decades. Some of this was planted and gave origin to new seed mixes.

* The word "cultivar" referring to a crop species in ADS-II, Report #23, Table 1 was changed to the word "crop" in the above Table by the agronomist on this Ag. Sector Assessment team.

** Sorghum is called "petit mil" and is often confused in translation with millet.

Recommendation

Every food production project assisted by USAID/Haiti should include a bean production component. The PVO's should be encouraged to include demonstrations of improved varieties and inoculants.

6. Major Industrial Crops

The major industrial crops usually considered in Haiti are sugar cane, coffee, cocoa and cotton.

a. Sugar Cane

Sugar cane has traditionally been one of the most important crops in Haiti. Although the industry had been destroyed in the revolution and sugar exports disappeared during the nineteenth century, sugar cane continued to be produced on a smaller scale. The production of clairin (a low grade alcohol) and rapadou (a raw sugar) began. Cane was grown under a smallholder system as opposed to large plantations as was common in the rest of the Caribbean. Therefore, when HASCO began operations in the 1920s they had to rely on small and medium farmers for cane; the amount of cane actually grown and controlled by the factory was small. This situation has continued up to the present, so that in the four cane growing areas, a good deal of the cane is produced by smallholders, as well as large holdings. One informal estimate is that 10% of the cane producers may control as much as 70% of the production. Cane is used for three distinct purposes in Haiti, each of which consumes a large portion of the total output. These are (1) production of sugar for domestic consumption and export; (2) production of clairin; and (3) production of rapadou and sugarcane for direct consumption. The structure of the sector has therefore made it difficult to know precisely what the production and area figures are.

Delatour (1983) states bluntly that all of the figures on cane production are wrong. Figures as high as 85,000 hectares of cane were reported. Production as high as 6.1 million tons had been estimated for 1975. He believes most of the estimates previously made were based on the 1950 census, with the DARNDR merely adjusting these figures in subsequent years. Using interpretations of aerial photos taken in 1956 and 1978 to measure the area in sugar cane, Delatour found that the area in cane in 1956 on the four plains was 28,510 hectares, and in 1978 was 30,536 hectares.

Table 35

Land Use in The Four Main Cane Producing Plains

	Area (Ha)			Area (Ha)		
	Total /	Under Cane	Cane %	Total /	Under Cane	Cane %
	1956			1978		
Cul-de-Sac	34,342	11,948	34.7	34,360	8,294	24.2
Plaine du Nord	23,897	2,478	10.3	32,000	10,690	33.4
Leogane	8,276	4,902	59.2	8,166	4,463	54.6
Plaine des Cayes	19,408	9,182	33.1	19,252	7,089	36.8
Total	85,923	28,510	33.1	93,778	30,536	32.5

Source: Delatour, 1983.

In addition to these areas which are adjacent to the sugar factories, Delatour accepted the figures of SCET International (1980) of 9,000 hectares on the Central Plateau. Also, he assumed that there were about 5,000 hectares of cane in other areas such as the Plaine de l'Arcahaie, areas around Jeremie and Jacmel and scattered mountain plots. He thus came up with a figure of 45,000 hectares for 1978, which he assumed was less in 1983. This compares with a figure of 100,786 hectares reported from the 1979 survey. A figure of about 45,000 hectares was assumed to be correct, but should have been declining in the past two years.

Using yield figures of 40 MT per hectare, Delatour arrived at a total production of 1.8 to 2.0 million tons of cane, which he felt was declining. Laurent and Levitt report on a special World Bank sugar sector study (World Bank: Haiti: Agricultural Sector Study, Vol. I, report no. 5375-HA) which estimated cane production by end-users. The figures arrived at confirmed Delatour's estimates. This study estimated annual consumption of cane for making clairin at 930,000 tons. Laurent and Levitt note that the figures for sugar factories and clairin do not take into account the informal sector which includes the following: cane for the manufacture of rapadou and syrup; clairin made but not declared to tax authorities; direct consumption; or sugar cane juice. This informal sector was estimated to constitute about 20 to 25% of the formal cane consumption.

Yields of cane, as noted above, were put at about 40 tons per hectare by Delatour. Some estimates have put yields as high as 55 tons. Most observers would agree that the former figure is closer to reality. Cane is generally grown on many small plots, not well cared for, often infrequently irrigated, underfertilized, and harvested over-mature. Yields are low. Therefore, there is reason to believe that the Laurent and Levitt estimates are at the upper limit of production, and unless the Guildives¹⁵ are increasing their purchases for making clairin, production must be declining. For 1985 and 1986 we have assumed that the Guildives have increased consumption slightly as more cane is available, and probably at much cheaper prices than previously.

i. Sugar Cane Situation

In recent years, Haiti has produced about 40,000 MT of sugar per year according to Delatour (1983). Almost all of the sugar cane for sugar is produced on the four coastal plains of the nation (Table 35). The annual importation quota for the Dominican Republic to Haiti was 27,000 MT in 1983. An additional amount greater than half of the quota is considered to have entered from the D.R. Changes in port policy have come about since the fall of the Duvalier regime. Apparently, Haiti is being "inundated" with sugar from the exterior in 1987.

The cost within Haiti of producing a pound of refined sugar ready for the market is \$0.24. The world price is approximately one-third of Haitian sugar production costs. Without a protection policy that excludes sugar imports at world trade prices, Haitian sugar production cannot survive. The United States has not granted a sugar quota to Haiti in several years.

The price paid to the producer for cane was \$13/MT for several years. The turn-out of sugar at the refinery has been as low as 7% for some plants. The average conversion rate in Haitian sugar mills is 10%. Generally, the cane has been cut several days before it reaches the mill yard. The hauler requires a partial payment before the cane is picked up at the farm. The cane remains on the mill yard a variable period of days but is often dry before it

15. Guildives are traditional factories involved in the production of clairin. They are usually registered with the tax authorities and their output is declared.

is milled. The cane supply to the mill is erratic. A mill may have more than 60% down time after it begins the season's operation. It may receive cane from as many as 7,000 small producers. The HASCO mill at Port-au-Prince is the only mill that controls as much as 25% of its cane supply.

ii. Alternative Crops for Cane on the Plains

Most sugar cane production for sugar refining in Haiti will be terminated. Sugar cane land on the plains will become available for other crop uses. A relatively short-term solution to the crisis approaching the cane farmers must be developed. Recommendations for possible alternative crops for the plains were proposed by the agronomist in this report (see below).

b. Coffee

Coffee production is given by MARNDR as 35,900 metric tons (average) over the 1980-1986 period grown on 132,960 hectares. This area in coffee is down from the 1979 MARNDR survey which listed 140,000 hectares. The latter figure has been accepted by Laurent and Levitt in their analyses, where they state that studies have shown that the area planted had been constant over the past decade. Declines from the 1979 survey were noticed in the Departement du Sud in the ADS-II second season 1985 and first season 1986 results. Sampling probabilities may have produced some of this recorded decline, as the second season 1986 showed 1,000 hectares of pure crop versus 230 hectares for the first study and 1,430 for the second. It may also be a function of how farmers respond to a question on pure or associated cropping. In the second season of 1985, farmers reported 5,070 hectares in association; in the first season of 1986 the figure was 5,950 and in the second season of 1986 it had risen to 7,900. It is doubtful that new plantings would have caused this much expansion. The overall coffee planting reported for the four southern departments was 5,300 hectares mono-cropped and 24,800 in association. Coffee is much more heavily grown in the northern departments of Haiti than in the south. The question is, would the area in coffee in the north be as much as 115,000 hectares? Unfortunately, at this time, the national survey results for the northern departments are not available to answer this question.

Coffee yields are usually given as 250 kg per hectare. Laurent and Levitt felt that this figure was the upper limit due to the increasing age and deterioration of the trees. Thus, they estimate an average production of 35,000

MT. This was felt to have been constant over the past decade, and is consistent with the MARNDR estimate.

i. The IICA Coffee Situation Report

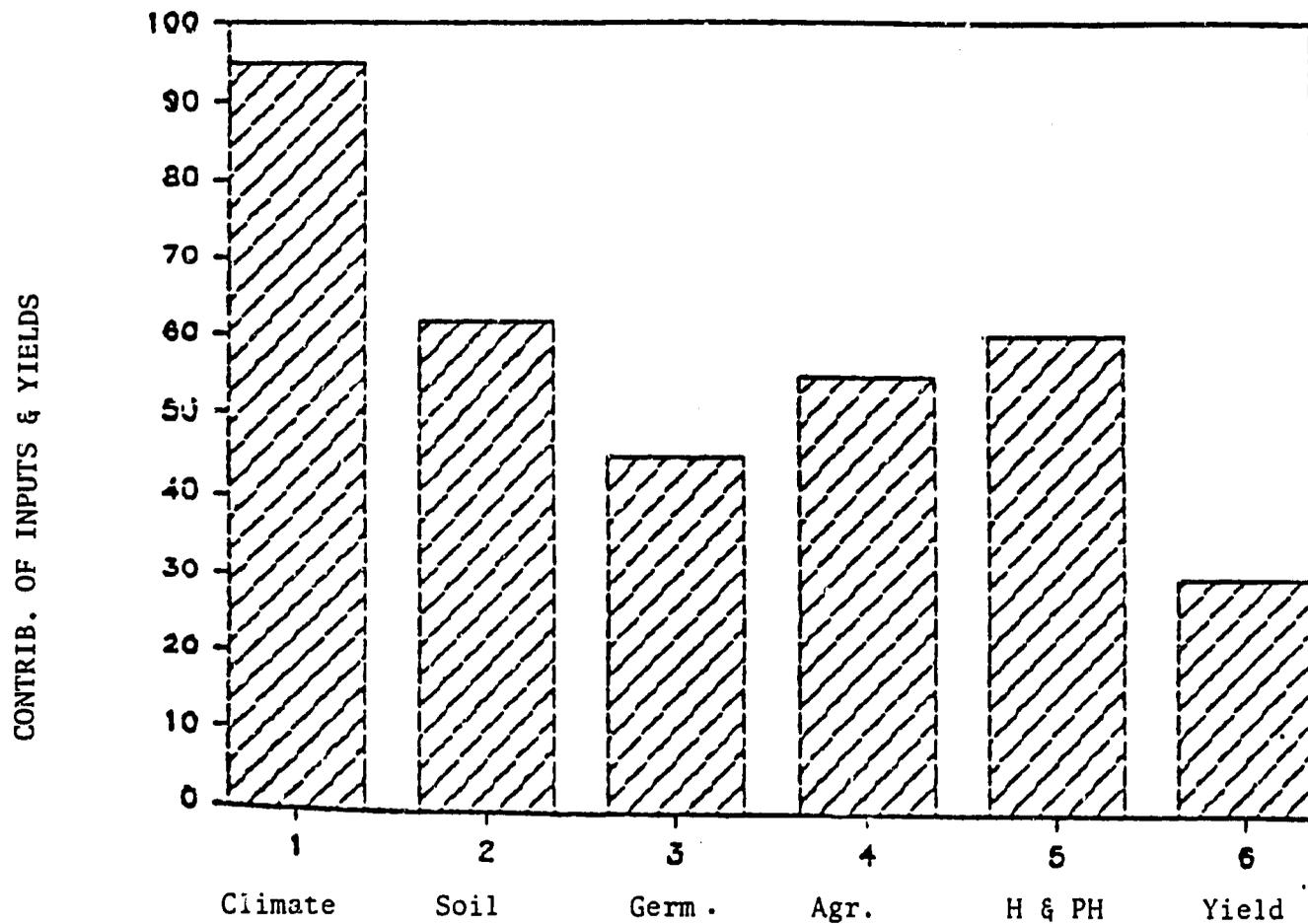
Coffee is Haiti's primary export commodity. The export history shows that the export price of Haitian coffee is determined by world coffee stocks. Prices rose from \$1.04/kg in 1975 to \$4.07 in 1977. This is directly correlated with the years of coffee recuperation in Brazil following the hard freezes in Parana state in July 1975. Prices of export coffee will of course continue to be determined by conditions in the major producing countries.

A team of specialists was contracted by USAID through IICA to review the coffee situation in Haiti in 1986. The report from this team is the single most informative document on Haitian coffee. It confirmed the reports of the last 20 years that Haiti's coffee production capability is in precipitous decline. They reported that "the situation has deteriorated further and almost to the point of no return, unless some far-reaching decisions are made and put into action immediately". In the sense that management is the rational combination of water, soil, practices, harvest and post-harvest practices, climate, genetic material, labor and capital they concluded: "Management ... is literally inexistent (sic) on the coffee farms in Haiti" (IICA, 1987).

The IICA team estimated the relative influence of climate, soil, germ plasm, cultural practices, and harvest and post-harvest practices on coffee yield in Haiti. This information is presented in Figure III-1. All factors except climate were considered to be limiting to yield. The low potential of the "typical" variety coffee of C. arabica type is the major constraint to production. Yield was estimated to be limited to 30% of potential coffee yield in Haiti's climate. Insects were reported to inflict more damage than disease on Haitian coffee. The leaf miner and mealybug are the most serious insect pests. Coffee rust was not observed by the team nor is it known to exist in Haiti, but it is in Costa Rica. Nematodes are present on roots of coffee trees in Haiti, but they are not considered to be major pests. Weed competition is known to reduce coffee yield. The IICA team observed that Haiti's coffee trees are very old. Younger plants were volunteer growth from seed distributed at random by

FIGURE III-1

NATURAL RESOURCES/TECHNOLOGY/YIELD



Source: IICA, 1987.

rats or other unmanaged means.

ii. Recommendations

It is recommended that a modern coffee production program be introduced to Haiti through an A.I.D.-funded program. The plan proposed by the IICA (1987) team is the basic program recommended. This approach would be radically different from both the Small Farmer Coffee Improvement Project of 1975-80 and the Small Farmer Coffee Marketing Project of 1977-82. The emphasis on cooperatives would be increased. A time frame of 10 years would be required. In the new program, the present coffee cultivar must be gradually replaced in order to remove cultivar constraints. Rust and nematode resistant varieties of C. arabia x C. robusta parentage should be introduced through variety trials. In order that suitable, site specific interventions may be delivered to growers, the project should be directed to growers or local cooperatives with one or more hectare in coffee. Cluster (covey) planting would reduce the time between seedling planting and first harvest year. Casual coffee growers who use trees in alley plantings between annual crops should be supplied coffee seedlings of improved selections.

iii. Sources of Technical Assistance (Information)

The Coffee Institute of Brazil (Instituto de Cafe do Brasil, ICB) has assembled one of the leading coffee program staffs in the world. Because of its organizational infrastructure through cooperatives and governmental collaboration, the ICB dominates the world coffee supply and price structure. The federated cooperatives for coffee production and marketing have access to thorough extension services, to producer credit, and to continuing research. Brazil's coffee producers maintain an unusual amount of control of the economic conditions surrounding their commodity.

The coffee research center of Brazil is located in the IAPAR research facility at Londrina, Parana. IAPAR is the Instituto Agronomico de Parana, which is funded in part by the coffee producers. The covey (cluster) system of planting was developed at IAPAR. Leaf miner and coffee rust resistance (tolerance) are high-priority research targets at IAPAR. Soil fertility and use of chicken manure for slow nutrient release are studied there.

c. Cocoa

MARNDR (1987) figures give 10,400 hectares in cocoa in Haiti. This has been generally consistent with other reports. Cook (1984) suggests a stable production of 4,000 MT with an average yield of 200 kg per hectare in traditional Creole gardens. This production figure is considerably higher than that given by MARNDR, even though their yield figure is 300 kg per hectare. If Cook's figures were accurate, then there would be up to 20,000 hectares in the country. Most of the cocoa is grown in the southern departments, heavily concentrated in Grande-Anse. The statistical results of the ADS-II national survey show a total of 2,364,000 trees in the four southern departments, with Grande-Anse accounting for 2,148,000 of them. If the plant density of 200 trees per hectare is correct under Haitian conditions, then 11,820 hectares would be planted in cocoa in the south.

d. Cotton

Cotton has been grown for many years in Haiti. According to a study recently carried out (Agland, 1987) there are two types of cotton grown, "Stoneyville 7" and "indigenous" cotton. These are not different varieties of cotton, but different species altogether. Stoneyville 7 is a variety of G. hirsutum or upland cotton. Indigenous cotton is a type of G. barbadense, which apparently grows wild throughout most of Haiti. It is often called "tree cotton", and it is harvested and exported to Europe for use in mattress stuffing, particularly on the central plateau. Stoneyville 7 is grown by farmers mainly in the Gonaives area for sale to the cotton gin, and is generally considered the "commercial", or export quality, cotton.

Cotton production peaked in the 1920s and 1930s before declining as the result of the boll weevil. This earlier production was of indigenous cotton which apparently was extremely susceptible to the weevil. Stoneyville 7 cotton was introduced in the 1960s and is currently the most intensively grown. Table 36 gives the production, acreage and average yield of cotton from 1962 to 1986. According to Agland, cotton production in the 1980s has ranged from 1,300,000 lbs to 6,087,000 lbs. Area planted during that period has ranged from a low of 3,841 acres in 1986 to a high of 11,458 acres in 1980.¹⁶ Yields have been very low, ranging between 300 and 700 lbs per acre. Production has apparently been largely ginned and used in Haiti, but cur-

16. Agland gave the area in acres and production and yields in lbs. To convert to the approximate kgs. per hectare, divide by 0.88

TABLE 36
COTTON DATA - HAITI ¹

YEAR	PRODUCTION SEED COTTON 000s lbs.	AREA PLANTED ACRES	AVERAGE YIELD LBS/ Acres ²	NUMBER OF FARMERS	AVE AREA PER FARMER ACRES	FARMGATE PRICE ¢/LB	TOTAL FARMGATE VALUE	COTTON SEED PRODUCTION (000s LBS)	ESTIMATED COTTONSEE OIL (20%) (000s LB)
1962	81	252	321	136	1.85	00.10	08,100.00	37	7.40
1963	650	1,072	606	310	3.46	00.10	065,000.00	296	59.20
1964	1,437	1,640	876	1,053	1.56	00.10	0143,700.00	655	131.00
1965	883	2,433	353	1,565	1.55	00.10	088,300.00	402	80.40
1966	468	4,718	99	3,009	1.57	00.08	037,440.00	213	42.60
1967	142	1,823	78	1,746	1.04	00.08	011,360.00	65	13.00
1968	943	1,741	542	1,943	0.90	00.08	075,440.00	430	86.00
1969	1,669	2,458	679	2,285	1.08	00.08	0133,520.00	761	152.20
1970	2,748	3,994	688	3,825	1.04	00.09	0247,320.00	1,252	250.40
1971	4,238	5,535	766	4,532	1.22	00.10	0423,800.00	1,931	386.20
1972	6,413	9,774	656	7,999	1.22	00.10	0641,300.00	2,922	584.40
1973	5,595	14,002	400	10,294	1.36	00.12	0671,400.00	2,550	510.00
1974	3,555	10,436	341	7,064	1.48	00.14	0497,700.00	1,620	324.00
1975	3,894	7,467	521	5,986	1.25	00.14	0545,160.00	1,774	354.00
1976	2,074	6,533	317	5,382	1.21	00.16	0331,840.00	945	189.00
1977	3,247	5,842	556	4,323	1.35	00.16	0519,520.00	1,480	296.00
1978	3,621	7,556	479	5,138	1.47	00.18	0651,780.00	1,650	330.00
1979	4,632	7,889	587	5,091	1.55	00.18	0833,760.00	2,111	422.20
1980	6,087	11,458	531	6,322	1.81	00.19	01,156,530.00	2,774	554.00
1981	2,695	6,699	402	3,962	1.69	00.19	0512,050.00	1,228	245.60
1982	3,889	6,306	617	3,909	1.61	00.19	0738,910.00	1,772	354.40
1983	3,997	6,765	591	3,749	1.80	00.20	0799,400.00	1,821	364.20
1984	4,887	6,753	694	3,536	1.91	00.20	0937,400.00	2,136	427.20
1985	3,820	6,192	617	4,019	2.03	00.20	0764,000.00	1,741	348.20
1986	1,300	3,841	330	1,442	2.66	00.20	0260,000.00	592	118.40
1987						00.20			

Source: Agland Investment Services, Inc., 1987, adapted from BNDAI Oil Production, Mission Calculations.

¹ To estimate lint amount, multiply seed cotton by 0.35.
² To convert lbs./acre to kg/ha, divide by 0.89.

rently exports of cotton to Europe are taking place.

e. Essential oils

The main essential oils produced for export in Haiti are vetiver, lime and amyris. According to Delatour (Delatour, 1983) essential oils production and export are relatively recent. Exports amounted to \$1,431 for 555 kg in 1932-33, rose to \$615,600 on 84 tons in 1950, reached 394.4 MT in 1976, worth over \$8 million, before declining to 215 tons for \$5.1 million in 1982. Apparently in the earlier years Haiti exported petit grain, neroli, and sweet basil, but currently only exports lime oil, vetiver oil, amyris, and a small quantity of bitter orange. According to Delatour, Haiti is the only producer of amyris, the largest producer of vetiver¹⁷, and the second largest producer of lime.

At farm level the cultivation of vetiver (the major essential oil source) is very destructive to the land since it is the plant's spreading roots which are distilled for oil. The vegetative part of the plant is used for thatch. Delatour suggests the need for investigation of the possibilities for growing vetiver in ways which are less destructive, in addition to conducting research on ways of increasing yield.

i. Vetiver

Vetiver oil is extracted from the dried roots of the vetiver plant, Vetiveria zizanioides Stapf, family Gramineae. Delatour cites reports putting the area in vetiver at 1,600 hectares in 1950, between 2,700 and 3,400 in the late 1960s and around 7,500 hectares in 1979 (Delatour, 1983). However, he notes that almost all estimates work back from export volume using a conversion ratio of about 1 to 1.5 percent and with estimates of root production of 1.5 to 2 tons per hectare. He cautions that often the market is weak and large areas may go unharvested, or that plants are allowed to mature, thus lowering the extraction rate of oil. Using the 2 ton per hectare figure, Delatour estimates the average area planted from 1980 to 1982 was 3,600 hectares, producing 7,200 tons of roots resulting in the export volume of 72,224 kg. In the second half of 1986, the ADS-II national survey recorded 400 hectares in mono-crop in the southern departments and 100 hectares each in associated cropping. This com-

17. Apparently the other two main producers of vetiver are China and Indonesia.

pared with 1,600 hectares grown in association with other crops in the southern department in the first season of 1986, and 810 hectares grown as a pure crop (ADS II, 1987).

ii. Lime

Using the 1980-1982 average output of oil, Delatour estimates that 15,282 tonnes of fresh fruits were needed at an average yield of 0.5% oil to fresh lime. Fruit yields were estimated to range from 10 to 30 tons per hectare. Assuming an average of 20 tons, Delatour estimates the area in lime for oil at about 800 hectares. He feels the actual plantations would be somewhat larger, and cites a study that put the area at 2,000 hectares which allowed for domestic use.

iii. Amyris

Amyris oil is extracted from a wild tree, Amyris balsamifera belonging to the Rutaceae family. Exports of this oil began in 1943-44 from a plant located at Chalons outside of Miragoane. The oil is apparently extracted from the main branches and trunk of the tree. Delatour reports that only trees from certain areas are appropriate for processing, and that the wood must be dried at least 6 months before processing. The wood is first chipped by hand and then mechanically ground into sawdust. Because it is very corrosive, only stainless steel can be used for the processing, which requires a distillation time of up to 168 hours (Delatour, 1983).

Delatour reports that it was claimed that the tree takes up to 20 years to grow, and that it grows spontaneously, no one knew how to grow them.¹⁸ The main supply areas are now apparently Tortuga Island, and Mole St. Nicolas.

Exports of amyris oil averaged 21,688 kg from 1950 to 1954, rising to an average of 32,341 kg between 1955 and 1959, with exports recording an increase of 69% for the 1960-1964 period and another 72% during the 1965-1969 period over the previous period (Delatour, 1983). This has been followed by a continuous decline.

18. Delatour seems to be in some doubt as to the truth of this information.

It seems that the producers of the oil in Haiti control output of the product to maintain prices at a high level, something they are able to do as Haiti is the sole producer of the product. In the 1950-54 period, price was \$2.45 per kg, dropping to \$1.90 in 1955-59, to \$1.83 in 1960-64 and to \$1.71 in 1965-69. Prices rose rapidly after this to \$9.15 per kg in 1975-79, and as high as \$15.90 in 1982.

iv. Bitter Orange

Bitter orange is apparently a very small specialized export product controlled by two plants. Delatour reports that one plant, Marnier L'Apostole, is a wholly owned subsidiary of the buyer and the fruit is grown on its own small plantation. In the second case the Haitian producer, Guacimal, has a long-term contract with Cointreau and grows its own supplies on a 100 hectare plantation.

7. Alternative Crops for Sugar Cane

The sugar cane situation in Haiti indicates that most of the present cane hectareage will not be used for sugar cane within a few years. Only one sugar mill is reported to be in operation this year.

A strategy for replacing most of the sugar cane produced for sugar with other crops must be developed. A study of the feasibility of several alternatives should be conducted by the Agricultural Development Office of USAID/Haiti. A potential alternative principal crop and several other feasible uses of the land released from sugar cane are presented in the discussion that follows:

a. Recommendation: Soybean Project for the Plains

A project for development of capabilities to produce crops that yield edible oils for domestic consumption is recommended for the plains.

Soybean production is feasible as an alternative crop to sugar cane on those soils of the coastal plains that are well drained. The climate and soils of the plains are suitable. Farmers on the plains generally have experience with bean production. Soybean cultivars with known adaptation to low latitudes are available from international centers. Soybeans are recommended as the major alternative crop to sugar cane in the plains. Beans, peanuts and corn are recommended as rotation crops with the soybeans.

The Agricultural Program of USAID/Haiti could have a

definite impact on the sustained production of edible oils for domestic consumption by developing a soybean production program in Haiti. The critical question, "What can be produced on the plains in place of sugar cane?" can find a partial answer in "Soybeans". A soybean program should include the rotation crops as good agronomic management demands for the tropics. The well-drained coastal plains soils would be targeted in this project. Food crops would not be displaced. Oilseed extraction capability is already present in Haiti.

The Leogane Plain would be the favored location for the implementation of a soybean production project in Haiti. This plain has all the requisites for the project suggested, and is used as an example in the following discussion.

i. The Argument for the Project

A rationale for an edible oil production program in Haiti, based on soybeans and including peanuts, corn, and beans as complementary crops follows.

Most of the demand in Haiti for edible oils is met by oil from imported oilseed. Annually from 1979-81, 18,960, 22,924, and 18,398 metric tons of soybean oil or soybeans for these amounts of oil were imported (FAO, 1987). Most of the oil was extracted in Haiti. This represents a high import cost for an agricultural product that can be produced in Haiti for domestic consumption.

Soils in the coastal plains contain alluvium transported from mostly calcareous sources. These soils occupy large areas suitable for production of soybeans, peanuts, corn and beans. The plains have most of the developed irrigation land area in the nation. Rainfall is generally adequate for production of these four crops, except in the Artibonite Plain near Gonaives where annual rainfall is about 600 mm. This is the primary cotton producing plain of Haiti. An expansion of cotton hectareage is recommended for the Gonaives area (see b. below).

In the Leogane Plain, sugar cane occupies more than half of the total land (55% of 10,000 ha) and 80% of the tilled land. The portion of each plain that is in sugar cane varies but the percentage is high for each. The following discussion on the Leogane Plain gives details as an example of the potential for substituting oil crops for sugar cane on the plains. In the case of Leogane Plain, 57.8% of the 6,985 ha

of tilled land is suitable for soybean production. Approximately 3,000 ha of the 4,037 ha suitable to soybeans is in sugar cane and 1,100 ha is in food crops.

Using the 3,000 ha figure as the land area at Leogane that will be removed from sugar cane and thus available for soybeans, the calculations that follow support the recommendation to produce soybeans on suitable former sugar cane land on Leogane Plain.

ii. The Calculation for Leogane Plain

Assumption: take 900 to 1,200 kg/ha as the anticipated soybean yield on the Leogane Plain. Use 1,000 kg for the calculation.

Given: Soybeans average 19% oil and 38% of protein meal.

Therefore: One ton of soybeans produces 190 kg of oil. A yield of one ton per ha on 3,000 ha produces 3,000 tons of soybeans, 570 tons of oil, and 1,140 tons of protein meal.

iii. The Calculation for All Coastal Plains

Substituting soybeans for sugar cane on all the sugar cane land suitable to soybeans on all the plains would provide about 3,350 MT of oil and 6,700 MT of protein meal. This is about 17% of present annual importation.

An extension of the calculation for Leogane Plain to all plains would give the following:

Assumption: 58% of land in sugar cane in all plains is suitable for soybean production.

Given: 30,536 ha in sugar cane on coastal plains.

Therefore: $30,536 \text{ ha} \times 0.58 = 17,710 \text{ ha}$
Soybeans/year, $17,650 \text{ ha} \times 1 \text{ MT/ha} = 17,710 \text{ MT}$
Oil, $17,710 \text{ MT} \times 0.19 = 3,365 \text{ MT}$
Protein meal, $17,710 \text{ MT} \times 0.38 = 6,730 \text{ MT}$

The edible oil produced is approximately 17% of the annual import of edible oil: $3,365/20,094 \text{ MT} = 16.7\%$.

Conclusion: Approximately 17% of present imports of

edible oil could be produced by replacing 50% of sugar cane area with soybeans.

The team is aware that the "Bumpers Amendment" prohibits A.I.D. funding crop production in developing countries that may compete with crops produced or in surplus in the U.S. However, we have gone ahead with our recommendation that a soybean production project be considered for Haiti on the basis of A.I.D.'s PD15, which provides the Agency's interpretation of the Amendment, and because the CBI, which affects Haiti's export status, is also relevant. We wish to emphasize that Haiti presently has no UMT (usual marketing requirement) for soybeans or soybean oil, since whatever is imported is provided under Title I/III concessional sales programs. Further, we note that the proposed project at best would meet only 17% of the current imports under PL 480, and would not in any event lead to exports of soy products from Haiti.

b. The Alternatives Described

Soybeans are proposed as Alternative "A". It is recommended that other crops be planted in rotation with soybeans. This would tend to avoid the development of pest populations. Market prices of soybeans would tend toward being market driven if they can be replaced readily by another crop. The rotation crops include beans, corn, and peanuts.

Other alternatives to sugar cane on the plains are listed and discussed below as "Alternatives B, C, D, E, F, G and H". Alternatives B, C, and D are directed toward land in sugar cane that is suitable to soybeans, beans, corn and peanuts. Alternative E involves coastal plains soils that are better suited to cotton than to other crops. Alternative F involves a 15-year program to use sugar cane for production of fuel alcohol.

Alternative B: Produce peanuts for edible oil, roasted nuts, and peanut butter.

Alternative C: Increase bean production for the domestic market. Cultivars highly resistant to diseases (especially mosaic virus) would be required.

Alternative D: Increase corn production for corn oil, for processed cereal products, and for dry packaged foods such as hominy grits.

Alternative E: Increase cotton production on the Gonaives

cotton land to produce edible oil, protein meal for ruminant feed and cotton fiber for market. A cotton program should increase hectareage and total production to the level that would make the present ginning operation economical. This would require double the average hectares producing cotton (2 x 6,200 = 12,400 ha) as calculated in the Haiti cotton report by Agland (1987). A cotton program in Haiti should also include consideration of Sea Island cotton production of fiber for typical domestic products and for export of long, fine fibers. Sea Island cotton fiber is not produced in the United States, thus not competing with a U.S. export. The fiber occupies a unique place among natural fibers.

Alternative F: Use sugar cane for production of fuel alcohol. Plains land not suitable to soybeans and other crops that require well-drained soils could support an alcohol program. Alcohol can be substituted for 10% of gasoline in conventional vehicles, used for drying agricultural products, to fire boilers in small industry such as laundries, and as fuel for electrical generators. Alcohol produced would substitute for imported petroleum and for scarce wood and charcoal.

Alternative G: Various combinations of A, B, C, and D can be devised because the crops are not mutually exclusive.

Alternative H: Combinations of A, B, C, D, E, and F.

c. Comparisons and Evaluations of Alternatives

- i. Alternatives A, B, and C would generate food of high protein content and in the case of soybeans, protein meal, for producing animal protein. The UN recommended daily protein intake is 60g per person. Haiti averages about 41 g of protein per person (31% low).
- ii. Alternatives A, B, C, and D include crops that can be produced advantageously in rotation on the same field. The three legumes and especially soybeans leave a N residue for the rotation crop. The grass crop (corn) is not susceptible to the diseases and nematodes that attack each of the legumes.
- iii. Alternatives A and D (soybeans and corn) can be produced on the moderately well-drained rice land. Soybeans are commonly produced in rotation with rice in the White, Black, Cache and Mississippi Rivers valleys of Arkansas. An alternate is needed for rice land in Haiti because of high supply and market import pressures from imported rice. While the

agronomic potential of rice in Haiti is good, the economic potential is presently limited.

- iv. Alternatives A, C, and part of B could be planned within a 5-year period. Option D would require a 10-year time frame, as would the peanut butter aspect of B.
- v. Alternative E (cotton) involves a drier plain and is not competitive with, nor will it substitute for, any other option. Cotton production should be increased in order to make the gin an economic unit.
- vi. Alternative F (alcohol) is a long term (15 year) type of project but has a precedent in Brazil and somewhat in Paraguay. It would replace imported fuel.
- vii. Summary on Alternative A. Soybean production can be initiated within a 5-year planning period. Positive aspects of this option include:
 - An imported food would be produced domestically;
 - Soybean meal is a high protein substance suitable for human consumption, and of great value in poultry and swine rations;
 - Soybean germ plasm for low latitudes is readily available;
 - Soybean inoculants to promote nodulation for symbiotic N transformation (fixation) are available;
 - Soybeans enrich the soil with N for grass cereals in rotation;
 - The products would be for domestic consumption;
 - The technical know-how for establishing successful low latitude soybean programs resides among the professional agronomists of the United States.

d. The Leogane Plain: A Sample Area

In 1986, a study team contracted through IICA by USAID made a study of crop production in the Leogane Plain of Haiti. The study was focused on irrigation systems. Four

reports and a project summary were published (IICA, 1986). The Plain of Leogane is situated on the north-south coastline on the west side of the island and on the north side of La Selle Mountain. Geographically, the location center is approximately 74° 30' West and 18° 26' North latitude.

The soil of the plain developed in recent times as alluvium was deposited by four rivers: the Gressier, Momance, Rouyonne, and Cormier. The alluvium contains calcareous and magmatic materials.

More than 55% of the land area of the plain is well-drained. Incomplete but instructive information on profiles of the well-drained soils is included in Table 37. A report compiled by several members of the Faculty of Agronomy at Damien (Madian, 1981) in Port-au-Prince described the well-drained soils of the Leogane Plain in essentially the same way as described by the IICA team.

Approximately 7,000 of the 10,000 ha in the Leogane Plain are planted to crops, both annuals and perennials. For convenience, the crops can be divided into: (1) food crops, and (2) sugar cane. Sugar cane occupies almost 80% of the land (5,500 ha) with 1,500 ha of cane irrigated. Much of the cane is on poorly drained soil with a clayey subsoil. Some of the cane land is flooded periodically by the rivers. However, much of the sugar cane occupies soils that are suitable for other crops including soybeans, peanuts, corn and sorghum. The IICA team report stated that sugar cane is dominant in the plain because of "tradition, the lack of irrigation water, land tenure and by lack of incentives for other crops".

The principal food crops in the Leogane Plain are: beans, corn, sorghum, sweet potato, plantain (banana), rice, cassava, and tomato. Food crops produced on 1,100 ha in this plain are cultivated in small field plots either in monoculture rotations or in mixed crop associations. The most common associations are plantain-beans-sweet potato or plantain-beans-cassava. Common rotations include beans-corn-sorghum, tomato-corn-sorghum, or rice-beans. Average food crop yields under irrigation with some fertilizer, especially on beans, and with cultural practices performed at the correct time are reported as: (kg/ha) beans, 1,000-1,500; corn, 3-4,000; sorghum, 2-3,000; and plantain 7-12,000 kg/ha. Actual and potential yields of crops in Leogane Plain are in Table 38.

TABLE 37

Characteristics of the Soils Suitable for Soybean and Peanuts
in the Plain of Leogane (Departement Ouest)

<u>USDA/SCS Classification</u> (After Tahal, 1981)	<u>Suitable</u> <u>Crop(s)</u>	% of Leogane Plain
Typic Ustifluvents Soil formed in recent alluvium; deep, silty loam, free carbonates present, good to excessive internal drainage.	All crops (including soybeans, beans, peanuts, corn)	13
Mollic Ustifluvents Soil formed in recent alluvium; deep, silty loam, free carbonates present, good internal drainage.	All crops (including soybeans, beans, peanuts, corn)	3.5
Mollic Ustifluvents Soil formed in recent alluvium; deep, silty clay loam to silty clay, free carbonates present, good internal drainage.	All crops (including soybeans, beans, peanuts corn)	10.0
Mollic Ustifluvents Soil formed in recent alluvium; very deep, silty loam, no free carbonates, good internal drainage.	All crops (including soybeans, beans, peanuts, corn)	31.3
	(Total)	57.8 of 6,985 ha

The successful cultivation of these food crops indicates that the well-drained soils are suitable for soybean production. The soils on 4,000 ha (Table 38) have the characteristics associated with soybean yields of 1500 kg/ha near 20° South latitude in Brazil. The rainfall amount and distribution at Leogane are adequate to produce more than 1,200 kg/ha. Irrigation and added potassium fertilizer could produce soybean yields of adapted varieties of well above 2,000 kg/ha.

Soybeans would fit in a sequence following a winter crop of beans at Leogane. Beans that are susceptible to mosaic virus in Haiti are planted in the plains during the cool season (see Figure III-2) and harvested in April. Soybeans could be planted in April. Soybeans could be planted in May/June and harvested in September.

e. Sources of Technical Information

The International Soybean Center (INTSOY) in the USA maintains a soybean germ plasm bank for tropical conditions. Photoperiod neutral soybean cultivars are available. INTSOY agronomists have conducted field trials on soybeans in more than 20 nations over the last 15 years. The tropical germ plasm bank is usually maintained at the University of Puerto Rico at Mayaguez.

INTSOY is a program of the Agronomy Department of the University of Illinois at Urbana-Champaign. Dr. John Santas is in the information and educational section at INTSOY. Dr. Harry Minor soybean crop ecologist at the University of Missouri at Columbia, conducted the tropical field trials for INTSOY for several years. The agronomist on this team worked in soybean research in Brazil for three years for the University of Wisconsin/A.I.D.

Soybean production at low latitudes is now feasible because soybean cultivators with photoperiod adaptation are available. EMBRAPA researchers in Brazil have recorded soybean yields of 2,500 kg/ha at 40 latitude. The technology for production of inoculant that is effective in hot, wet regions has added stability to tropical soybean production. Dr. Jardine Freire of IPAGRO/EMBRAPA in Porto Alegre, Rio Grande do Sul, Brazil is a leader in inoculant work.

8. The Social Organization of Small Farm Agricultural Production and the Role of Women

The timing and orientation of the scope of work for this

TABLE 38

Yield of Crops Planted in Leogane Plain, with Comparisons

<u>Crop</u>	<u>Average Actual Yield*</u> (kg/ha)	<u>Potential Yield**</u> (kg/ha)	<u>National Average Yield</u> (kg/ha)
Corn	1,000	3-4,000	780
Sorghum	1,000	2-3,000	790
Rice	2,000	3,000	2,540
Beans (dry)	750	1-1,500	590
Bananas (plantain)	5,000	7-12,000	6,270
Potatoes (sweet)	4,000	6-8,000	585
Cassava	4,000	6-8,000	4,270
Sugar cane	55,000	80,000	50,600
Tomato	29,000	35,000	12,000

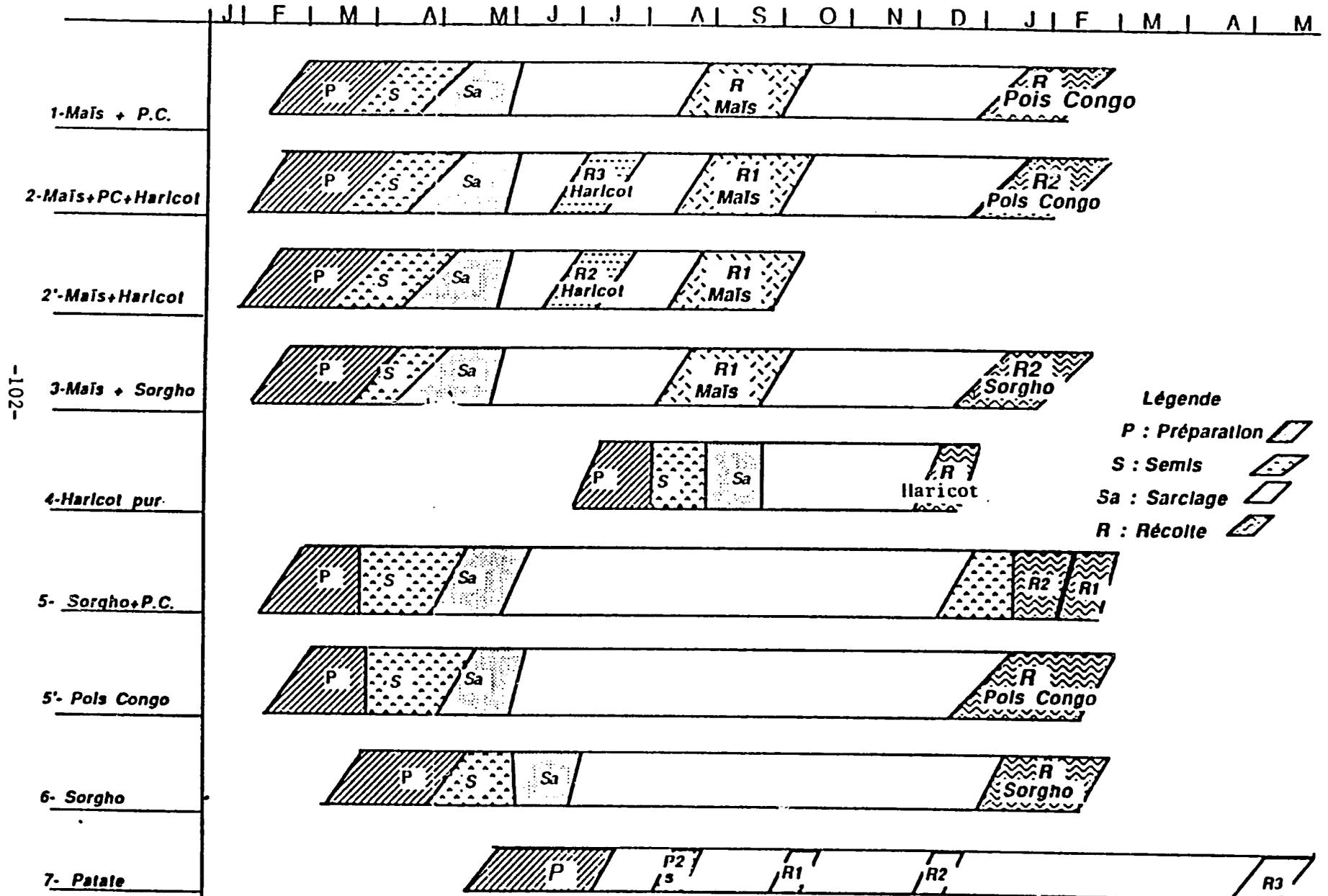
* Average of rainfed and irrigated (supplemental and full).

** Assumes some fertilizer, fully irrigated, timely planting and harvest.

Source: IICA, 1986, CEP, 1985.

FIGURE III-2

CROP CULTURAL CALENDAR FOR DISTRICT



Source: STABV, 1987, Haiti.

ment did not permit a concerted examination of the social organization of farming or of the process of household decision-making on the hillsides or in the plains. This kind of micro analysis at the field level is not appropriate to a sector assessment of this generality in any case. Nevertheless, in order to make available acceptable adaptive technological or support system improvements, ultimately this kind of micro-level data collection and analysis is necessary. The household consumption survey being funded by A.I.D. should provide a subset of relevant information despite problems in its implementation. Further, there are a number of micro-level studies by anthropologists and other social scientists which provide some relevant data and analysis.

Surprisingly, however, there is a general lack of information on the role of women in agricultural production, although it is widely recognized that women play a key role in agricultural marketing, both on the local level and at the national level as well. Perhaps because this aspect of women's roles in agriculture is widely accepted by technicians and analysts, more in-depth attention has not been given either to the specifics of this role, or to their other roles, especially as producers and processors.

In a country where data are generally poor, as elsewhere, data sets tend to be disaggregated by sex. However, A.I.D. should do whatever it can to see that this oversight is not continued in studies which it funds. Further, project designs should pay genuine attention to the role of women, rather than providing a pro forma "WID" analysis. This is called for, for example, in the scope of work for the forthcoming PP for the Coffee Project. It is also noted by ADO staff that the PVOs often raise the role of women in their project activities in agriculture of themselves, and that this should be encouraged and built upon.

There is some reason to believe that the new policy shifts on the part of the CNG--especially those that have facilitated the importation of contraband--have had a disproportionately deleterious effect on the incomes of women marketers. This, if true, derives in part from the scale at which such activities have been managed and implemented. However, if it is true, then the overall effect on rural households, especially those in the hillsides, may be doubly deleterious, since income from maize production will be lost as protection ceases, while at the same time, income from marketing of maize and other products also declines--whether these products are produced by the household itself or by others.

Further, there is at least anecdotal evidence that there is a "feminization of poverty" in urban settings in Haiti, since the proportion of female-headed households in the slums of Port-au-Prince, for example, may be higher than the proportion of

female-headed households in rural areas (see Chapter V). However, it is possible that the proportion of households headed by women in hillside areas is also high in absolute terms, given out-migration patterns and other social and demographic trends characteristic of the Caribbean as a whole. These matters, as well as the specifics of the role of women in agricultural production and marketing, merit closer investigation and coherent developmental attention.

9. Assessment of the State of Agronomic Practices on Small Hillside Farm Holdings

Most of the land occupied by annual crops on the hillsides has a slope greater than 50%. The soil is generally highly eroded with many limestone rocks of 5 to 15 cm diameter on the surface. Further erosion under present traditional cropping systems is certain. Perhaps 25% of the hillside fields have been terraced. Property lines that run across the slope present some deterrent to running water. Beans are planted on a random broadcast pattern with high plant populations up to 250,000 per hectare. Sorghum and corn are planted in clusters of 3 to 5 plants per hill with a high population of 50,000 hills per hectare. These populations of beans, sorghum and corn give complete canopy covers approximately 6 weeks after plant emergence. For the remainder of the crop season, the soil surface is protected in these fields. Extremely high soil erosion occurs during field preparation and until the crop canopy forms, however.

a. Cropping Methods

Sweet potato plants (slips) are transplanted to low beds in the field. The field beds are approximately 50cm wide at the base and 15cm high. The vines grow to full ground cover in three weeks. Erosion is greatly reduced until the potatoes are dug at harvest time. This activity exposes the soil to extreme erosion pressures. Sweet potato beds are often laid out across the slope to reduce erosion. The vines are often collected and carried to livestock for forage. The removal of tops and roots along with the soil disturbance of harvest make sweet potatoes a high erosion risk crop in hillside farming.

Other hillside crops that require soil disturbance for harvest include yams, manioc, and peanuts. These crops are high risk erosion crops. The manioc provides perennial but only partial ground cover. Yams have high yields compared with sweet potatoes. Peanuts are legumes with symbiotic nitrogen transformation capability.

All of the annual crops of hillside farming leave the soil exposed to falling rain for part of the crop season. Crop stover is generally removed from the crop plots and

carried to livestock for forage. Root crops require soil disturbance at harvest. Generally, no fertilizer is applied to hillside food plots. The drain on soil fertility is not replenished by fertilizer or plant residue. Organic matter is not returned to the soil to promote soil structure development or to mineralize into plant nutrients. Nutrient drain and erosive forces of falling rain on bare soil and running water on steep slopes all combine to produce a potential disaster for the people who depend on this production system for food. The fields will not sustain their present production without changes in the system of hillside farming.

b. Crop Cultural Practices, Calendars and Predominant Crops

The cultural practices for crop production involve a wide range of factors including choice of soil site, selection of crop and variety, time of planting, pattern of planting, fertilizer choice and other agronomic decisions.

Figure III-2 is a calendar of crop cultural activities developed by STABV (1987) for a pilot program in Morne a Cabrit. This calendar is typical for hillside agriculture in Haiti. Figure III-3 includes six sets of cropping calendars that are used on the small fields (one-third ha) in hillside farming. Two to six crops will be grown on one parcel of land. The crops may be planted in monoculture or in various combinations (associations) in one field. Note that pigeon pea (pois congo) is a long-season crop, serving a vital function in soil stabilization. This ADS-II Survey data illustrate the dominant presence of sorghum and corn in the region. Pigeon peas follow these two cereals in total hectares planted. Sweet potatoes, cassava, bananas, and beans are always present in this region and all regions of Haiti.

c. Soil Erosion

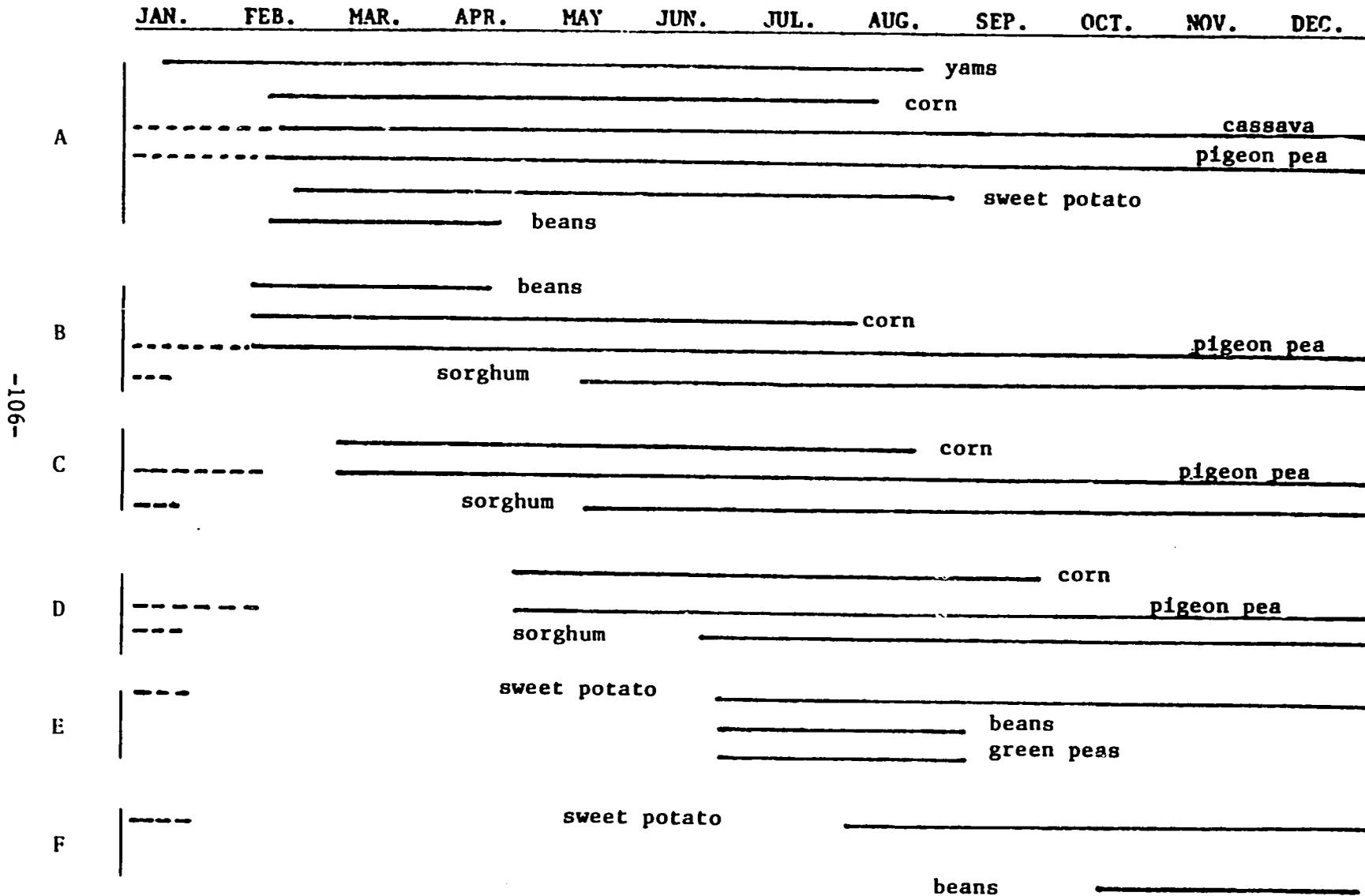
Soil erosion is the greatest constraint to sustained food production on hillside fields. Hillside soils are highly eroded now. The crop cultural system in use favors accelerated erosion. Soil depth is not adequate to store enough water to prevent water stress in beans, sorghum, and other common crops. Surface infiltration rates are low, and therefore runoff is excessive. The fact that these steep soils have supported intensive crop culture for many years is evidence that the soils were once stable and fertile.

d. Erosion Observed

Many former food crop fields are abandoned with only the

FIGURE III-3

SIX GENERAL CROP CALENDARS FOR HAITI



Source: Blemur, M., 1987.

perimeters identified by sisal plants and rock exposed in the field. Water drainageways with bottoms of bare rock often extend 100 m downslope from hillside food production plots. Rainfall is neither infiltrating into the root zone nor into the zone beneath the rhizosphere to recharge hillside springs. Torrents of unchecked water carry soil and rocks from the hillside fields to the valleys below. Intercropping between perennial plants with residue management that returns plant nutrients and soil-binding humus to the fields are urgently needed to sustain the food production capacity of these fields.

e. Constraints to Crop Production

Climate, soil, germplasm, agronomic practices and crop harvesting methods are determinants of crop yield. In the micro-environment of the plant, physiological conditions, plant nutrition, diseases, insects, nematodes, and weeds are constraints to crop production.

i. Constraints of Climate, Soil, and Crop Variety

The study team on coffee (IICA, 1987) proposed a scheme for communicating an agronomic evaluation of crop yield constraints to decision-makers. Based on field observations and notes, they assigned a numerical value (score) to five determinants of crop yield with the greatest restraint receiving the lowest score and the least restrictive factor receiving the highest score. The combinations of scores indicate the magnitude to which yield is limited. This scheme is basically an extension of Von Liebig's classic "Law of Limiting Nutrient Elements". The factors present in the lowest amount relative to the amount required for maximal yield becomes the ultimate determinant (constraint) to yield. The relative scores for constraints to yield of twelve crops in Haiti have been developed by the Agriculture Sector Assessment team Agronomist (Table 39).

Using corn from Table 39 as an example, the score of 60 for climate and the score of 20 for soil indicate that soil conditions are three times more restrictive than climate to corn yield on hillside farms. In the case of corn production on hillside farms, the combination of constraints as indicated by their scores restricts corn yield to 20% of its potential. "Potential" yield in this scheme is the yield that would be realized if none of the five factors had a score less than 100.

ii. Constraints of Plant Condition, Nutrition and Pests

The constraints to production of 20 important crops in Haiti have been identified and tabulated by Marguerite Blemur (1987), M.Sc. in tropical agronomy, and are presented in Table 39. The table is extensive; therefore, its content will not be described in the text of the report. These summary statements and evaluations of the intensity of the constraints should be helpful to the reader:

- o Nitrogen is the nutrient most often deficient in cereal crops;

10. Major Constraints to Establishing a System of Sustainable Crop Production in Haiti

Constraints which prevent the rural householder within the dual agricultural systems (hillsides and plains) from achieving increased production and more stable food supply and income level are numerous in Haiti. Constraints are often considered at two levels: (1) farm-level, and (2) support systems level. Farm-level constraints include access to productive inputs and shortage of natural resources. Support systems-level constraints involve marketing government, and other institutional entities (such as cooperatives--see Chapter VI). In Haiti, the rank order of constraints differs between hillside and plains agriculture.

a. Hillside Farming

In hillside farming, the primary constraint to sustainable production is the limited amount of tillable soil. No amount of credit, farm-to-market roads, improved cultivars, or cooperative management expertise will replace the fragile soil mantle on the steep hillsides of Haiti. Soil is the natural resource in greatest peril in hillside farming. Hillside soil will erode faster and faster as permanent tree vegetation is removed. Soil is the number one constraint to successful farming on the hillsides. If erosion continues, farming in terms of annual tilled crops will come to an end on the slopes. If allowed to erode further, the denuded land will be torn off the hillsides and washed to the drainage-ways and streams.

Recommendation:

Support systems, including rural education on conservation farming, are the only hope for stabilizing the soil and thus stabilizing production on the hillsides. A vigorous program of information delivery is needed. This extension-type work could function through agricultural

TABLE 39

INFLUENCE OF CLIMATE, SOIL, GERM PLASM, AGRONOMIC PRACTICES,
AND HARVEST/POSTHARVEST CONDITIONS ON YIELDS OF
13 CROPS, HAITI

A. Hillside Farming Conditions								
	Coffee	Beans	Corn	Sorghum	Cassava	S. Potato	Tomato	Peas
Climate	95	80	60	80	90	80	70	90
Soil	60	30	20	30	40	40	40	40
Germ plasm	45	50	40	30	80	60	60	40
Agronomic Practice	55	60	50	60	75	70	60	60
Harvest/Post	60	70	70	70	80	60	60	70
YIELD % of Potential	30	30	20	30	35	40	40	40
Haiti Yield Avg. (kg/ha)	250	540	700	600	4,000	6,000	8,000	368

B.1. Plains, Irrigated

	Beans	Corn	Cotton	Rice	Sugar Cane
Climate	95	95	95	95	95
Soil	90	90	80	95	90
Germ plasm	40	30	70	60	80
Agronomic Practices	40	30	65	40	65
Harvest/Post	60	70	85	65	65
YIELD %	40	25	65	40	65
Haiti Yield (kg/ha)	1,000	1,200	550	2,500	30 MT

B.2. Plains, Rainfed

Climate	70	70	75	n/a	70
Soil	80	90	90	-	90
Germ plasm	50	30	75	-	80
Agronomic Practices	60	30	60	-	70
Harvest/Post	70	75	85	-	60
YIELD %	40	20	40	-	60
Haiti Yield (kg/ha)	750	800	210	-	12 MT

TABLE 40
PHYSIOLOGICAL, DISEASE AND INSECT PROBLEMS OF THE MAJOR CROPS GROWN IN HAITI (FROM VARIED SOURCES)

CROP	PHYSIOLOGICAL PROBLEM	DISEASE	CONTROL	INSECTS/ENEMIES	CONTROL
Corn	N Deficiency	<u>Helminthosporiose</u> (leaf spot) (f.)	Fungicide (Beulate, Capten)	<u>Spodoptera frugiperda</u> (eat the leaves)	Insecticide, cultural pract alternate rows of sun- flowers or cotton
		<u>Ustilago maydis</u> ² (f.) (Charbon) <u>Cercospora maydis</u> (spots on the leaves) (f.) (ST Raphael) Downy Mildew	Fungicide, Resistant Variety Fungicide		
		Corn Stusit (Virus Mycoplasma)	Resistant Variety Resistant Variety	<u>Heliothis</u> sp (ear worm)	Insecticide as Sevin, Malathion
Sorghum/Millet	N Deficiency Weeds ³ Sterility	<u>Tolyposporium</u> <u>penicillarias</u> "charbon" of the panicle (f.) caused by <u>Sphacelotheca</u> <u>reiliana</u> Mildew (f.) (<u>Sclerospora</u> <u>granimicola</u>)	Fungicide, Resistant Variety Fungicide	<u>Cecidoniya</u> , <u>Geromya</u> <u>Permiseti</u> , <u>Contarinaria</u> <u>Sorghicola</u>	Early maturing Varieties
Rice	N Deficiency Zn Deficiency	<u>Piriculariose</u> (<u>Piricularia</u> <u>oryzae</u>)	Cultural Practices Decrease N doses Adequate Irrigation	Rats caused 15% of loss in the Artibonite Valley during rainy seasons	Phosphorus and other fertilizers
		<u>Helminthosporiose</u> Blast Rust	Good Drainage <u>silicium</u>	Bugs (<u>Nezara</u> <u>viridula</u>) During cooler seasons	Insecticide
		NB - For all grains in stocks bacterias and fungi in humid conditions.	Fungicide	Birds - "madam sarah" Grain stock insects	Scarecrow Drying

CROP	PHYSIOLOGICAL PROBLEM	DISEASE	CONTROL	INSECTS/ENEMIES	CONTROL
				<u>Sitophilus orizae</u> <u>Tribolium spp.</u> <u>Colandra orizae</u> <u>Trogoderma granarium</u> <u>Rhizoperta dominica</u> Rats, mice	Insecticide Raticide
<u>PULSES</u>					
Common Beans		Golden Mosaic (V.) in the plains	Resistant varieties such as Tamazulapa	<u>Beltrisia, tobacchi</u> vector of mosaic, <u>Empoasca fabae</u> (leaf hoppers)	Insecticide Insecticide
		Anthracosis (f.) Angular spot disease Rust (the last three diseases in the highlands)	Fungicide Resistant Varieties		
Cow pea		Mosaic	Resistant Variety	Cowpea weevil Aphids Beetles (in storage)	Insecticide Insecticide Insecticide
<u>ROOTS AND TUBERS</u>					
Cassava		<u>Cercospora</u>			
Sweet Potatoes				<u>Cylas formicarius</u> (weevil) Beetles	Resistant Varieties from IITA, Cultural practices
Yam				<u>Heteroliquis</u> Soil insects in general	Insecticide such as Diazuon cultural practice
Potatoes		<u>Pseudomonas</u> <u>solanacearum</u> (b.)	10-80% attacks Resistant Variety from CIP	<u>Phthorimaea</u> <u>opercullela</u> <u>Diabrotica</u>	Insecticide Insecticide

CROP	PHYSIOLOGICAL PROBLEM	DISEASE	CONTROL	INSECTS/ENEMIES	CONTROL
		<u>Phytophthora (f.) infestans</u> (mildew) <u>Rhizoctonia solani</u> <u>Alternaria solani</u> Powdery scab Mosaic (v.)	Fungicide not used (important disease) Fungicide	<u>Epitrix</u> <u>Aphid (Myzus persicae)</u> <u>Aspidiella</u> attack tubers in stocks	Insecticide
<u>EXPORT/INDUSTRIAL CROPS</u>					
Coffee	Aging, too much shade	<u>Cercospora coffeicola</u> <u>Rosellinia necatrix (f.)</u> (f.) in Petit Goave <u>Pumagina (f.)</u> <u>Rhizoctonia solani</u> (in nurseries)	Fungicide Fungicide Fungicide	Leaf miners <u>(Leucoptera coffeicola)</u> <u>Planococcus citri</u> Nematods	Insecticide Insecticide Nematicid
Cocoa	Too much shade	<u>Phytophthora palmivora (f.)</u> <u>Monilia sp.</u>	Fungicide resistant variety	<u>Helopeltis (miridae)</u> nematods	
Sugarcane		Anthracnose loss 5-15% in Les Cayes in Plateau Central Rust from Dominican Republic	Project - 20 resistant varieties financed by PL480 Title III	<u>Pyraustia rubilalis</u> (borers)	Insecticide Cultural practices
Cotton				Boll weevil	Cotton plow down Insecticide
<u>FRUIT TREE</u>					
Coconut		Lethal yellowing disease (v.)	Dwarf resistant varieties. Trial with var. from Ivory Coast at CRUDEM Farm	<u>Stratasgus quadrifoveatus</u> (rhinoceros)	Insecticide

CROP	PHYSIOLOGICAL PROBLEM	DISEASE	CONTROL	INSECTS/ENEMIES	CONTROL
Mango		<u>Anthracosis</u> (<u>Collectotrichum gloeosporioides</u>) Powdery Mildew (<u>Oidium</u> sp.)	Resistant varieties from Indonesia and Philippines	Scab (<u>Elsinoe mangifera</u>)	
Avocado		Phytophthora (root rot) in low lands			
Banana	Fe deficiency in calcareous soils	Moko disease (b.) (cul-de-sac) <u>Cercosporioce</u> (leaf spot)	Resistant varieties	<u>Cosmopolites sordidus</u> Nematods	Insecticide Nematicide
Citrus	Mg deficiency	<u>frimagina</u> (f.) (most common) <u>Tristera</u> (v.) or sour orange used as root stock	Fungicide Resistant varieties	Aphid Mealy bugs (<u>Planococcus citri</u>)	Insecticide Insecticide
Cashew	Aging	<u>Anthracosis</u> serious problem in producing areas	Resistant Varieties from Brazil, India Tanzania	Thrips	
VEGETABLE					
Tomato		Tobacco mosaic <u>Fusarium</u> (f.) <u>anthracosis</u> damping off	Resistant varieties Fungicide	Cut worms, flea, beetles, white flies, fruit worm, aphids, ants, beetles, bugs, worms, mites are the most common insects.	Insecticide

NB - Legend: f = Fungal Disease
b = Bacterial Disease
v = Viral Disease

Control - Chemical pest control (insecticide, fungicide...) are not used by the small traditional farmers except in some areas and for high-value crops such as rice, vegetable or some industrial crops as sugar cane and cotton.

Poor agronomic practices hide the effects of the damage made by the pests. A thorough study to identify the pests, their incidence, the resistance of the traditional varieties is needed.

The Plant Protection Service of the MARNDR is soon going to publish a booklet on the main pests affecting the major crops in Haiti. This work is financed by the PL480 Title III.

2 This disease, Ustilago maydis affects the varieties from CIMMYT. Since corn with this disease is a favorite dish in Mexico, the varieties are not selected against this disease. It is different for the Haitians. Therefore, the cultural aspect should be taken into account in the introduction of crops and varieties.

cooperatives, private voluntary organizations, or a conventional extension service, but it must be functional within the next decade in order to prevent an increased food deficit in the hillside areas.

b. Plains Farming

Plains farming faces constraints that are different from those affecting the hillsides. Crop systems must be developed to replace the sugar cane industry which is disappearing from Haiti. There is no magic crop that Haiti can suddenly begin producing that will take the position formerly filled by sugar cane. The answer to the dilemma lies in the removal of both farm-level and support-level constraints.

Recommendation:

Improved cultivars of crops adapted to the well-drained portion of the coastal plains land are needed. Crops that will replace imported foods should be introduced. Soybeans for edible oil production are recommended for about 17% of the plains hectarage. Beans, peanuts, and corn are recommended as crops to be grown in rotation with soybeans on the plains.

c. Research and Organizational Infrastructure

A research program will be required to resolve the technical problems involved in introducing a new crop. Governmental support of a transition program from sugar cane to other crops may be necessary. Agro-industries such as peanut roasting, peanut butter manufacturing, and soybean oil expelling may need initial government assistance. Agricultural cooperatives for protecting seed quality, and supplying production inputs such as fertilizer will be vital.

d. Tree Crops and Alternative Crops

A wide range of tree crops must be established in hillside farming. Alley tree plantings offer some hope for extending hillside tillage a few years. Coffee, cacao, mango, avocados, papaya, pineapples, kiwi, vanilla, black pepper and aloe vera could all be used advantageously in hillside agriculture. Honey production should not be overlooked in either hillside or plains farming systems.

Recommendation:

All options, from sugar cane for alcohol production to vegetable production for export markets should be inves-

igated. The plains soils are reasonably well drained, moderately fertile, and have adequate moisture in a normal year. Their productivity should be utilized to alleviate the income crisis faced by sugar cane producers.

11. Conclusions

Crop production in Haiti involves annuals and perennials, food and fiber crops, vegetables and tree crops, hillside and plains agriculture, mono-culture and association planting, irrigated and rainfed crops, warm/wet season and cool/dry season planting, all interfacing with forest grazing agriculture on the hillsides and with fodder foraging by animals in the plains.

a. Hillside Agriculture

The overwhelming impression of the team regarding hillside farming is that many of the approaches and entities above must function together in order for the peasant to survive on the land. Many changes are needed in hillside crop production and changes must come in order to preserve the fragile soil on the slopes. Yet, innovations must be introduced slowly because the average hillside farm family has only a half hectare on which to make a living. The family cannot afford to put even 10% of its land into a conservation reserve. As long as there is enough soil remaining to cover a seed, the peasant will insist on planting the seed on even the steepest hillside (greater than 60% slope). Short-term economic and food supply necessity drives decision-making in hillside farming. Innovations intended to bring about sustainable crop production on the slopes must attain their long-term objective while allowing the peasantry to continue to squeeze an existence out of the land.

Soil erosion is the obvious and indisputable major constraint to sustainable crop production in hillside farming in Haiti.

The erosion scars in hillside fields are the evidence that erosion is accelerating. There is no quick solution to the problems of hillside farming in Haiti. Complete out-migration from the hillsides is not a viable option. If the peasantry is forced off the land because it will not feed them anymore, the typical destiny of rural-to-urban peasant migration awaits, with deleterious consequences at the individual and national levels. Conservation farming that uses every means available to stabilize the soil must be employed in order that the hillside farm families can feed themselves. The soil depends on the presence of a connecting web of roots of perennial plants to keep it in place on the slopes.

b. Plains Agriculture

Crop production on the plains presents different problems from farming on the hillsides. Plains soils are adequately deep and level enough to provide high productivity under intensive crop cultural systems.

The major constraint to sustainable crop production on the plains is lack of a market for the products of the crops now planted on the plains. Sugar cane dominates the plains' land area, but there is no market for sugar produced at the high cost typical in Haiti. Rice is also a principal crop on the plains. Hopefully, improvement in rice production efficiency will salvage this crop for Haiti, although costs of production currently make Haitian rice unprofitable. An alternative must be found for sugar cane produced for sugar.

c. Constraints to Crop Production

Constraints to crop production in Haiti can be reduced through research, cooperative purchasing of inputs and cooperative marketing of products, and a delivery system for site specific interventions to the farmers. A long-term commitment to problem solving research is vital. Recommendations have been included in the following section.

Many agencies and organizations are active in hillside agriculture and environmental improvement in Haiti. The private and voluntary organizations (PVOs) number perhaps 100 in agriculture--the PVOs are humanitarian in outlook and eager to build their local programs. Some were observed to be making real headway in tree planting activities and watershed projects. The STABV has a new system for monitoring and tracing PVO activities. Further efforts at coordination are needed. The concept of PVO involvement is positive for rural development in Haiti. Participation of A.I.D. in providing support to selected PVOs is justifiable at least in the medium-term; replication of small-scale applied research on a broader scale may be an option for A.I.D. funding.

d. The Role of A.I.D. in Infrastructure and Project Development

The USAID/Haiti program in agriculture can continue to have significant impact on agricultural conditions. A.I.D. should insist that the GOH strengthen the organizational infrastructure in the MARNDR to carry out those tasks that affect national-level interventions. Other-

wise, the nation will be ill-equipped to absorb the sources of developmental assistance available from donors.

There are certain projects that A.I.D. should consider for action during the current CDSS period. Other areas of potential intervention should be targeted for detailed studies in this Action Plan period. Specific recommendations for four projects and five studies follow:

These recommendations are summations of material discussed in the body of the report. The recommendations are divided into two categories:

- i. recommendations for actions to be considered by USAID/Haiti within this planning period, and
- ii. studies that should be initiated to gather information on a variety of constraints to agricultural productivity in Haiti.

(1) **Recommended Projects**

Development Program for Alternative Crops for Sugar Cane

- introduce photo-period soybean cultivars;
- increase edible bean production on the plains;
- increase corn production on plains to decrease unit cost of corn in the market;
- introduce improved rice to reduce unit cost of Haiti-produced rice;
- increase cotton production to level required to make the Gonaives gin an economical unit.
- Irrigation systems must eventually be repaired and expanded to sustain productivity on the plains.

Program development for hillside agriculture

- increase emphasis on hillside farming techniques that include conservation elements such as alley cropping and terrace development;

- improved goat performance through breed improvement, and better nutrition and health care,
 - cross-breeding cattle to tropical breeds,
 - helminth prevention.
- (6) Initiate a feasibility study of a systematic soil survey of the plains and hillsides.

Assessment Studies Recommended

Formal studies by USAID staff and contractors on the following topics should provide information needed by the program leaders for future planning purposes.

- (1) Study the role for agricultural extension and research in Haiti. This study would include all aspects of agriculture: agroforestry, agro-pastoral, hillside crops, plains crops, animals, fruit, coffee, new crops and traditional crops unless already thoroughly covered in recent studies by other donors.
- (2) Import costs of edible oils to the nation--both concessional and full price imports.
- (3) Irrigation practices and sources of potential surface water retention structures for irrigation including drip irrigation.
- (4) Environmental impact and economic value of pesticides in agriculture.
- (5) The role of women in agricultural production, marketing and acceptance of new food crop cultivars.

B. Livestock

1. Overview

There are wide differences in the estimates of numbers of animals in Haiti and the amount and value of livestock products. It appears that no effort has been made by either government agencies in Haiti or by foreign donors to accurately record statistics on the livestock subsector. The ADS-II project is collecting data on livestock numbers as a part of the national survey on agriculture but unfortunately that survey has not been reported completely for the entire country. Furthermore, the

survey does not supply information on fertility and fecundity, nor does it provide the means for measuring the offtake rates on the national herds.

Livestock production was not reviewed by Levitt and Laurent, and was not included in their estimates of GDP. World Bank estimates of the contribution of livestock to the agricultural sector and GDP were given in the statistical appendices of their 1986 report (World Bank, Haiti: Public Expenditure Review, 2 Vols., May 1986, Report No. 6113-HA.). The figures for the 1976 to 1985 period are given in Tables 42 & 43. The comparison of the World Bank GDP figures showing livestock as a separate sub-sector with those of Laurent and Levitt, which show no livestock are given in Table 41.

Due to this lack of data on livestock production in Haiti we have estimated contributions of each class of livestock to national production. Several problems were encountered. One, the estimates of livestock numbers vary widely as noted above. Two, off-take rates by class of livestock are unknown, and in most cases, are not estimated in the literature. Three, dressing percentages of the various classes of livestock are not known with any certainty and no statistics have been gathered for livestock classes and ages to our knowledge. Fourth, there are no figures available for the values of animal by-products or "fifth quarters". Finally, figures given for such things as milk production and egg production are quite arbitrary and subject to assumptions not clearly stated. Until such time as more accurate data are available, presumably through the ADS-II project, we present estimates below, recommending caution in their use. Value of contributions to GDP are given as farmgate prices according to our estimates. This assumes that production costs are either non-existent or so small that it is not necessary to include them to arrive at an estimate of value added by livestock. Other costs, particularly those incurred in the recent hog repopulation, are assumed to be investments that would therefore be included as part of the contribution to GDP. We assume that the value of processing and value added to by-products, i.e. leather production from hides, are subsumed under industrial processing accounts. The same holds for transportation and marketing costs.

2. Swine

The hogs indigenous to Haiti prior to 1980 were reportedly descended from pigs brought to Haiti by the Spanish, with some mixture from other European pigs, probably French and English. The local "creole" pig was small, dark or black, with low fertility and a low growth rate. The creole pig at slaughter weighed approximately 70 kg and was about 2 years old. The pigs were commonly tethered (en corde) part of the year, and often free-ranging during certain seasons. They were semi-

TABLE 41

VALUE ADDED OF AGRICULTURAL COMMODITIES (U.S. \$ THOUSANDS AT CONSTANT PRICES)

	FY 76	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85
LAURENT & LEVITT										
TOTAL (US \$)	449,011	426,263	445,338	463,221	467,835	457,485	478,956	458,957	493,225	461,189
TOTAL (GOURDES)	2,245,055	2,131,315	2,226,690	2,316,105	2,339,175	2,287,425	2,394,780	2,294,785	2,466,125	2,505,945
WORLD BANK										
GOURDES										
AGRICULTURE	1,413,000	1,309,000	1,334,000	1,433,000	1,444,000	1,415,000	1,396,000	1,356,000	1,398,000	1,422,000
LIVESTOCK	262,000	266,000	270,000	275,000	279,000	284,000	231,000	235,000	240,000	244,000
TOTAL	1,675,000	1,575,000	1,604,000	1,708,000	1,723,000	1,699,000	1,627,000	1,591,000	1,638,000	1,666,000
DOLLARS										
AGRICULTURE	282,600	261,800	266,800	286,600	288,800	283,000	279,200	271,200	279,600	284,400
LIVESTOCK	52,400	53,200	54,000	55,000	55,800	56,800	46,200	47,000	48,000	48,000
TOTAL	335,000	315,000	320,800	341,600	344,600	339,800	325,400	318,200	327,600	333,200
POPULATION (000)										
TOTAL	4613.0	4678.0	4743.0	4810.0	4877.0	4965.0	5054.0	5145.0	5237.0	5332.0
RURAL	3801.0	3835.0	3870.0	3905.0	3940.0	3975.0	4011.0	4047.0	4084.0	4120.0
LAURENT & LEVITT										
INCOME P.C TOTAL POP.	097.34	091.12	093.89	096.30	095.93	092.14	094.77	089.20	094.18	088.49
INCOME P.C. - RURAL	0118.13	0111.15	0115.07	0118.62	0118.74	0115.09	0119.41	0113.41	0120.77	0111.94
WORLD BANK										
INCOME P.C TOTAL POP.	072.62	067.34	067.64	071.02	070.66	068.44	064.38	061.85	062.55	062.49
INCOME P.C. - RURAL	088.13	082.14	082.89	087.48	087.46	085.48	081.13	078.63	080.22	080.87
LAURENT AND LEVITT AS % OF WORLD BANK										
	134.03%	135.32%	138.82%	135.60%	135.76%	134.63%	147.19%	144.24%	150.56%	150.41%

TABLE 42

LIVESTOCK AND LIVESTOCK PRODUCTS PRODUCTION IN HAITI (CURRENT U.S. DOLLARS)

	76	77	78	79	80	81	82	83	84	85	86
NUMBER OF PIGS	1,100,000	1,100,000	900,000	606,710	375,549	0	0	2,000	12,000	72,000	200,000
SOURCE	EST	EST	IIICA	DARNDR	SLAUGHTERED			IMPORTS	IM + PROD	PROD	PROD
\$/HD	\$17.00	\$20.00	\$22.00	\$24.94	\$24.94	\$0.00	\$0.00	\$110.00	\$110.00	\$120.00	\$120.00
PROD RATE	0.60	0.60	0.60	0.60	1.00	0.00	0.00	0.00	0.40	1.00	1.00
VALUE OF PROD	\$11,220,000	\$13,200,000	\$11,800,000	\$4,890,320	\$9,366,192	\$0	\$0	\$0	\$528,000	\$8,640,000	\$24,000,000
NUMBER OF GOATS	1,000,000	1,136,976	945,221	937,365	595,000	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,400,000
SOURCE	EST	DARNDR	DARNDR	DARNDR	FAO	FAO	EST	EST	EST	EST	EST
\$/HD	\$9.00	\$10.00	\$11.00	\$12.00	\$14.00	\$15.00	\$16.00	\$16.00	\$18.00	\$18.00	\$16.00
PROD RATE	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
VALUE OF PROD	\$3,600,000	\$4,555,944	\$4,158,972	\$4,767,352	\$5,572,000	\$6,000,000	\$7,040,000	\$7,680,000	\$9,360,000	\$10,000,000	\$10,000,000
NUMBER OF CATTLE	650,000	700,000	722,064	742,167	779,275	810,239	859,151	902,107	947,214	994,575	1,044,300
SOURCE	EST	EST	DARNDR	DARNDR	EST						
\$/HD	\$90.00	\$130.00	\$165.00	\$185.00	\$215.00	\$250.00	\$275.00	\$300.00	\$310.00	\$315.00	\$320.00
PROD RATE	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
VALUE OF PROD	\$6,435,000	\$10,010,000	\$13,105,025	\$15,103,050	\$17,429,854	\$22,501,573	\$25,989,318	\$29,769,597	\$32,299,937	\$34,462,024	\$36,759,501
MILK PRODUCTION (KGS)	1,829,932	1,970,761	1,940,156	1,645,306	1,727,571	1,813,950	1,904,647	1,999,000	2,099,074	2,204,067	2,315,111
PRICE	\$0.12	\$0.12	\$0.15	\$0.17	\$0.10	\$0.19	\$0.21	\$0.22	\$0.22	\$0.22	\$0.22
VALUE	\$219,599	\$236,491	\$282,407	\$282,993	\$307,508	\$351,906	\$399,976	\$447,973	\$470,372	\$493,890	\$510,505
NUMBER OF SHEEP	100,000	100,000	100,000	105,509	100,000	100,000	100,000	100,000	100,000	100,000	100,000
SOURCE	EST	EST	EST	DARNDR	EST						
\$/HD	\$11.00	\$11.50	\$12.00	\$14.00	\$15.00	\$16.00	\$17.00	\$18.00	\$18.00	\$18.00	\$18.00
PROD RATE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
VALUE OF PROD	\$165,000	\$172,500	\$180,000	\$221,569	\$225,000	\$240,000	\$255,000	\$270,000	\$270,000	\$270,000	\$270,000
NUMBER OF FOAL	2,000,000	2,050,000	2,000,000	3,000,000	3,150,000	3,300,000	3,950,000	4,750,000	5,000,000	5,000,000	5,000,000
SOURCE	EST	EST	EST	DARNDR	EST						
\$/HD	\$1.40	\$1.50	\$1.46	\$1.60	\$1.89	\$2.05	\$2.21	\$2.40	\$2.60	\$2.75	\$3.00
PROD RATE	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
VALUE OF PROD	\$4,312,000	\$4,713,706	\$4,662,504	\$5,285,200	\$6,548,850	\$7,424,002	\$9,617,223	\$12,540,000	\$14,300,000	\$15,125,000	\$16,500,000
EGGS DOZEN	3,700,000	3,797,016	5,377,000	5,740,516	5,985,000	6,270,000	7,505,000	9,025,000	9,500,000	9,500,000	9,500,000
PRICE PER DOZEN	\$0.67	\$0.94	\$0.91	\$1.00	\$1.10	\$1.20	\$1.30	\$1.47	\$1.59	\$1.69	\$1.04
VALUE OF PROD	\$3,303,720	\$3,564,168	\$4,902,306	\$5,747,600	\$7,061,702	\$8,006,251	\$10,370,364	\$13,283,137	\$15,142,779	\$16,015,003	\$17,456,353
TOTAL ALL LIVESTOCK	\$29,255,319	\$36,452,849	\$39,172,014	\$35,516,900	\$47,511,105	\$44,524,532	\$53,671,881	\$63,990,709	\$72,371,140	\$85,005,917	\$105,504,439

NOTE: THE 1979 FIGURES FOR PIGS INDICATE A PRESUMED DEATH LOSS OF 200,000 HEAD AT \$24.94 PER HEAD
 SOURCE: MISSION ESTIMATES

TABLE 43

ESTIMATION DU NOMBRE D'ANIMAUX DANS QUATRE DEPARTEMENTS
(2eme Saison, 1986)

	DEPARTEMENT DU SUD		DEPARTEMENT DE LA GRAND-ANSE		DEPARTEMENT DE LA SUD-EST		DEPARTEMENT DE L'QUEST		TOTAL	CV
		CV		CV		CV		CV		
VOLAILLES	853000	0.10	1147000	0.15	417000	0.08	567000	0.09	2985000	0.07
DISPARUES	1011000	0.10	611000	0.11	220000	0.07	270000	0.06	2112000	0.06
Pourcentage:										
COQ	31.32	0.11	22.75	0.16	23.82	0.08	19.78	0.11	21.92	0.07
POULE	34.75	0.08	36.17	0.16	35.66	0.08	33.65	0.09	35.21	0.07
POUSSIN	38.78	0.11	37.90	0.12	39.33	0.09	44.95	0.10	39.69	0.06
GARDIENNAGE	3.16	0.17	6.03	0.12	6.72	0.10	10.78	0.17	6.21	0.08
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	73.22	0.68	74.46	0.07	67.74	0.06	59.71	0.08	69.50	0.04
BOVINS	138000	0.09	178000	0.13	49000	0.09	116000	0.10	482000	0.06
DISPARUS	48000	0.14	33000	0.12	14000	0.11	15000	0.09	110000	0.07
Pourcentage:										
VEAU	20.39	0.11	18.83	0.09	22.47	0.11	27.52	0.08	21.75	0.05
TAUREAU	23.65	0.09	24.95	0.16	26.81	0.12	22.23	0.15	24.11	0.07
VACHE	55.68	0.09	56.27	0.15	49.56	0.08	49.23	0.09	53.72	0.07
EN GARDIENNAGE	15.84	0.10	16.01	0.09	32.46	0.18	24.86	0.10	19.78	0.06
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	48.10	0.07	55.69	0.09	37.95	0.07	42.52	0.07	47.77	0.04
CAPRINS	254000	0.11	371000	0.14	150000	0.11	203000	0.08	98000	0.07
DISPARUS	203000	0.09	1460000	0.10	76000	0.10	86000	0.06	510000	0.05
Pourcentage:										
CHEVREAUX	24.57	0.15	29.72	0.19	25.71	0.12	28.92	0.09	27.60	0.09
CABRIS	24.14	0.15	26.64	0.16	28.97	0.12	26.22	0.09	26.26	0.08
CHEVRES	51.20	0.09	45.65	0.11	45.28	0.10	44.92	0.08	46.12	0.05
EN GARDIENNAGE	10.49	0.15	10.26	0.08	22.15	0.17	18.71	0.11	13.90	0.06
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	52.43	0.08	60.80	0.07	56.91	0.06	47.71	0.07	54.16	0.04
OVINS	105000	0.18	64000	0.33	3000	0.33	15000	0.21	187000	0.15
DISPARUS	67000	0.12	11000	0.32	1000	0.25	4000	0.20	84000	0.10
Pourcentage:										
AGNEAUX	24.58	0.22	22.99	0.31	21.36	0.35	29.74	0.21	24.39	0.16
MOUTONS	24.39	0.25	40.94	0.41	33.62	0.31	29.68	0.20	30.59	0.22
BREBIS	50.60	0.14	36.07	0.28	45.02	0.35	40.14	0.22	44.74	0.12

	DEPARTEMENT DU SUD		DEPARTEMENT DE LA GRAND-ANSE		DEPARTEMENT DE LA SUD-EST		DEPARTEMENT DE L'QUEST		TOTAL	
		CV		CV		CV		CV		CV
EN GARDIENNAGE	17.23	0.21	5.68	0.17	6.35	0.52	9.35	0.24	12.51	0.17
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	20.95	0.12	16.28	0.22	2.49	0.29	3.25	0.22	12.98	0.10
PORCS	33000	0.20	12000	0.14	8000	0.34	36000	0.17	89000	0.11
DISPARUS	13000	0.34	3000	0.40	1000	0.31	10000	0.26	27000	0.20
Pourcentage:										
PORCELETS	32.14	0.33	38.38	0.23	30.25	0.45	34.92	0.17	33.94	0.14
PORCS	24.46	0.19	18.01	0.12	24.24	0.36	25.83	0.17	24.14	0.11
TRUIES	43.21	0.17	43.61	0.13	45.52	0.27	39.25	0.18	41.85	0.10
EN GARDIENNAGE	4.63	0.25	5.26	0.18	4.31	0.29	12.02	0.35	7.69	0.22
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	2.30	0.17	0.84	0.17	2.12	0.36	3.09	0.24	2.06	0.12

domesticated, scavenging for much of their food. Fixed or balanced rations were seldom provided, although pigs were often fattened prior to slaughter. Because of the creole pig's small size, it could easily be slaughtered and consumed in a short time without much spoilage. Research on the rural economy of Haiti has shown that pigs were used as a sort of savings bank, to be sold when the need for cash arose. The black creole pig was used also in local religious ceremonies.

a. Economic Status

The economic analysis for the Interim Swine Repopulation Project Paper put the pre-ASF (African Swine Fever) production value at 30 million dollars (PP, p. 47). This was based on the USDA estimate of pork production at 12 thousand metric tons and a 67% dressing percentage. Pork prices were put at \$3.97/kg. These figures seem somewhat suspect. The value of pork noted above would make the price of a dressed hog \$212.79 if the mature slaughter weight of 80 kg is to be believed. Yet the market value of a pre-ASF pig is usually given as \$50.00 (Matter, 1984, p. 21; PID, p. 29). With the \$50 value, 12,000 MT of live pork would equal 150,000 pigs at 80 kgs each or a total of \$7,500,000. On the other hand, 12,000 MT of live pork production would only equal about 2.4 kg per capita per year (1.698 kg dressed weight), which seems low. Another possibility is that the slaughter weights of live pigs may not average 80 kg. Given that it is likely that pigs were slaughtered at various ages, a liveweight average of 60 kg is probably more reasonable.

The Project Paper for the swine repopulation project cites specific studies relative to pig production and its importance in the social and economic systems of rural Haitian peasants (PP, pp. 29ff). A study done by Jean-Marie Devillard gives a figure of 6.4% as the estimate of the contribution of swine to household income, which accounted for 44% of income from livestock. Additionally, it was estimated that 2% of the commercial value consumed on Haitian farms came from swine, which was 32.6% of animal products. If we used the Laurent and Levitt figures for per capita income from the rural areas of approximately \$112.50 and assumed 50% was monetized, then the value of pork consumed would be \$1.125 per capita, or a total of \$4,500,000. This would mean pork production would have an annual value of \$18,900,000.

For the period since 1983, the value added of pork to the GDP is easier to calculate. Initially, 2,000 sentinel pigs were brought into Haiti and have been allowed to multiply. By August 1986 it was estimated that there were 20,000 pigs originating from those sentinel pigs. Second,

the number of "private sector" pigs deriving from Ministry of Agriculture sources were estimated at 5,000 to 10,000 head. The third source was the USAID/IICA swine from the repopulation project. This group consisted of 4,600 sows at Secondary Multiplication Centers (SMCs) and 7,000 gilts distributed to farmers. This made the estimate of pigs at 12,000 to 15,000 in the latter group. The total population was 39 to 45,000 head (Report by the Review Team, Dr. Fran J. Mulhern, August 24, 1986).

It is estimated that the pigs produced from the repopulation herd number 250,000 in 1987 (G. Sullivan, USAID/Haiti, 1987). The Project Paper estimated that the basis for a 400,000 swine herd by 1988 has been established. Starting with the import of 2,000 sentinel pigs in 1983, we can expand production of pork at an almost linear rate of expansion up to 400,000 in 1988 with some offtake of castrated males during the period. This amount would equal about 40% of the herd over this period. The improved swine in Haiti will be able to produce considerably more pork with fewer animals than was the case during the pre-ASF period. A 100% offtake rate should be possible if some care and management are practiced. (That is, an equal number of slaughtered hogs as remains in the national breeding herd.) Thus, we can assume that by 1988, pork production will reach at least \$20,000,000 per year. This will increase somewhat if the price of pork does not drop below the cost of production, which may be higher than was previously the case.

For purposes of calculating the value-added from pork production over the time period considered (1976-1985) we have used an offtake rate of 60% during the pre-ASF period, 40% for the year in which only first litter production of imports was considered, and a 100% figure after that. The latter figure takes into account that the population was growing even if marketing did not total that percentage. For national accounts the farm level increases need to be added.

b. Nutrition and Forages

As noted, pigs grown in Haiti prior to 1980 were commonly tethered or were free-ranging, at least during certain seasons. They scavenged for much of their diet, and were also fed a variety of local supplements--table scraps, waste fruits and vegetables, weeds and agricultural wastes. Food costs were low, as little prepared food was purchased. Since repopulation with the new swine breeds, higher nutrition levels to take advantage of the genetic potential of the new breeds is needed. This, in turn, has placed greater emphasis on prepared, bagged foods, either

purchased from private suppliers or through various government or non-government organizations.

One major constituent of commercially-prepared feeds is wheat shorts. Current (1987) shortage of wheat shorts or suitable replacement feedstuffs has substantially raised the cost of commercial feeds. As commercial feed costs may constitute 70 to 80% of pork production costs, a small change in feed prices may spell the difference between profit and loss to a farmer relying largely on purchased feeds. For instance, it is reported that due to the present feed price crisis, weaned piglet prices have dropped 50%, and the price may drop to \$25 in 1989 (USAID, 1987, p. 70).

Production of local feeds, either for on-farm use or for sale to off-farm producers, would greatly assist the small farmer/pork producer, and improve the profitability of pork production for both small- and medium-size operators. Bagged (commercial) feed may cost 3 times as much as the locally-produced feed. Because of this, substituting local feed can cause a substantial decrease in feed costs, and a concomitant increase in profitability (Table 44). Dependence on imported feeds makes the producers' costs swing wildly with the availability of imported feeds. For example, wheat bran in 1986 was \$3.00 per sack, but due to its present shortage, the street price has risen to \$12.00 per sack (1987). Feed prices quoted by Purina and Sonuan are in the range of \$10 to \$15 per sack--too high for profitable pig raising.

Recommendation:

While some work has been done, additional information is needed on proper use of local feedstuffs, (Table 45) as well as an economic analysis on cropping systems that can benefit pig raising. Cropping strategies both on plains areas and hillside farms could be designed to benefit swine through lower feed costs and better nutrition.

It may be necessary, at least in the short run, to encourage the importation of feed grains from the United States to provide a bridge for small pig producers until a more reliable supply of local feeds can be made available. An economic study should be made to determine both the short-term and long-term impact of such a policy on pig production and on the development of a local feedstuff capability. Availability of adequate water was often noted as a production constraint by swine owners. A good

TABLE 44

COST RELATIONSHIP BETWEEN FULL FEED COMPRISED OF BAGGED FEED
WITH DIFFERENT LEVEL OF SUBSTITUTION OF LOCAL FEED

Percent of Bagged Feed %	Percent of Local Feed %	Cost of Bagged Feed \$	Cost of Local Feed \$	Total Cost of Feed \$
0	100	0.0	83.00	83.00
10	90	24.00	74.00	98.00
20	80	50.00	66.00	116.00
30	70	75.00	58.00	133.00
40	60	100.00	50.00	150.00
50	50	124.00	42.00	168.00
60	40	150.00	33.00	188.00
70	30	174.00	25.00	199.00
80	20	200.00	16.00	200.00
90	10	224.00	8.00	232.00
100	0	249.00	0.0	249.00

Note: Table was constructed based on discussions with Drew Kutschenreuter, Chief of the Extension Team of IICA. It was estimated that local feed is 20% DM and bagged feed is 90% DM; therefore, it takes 4.5 the amount of local feed to equal bagged feed.

Source: Evaluation of the Haiti Interim Swine Repopulation Project, USAID/Haiti, June 1987, p. 105.

TABLE 45

ESTIMATED QUANTITIES OF FEEDSTUFFS AVAILABLE IN HAITI (1982)

Feedstuff	Estimated Quantity Available (metric tons per year)	Location
Wheat Millings	35,000	Port-au-Prince
Rice Bran	10,000	Artibonite Valley
Molasses	15,000	Port-au-Prince
Soybean Meal	80,000	Port-au-Prince
Cottonseed Meal	500	Port-au-Prince
Citrus Rinds	20,000	Many sites
Brewery Wastes	100	Port-au-Prince
Sunflower Cake	unknown	Port Dauphin/Jacmel
Wet Cocoa Pods	30,000	Cap Haitien
Sugarcane Bagasse and Top	unknown	Many sites

Source: Targeted Watershed Management Project Paper, (521-0191), p. G-13.

water source not only improves sanitation in piggeries, but it reduces heat stress where this is a problem. The importance of a good water supply is everywhere emphasized in training sessions--a point to which many producers did not give adequate consideration in the past.

c. Animal Health

Since control of ASF and repopulation of swine, Haiti may have one of the least disease-ridden swine herds in the world. As the swine population grows, however, the susceptibility to infectious disease transmission increases exponentially, and greater care must be taken to detect disease problems as they first occur. Because of limited veterinary services and laboratories, common infectious diseases such as transmissible gastroenteritis, pseudorabies, and erysipelas will be more difficult to detect and control should they occur, as they do in many more developed countries.

Lack of a functioning, reliable veterinary diagnostic laboratory in Haiti greatly increases the risk that a new disease of swine, cattle, goats, or other livestock may quickly spread once it is established. Identification and prompt treatment becomes ever more important as the swine population grows and opportunities for disease transmission increase. Such a laboratory, to be effective, would require wholehearted support and direction from MARNDR and FAMV. At any rate, emphasis should be placed on preventive care, good management, proper diet and judicious use of veterinary drugs.

d. Macroeconomic Factors, Pork Imports

With the eradication of pigs following the outbreak of ASF, local pork disappeared from the market. Pork imports, as expected, rose tremendously. However, these imports have not decreased substantially since the pig population has increased to its present size. In the first quarter of 1987, some 2.7 million pounds of pork products were imported, equivalent to 19,300 whole carcasses with a dressed weight of 140 lbs. At this rate, some 10.8 million pounds will be imported in 1987, and in fact this amount is probably underestimated. This, however, would represent about 77,140 carcasses of 140 lbs each.

Local pork meat is higher in price than the pork by-products or second cuts being imported. Both HAMPCO and FAMEPAK, the two Haitian commercial meat packers, see imported pork as a practical source of low-priced pork for local consumption. HAMPCO, for instance, when purchasing

locally at \$.70 to \$.80/lb liveweight, must sell to retailers at \$1.40 to \$1.60/lb. However, they feel that pork, to be affordable to the masses, must retail at less than \$1.00/lb--hence the need for cheaper imported cuts. HAMPCO also stated that more local pigs are being offered than they are interested in buying. If the local supply of pork already exceeds the demand at a reasonable price (with respect to production costs), serious marketing problems lie ahead for the small producers.

Price structures can change, as can import duties, local feed availability and costs, and customer purchasing habits. At the present time, however, it is apparent that imported pork prices are having a strong and adverse effect on swine production and marketing.

3. Goats

Goats are well-adapted to the small size of Haitian farms, as indicated by the 54% of farm households that own goats (ADS-II). Approximately 980,000 goats were reported in 1986 for the four southern departments alone, or about 5.4 goats for each family practicing goat husbandry (Table 43). Mission estimates place the 1986 national goat herd at about 1,400,000 animals. The increase of 300,000 to 400,000 goats since 1981 is probably related to the swine eradication program, as farmers increase goat herds to partly compensate for the absence of swine.

Prices for goat are difficult to find. JWK gave prices for live goat at \$9.00 per head in 1976 (JWK International Crop. in Matter, 1983, p. 24). Matter quotes a range of \$8 to \$12 for kids, \$12 to \$24 for does and \$16 to \$35 for bucks in 1983. Most quoted prices were \$12, \$18 and \$22 respectively for kids, does and bucks, which probably more accurately reflect prices for slaughter animals (Matter, p. 123). The figures reflect about \$1.00 per kilo liveweight (1983). In 1979, DARNDR's data gave meat prices for goat as \$1.26/lb in Port-au-Prince and \$.80/lb in Hinche/Gonaives. It is believed these prices were slightly inflated. We have maintained a price per head of \$18 for two reasons. One, the expansion of the national flock would suggest that both male and female goats of "prime" condition would be kept for breeding during the expansion phase. This would mean slightly lower quality, and therefore prices, of those animals being sold. Second, the expansion of the flock meant expansion of the marketed numbers given a constant offtake rate. This is probably not realistic, unless management and feeding improved at the same time as the flock was expanding in order to have a constant offtake and an increase in breeding animals. However, this is somewhat offset by the fact that we have not added the expanded flock numbers to the annual value added for production. That is, we have shown as value added only the offtake of the increased flock, and not the increased investment that a larger

flock would have given.

Given the above figures, the liveweight value of goat in 1983 would be about \$7.68 million (1.2 million head X 40% offtake X \$18); in 1976 that figure was about 50% of this value. The 1979 DARNDR figures would be about \$36.95 per head for meat. Assuming about 60% dressing percentage, this would give \$22.17. With a 20% reduction for butchering and marketing, the liveweight value would be \$17.74, very similar to the 1983 prices. If we consider that the DARNDR figures are mainly for the large urban market, our national average should be lower. We have calculated a value of \$12 per head for a national average. Given a 1976 figure of \$9 per head we have estimated the other years' values as a constant smooth increase through the data points when we had any figures given, i.e., 1976, 1979, and 1983.

Low productivity of the local "creole" goats prompted USAID/DARNDR/Winrock International to institute a goat improvement project in 1982. First-stage work was conducted on the Central Plateau, but in Stage Two, the project work was extended to the western and northwestern regions as well. The project goals were (1) to train small goat herd owners in management of their herds; (2) to disseminate improved animals to local farmers for breeding purposes; and (3) to provide extension services to local participants. A.I.D.-funded assistance to the goat improvement project ended in June 1987, with MARNDR assuming further responsibility for the project's continuation. Nubian and Alpine breeds were crossed with local creole does to improve milk production and growth. As shown in the Winrock mid-project evaluation, both Alpine and Nubian breeding substantially improved growth rates of progeny (Table 46).

Improved goats for breeding purposes were distributed to local cooperators, who were then to serve as intermediaries to improve local blood lines through stud service or through sale or exchange of cross-bred kids. A total of 232 cross-bred bucks and does were distributed to nine ABCs (Associated Breeding Centers), and another 80 to 90 are ready for distribution by early 1988. It is estimated that 1,650 beneficiary producers now have access to improved bucks (Winrock, 1987). Effecting a real improvement in the national goat herd using cross-breeding is a long-term affair, however. Winrock International envisions a time frame on the order of 15 to 20 years, during which MARNDR, with outside assistance if possible, will have to support the improvement program.

TABLE 46

WEIGHT IMPROVEMENT COMPARISON OF CROSSBRED KIDS OVER
STRAIGHTBRED KIDS IN PERCENT

Kid genotype	Birth wt, %	16 wks wt, %	26 wks wt, %	38 wks wt, %	50 wks wt, %
1/2 Alpine	26.8	14.6	14.8	20.1	25.0
1/2 Nubian	20.8	18.5	19.1	18.0	14.3
3/4 Alpine	62.3	63.3	67.8	51.8	—
3/4 Nubian	40.0	49.8	35.6	28.1	—

Source: Winrock International, 1987.

Achieving the production potential of the improved goat breeds requires a continuous supply of high quality forage, either as grazing, cut-and-carry or green chop, hay or silage. Forage production trials by the Goat Production Improvement Project have screened a number of promising forage grasses and legumes adapted to Haiti (Table 47). While substantially higher forage yields are possible under irrigation on better soils, the poorer, drier hillside farms as in Table 47 can produce much larger amounts of high-quality forage using the recommended introduced grasses and legumes than produce under present management. Using the highest yielding combination (elephant grass and siratro) on irrigated land at Damien, from 120 to 140 adult goats could be maintained per hectare, if fed on green-chop or silage. Thus a 4-goat herd could be fed from a 300 m² plot, if it were the sole source of feed. By using crop residues, household wastes and other low cost feedstuffs, a 4-goat herd might need only half this area, or a plot as little as 12 X 12 meters (Winrock, 1987). On poorer, non-irrigated hillside soils, a much larger area would be needed, but the advantages of using introduced grass or grass-legume forages are obvious.

Nutrient content of available crop residues and miscellaneous items used as goat feed varies greatly, as does its availability over the year. Winrock reported the nutrient analysis of 128 available feedstuffs, including such crop residues as sweet potato tops, sugar cane tops and bagasse, corn stalks, tops, and cobs, and fresh and sun-cured residues of sorghum (Winrock, 1987). This information, now available, will assist greatly in the formulation and evaluation of complete rations.

While much has already been done to improve goat production for the benefit of small farmers in Haiti, the job is by not means completed. The Goat Improvement Project staff visualized a period of 15 to 20 years required to upgrade the national herd to an acceptable level. Availability of breeding stock, management techniques including pasture production and optimum use of

TABLE 47
FORAGE PRODUCTION YIELDS AT TITAMIN

	Days	1 Yield*	2 Days	Yield*	Accumulated Yield*
<u>Grasses</u>					
<u>Cenchrus ciliaris</u> (Buffel common)	93	2.44±0.54	134	1.07±0.16	3.51
<u>Cenchrus ciliaris</u> (Buffel nueces)	93	1.81±0.92	134	1.19±0.30	2.99
<u>Panicum maximum</u> (Guinea grass)	93	2.50±0.89	134	1.59±0.10	4.09
<u>Panicum maximum</u> Var. Trichoglume (Green panic)	93	1.96±0.48	134	2.55±0.52	4.51
<u>Panicum coloratum</u>	227	1.68±0.60			1.68
<u>Legumes</u>					
<u>Leucaena leucocephala</u> var. cunningham (K500)	227	0.79±0.24			0.79
<u>Leucaena leucocephala</u> var. salvador (K67)	227	0.59±0.15			0.59
<u>Associations</u>					
<u>Cenchrus ciliaris</u> (Buffel nueces) with <u>Macroptilium atropurpureum</u> (Siratro)	93	0.88±0.38	134	1.49±0.20	2.37
<u>Panicum maximum</u> (Guinea grass) with <u>Macroptilium atropurpureum</u> (Siratro)	93	1.07±0.40	134	0.73±0.35	1.80
<u>Panicum maximum</u> var. Trichoglume with <u>Leucaena leucocephala</u> var. Cunningham	93	1.04±0.62	134	1.81±0.78	2.85
<u>Panicum coloratum</u> with <u>Leucaena leucocephala</u> var. cunningham	227	1.39±0.05			1.84
		0.45±0.15			
		1.84±0.10			

* yield in tons DM/ha.

Source: Final Report: Goat Production Improvement Project, Haiti, Winrock International, June 1987, Sec. 6, p. 17.

crop residues, and extension of this information to peasant farmers remain obstacles still to be overcome. MARNDR staff and the small farmers themselves will eventually carry the responsibility and cost of this program. The process would be greatly speeded up if external assistance were available, especially in the areas of breeding stock and extension efforts.

4. Cattle

Cattle numbers were put at 742,167 head in the 1979 survey. DARNDR also estimated numbers at 722,084 in 1978 and 538,146 in 1977. The latter figure is difficult to understand. Such an increase would have required a 34% jump in numbers in one year, which is not likely.¹⁹ IHS had estimated numbers at 669,272 in 1950 and 636,737 in 1970-71. FAO starts from approximately the same base as IHS in 1961-65 but estimates numbers as high as 960,000 by 1970. After that FAO shows numbers declining to 737,000 in 1977, with increases in following years, reaching 1.2 million head in 1981. We have accepted MARNDR's figures for 1978 and 1979. We have then allowed a 5% growth rate of the breeding herd, partly as a response to increased population, partly reflecting urbanization, and partly as a response to prices. We feel it is doubtful that the beef herd could grow any faster than this given the low fecundity rate of the breeding females.

Almost all cattle are owned in small lots of 1 to 3 head. Matter (1983, p. 27) gives 21 large ranches in the country, but it is doubtful if even these are very large. One was listed as having 135 head. A reported 10,000 head of Zebu cattle as part of the Dauphin farm is questionable, and certainly the numbers have been reduced since 1986 as the previous owners of both the land and livestock have reportedly left the country.

Even the few "Zebu" cattle seen in the countryside show little quality breeding. All of the other cattle are a mixed breed of "creole" cattle which contain both Bos taurus and Bos indicus breeds. Smaller dairy breed background such as Jersey is evident. It is likely that some Jamaica hope is also present.²⁰ As a consequence, cattle are small, cows about 250 kgs when mature, and mature males seldom exceeding 400 kgs. Slaughter cattle seen in the markets would not exceed an average of 350 kgs.

19. It should be noted that 1980 UNDP project document shows agricultural statistics figures for the central plateau of 82,444 head, which, when compared with other data, are certainly excessive (UNDP, Project De Mise En Valeur Du Plateau Central, 1980).

20. IICA agrees that Jamaica Hope would do very well in Haiti but knows of no importations of the breed.

Offtake rates of the herd are low. Cows do not calve until 3 to 5 years of age and then calving intervals exceed 2 years. Poor management, disease, poor nutrition and lack of investment produce low growth rates. Animals reach slaughter weight in 3 to 5 years. Similar conditions in Africa put offtake rates at 9 to 10 percent. In Haiti the offtake rate is probably slightly higher, particularly in areas where rainfall is high. Thus, an estimate of 11%, which appears to be FAO's calculation is probably about correct. In 1979, 81,638 head are estimated as slaughtered, a total of 20.4 million kg liveweight. This estimate may be high. According to the UNDP study cited, the MARNDR gave slaughter figures for 1962 as 68,392, for 1964 as 57,776, and for 1973 as 28,400 (UNDP, 1980). These figures seem exceptionally low and, if accurate, would indicate a very low offtake rate of the national herd. More likely, these are numbers indicated from the larger markets, and do not take into account the slaughtering of a few animals at market day in several small markets throughout the country. Dressing percentages are low, not unusual for older cattle with high percentages of Zebu blood. We assumed a dressing percentage of 45%, although figures as low as 40% are given (UNDP, 1980). This gives total beef produced as 9,184,275 kg, or about 1.84 kg per capita for 1979.

JWK gave cattle prices as \$90.00 per head for 272 kg animals in 1976. Matter gives prices as \$225 for 275 kg cows and \$300 for 325 kg bulls in 1983. Figures quoted to us in the markets were fairly close to these, only slightly higher for 1987. If we use a high estimate for that year of \$300/head, and allow that there may have been as many as 990,000 head in 1983, then 190,000 head would have been slaughtered for a total value of \$32,600,000 in 1987. This figure may be high, but for lack of better estimates it can be accepted until national data improve. We believe that cattle prices may have risen slightly, about the level of inflation over the last four years. We have therefore increased values up to \$320 per head by 1986.

Cattle ownership seems more widespread than originally assumed, with about 48% of all rural households in the southern departments owning cattle (Table 43). Cattle of all ages in the four southern departments average 1.44 per household. Of households which engage in cattle raising, however, the figure rises to 3.0 per household. Livestock raising, even on the small farms characteristic of both hillsides and plains, is obviously an important part of the small farmer's strategy of diversified agricultural production.

Detailed current livestock census data are not available for the country as a whole, and an exact accounting must await analysis of future ADS-II data. Merely on the basis of comparable area, however, a national estimate based on the southern areas indicates a national herd size of 1,023,800--very close to the Mis-

sion estimate of 1,044,304 for 1986 (Table 42). This suggests that cattle density in the southern area must be reasonably close to the national average of about 0.20 head per person. There are approximately 0.37 cattle per ha of total land area. Of land actually in some form of agricultural, agro-pastoral, or agro-silvicultural use, however, cattle density is about 0.79 per ha. This is rather high, considering that livestock is secondary to food crop production on virtually all small land holdings.

a. Animal health

Animal health is an important aspect of animal production. Most of the common serious diseases of cattle are not now present in Haiti, with the exception of anthrax. For this serious soil-borne disease there is an effective vaccination, but its availability to many small hillside livestock owners is doubtful.

A more pervasive animal health problem is the prevalence of internal and external parasites. Corrective veterinary medicines are available, but the expense and inconvenience limit their timely use by peasant farmers, especially in the more remote locations. Increased emphasis on animal health would make a dramatic improvement in animal performance in both milk production and growth, and would be a readily visible item in any livestock improvement program. Screw-worm is also present, and may require constant attention when an infestation occurs.

b. Animal nutrition

The low nutritional level of cattle is a major production constraint. Livestock, including cattle, pigs, goats and sheep are fed a wide variety of available forages on most small farms.

i. Crop residues produced on-farm.

Crop residues such as corn or sorghum leaves and stalks, sweet potato-vines, bean plants and manioc are used as available. Certain waste fruits may be used from time to time. Sugar cane tops do not appear to be extensively used and this alone could add sensibly to the forage mix. In the case of corn and sorghum as well as cane, lower leaves could be stripped well before the crop matures, with little or no reduction in yield. Feeding such hand stripped leaves at a younger, more palatable and nutritious stage would extend considerably the forage supply from these major agricultural crops.

Certain trees and shrubs planted in alley-cropping or contour-terracing systems produce large amounts of edible forage. When the stems are harvested in coppice for firewood, posts and poles or when pruned to maintain desirable size and form, the leaves may be fed as a high-protein forage. Legumes such as Leucaena leucocephala, Desmanthus spp., Calliandra calothyrsus, Cassia siamea and Mimosa scabrella are good examples of silvo-forage crop trees that should be tried in this context. Leucaena in particular has been extensively (and successfully) used in a number of tropical and sub-tropical countries. Leucaena biomass production has exceeded 6 metric tons per ha per year (15-20 tons fresh clippings), yielding over 160 kg N, 15 kg P, 150 kg K, 40 kg Ca and 15 kg Mg. Care must be taken in feeding Leucaena cuttings. Although highly nutritious, they contain a toxic amino acid, mimosine, which affects both ruminants and non-ruminants. Diets should not contain more than 30% Leucaena, and non-ruminants should not exceed 10% by weight. Additional information on Leucaena varieties and use can be obtained from Leucaena Research Reports (NFTA), P.O. Box 680, Waimanalo, HI, 95795, USA.

The following list includes the major on-farm agricultural residues that are readily available.

Stover, Culms, and Leaves

Residues from harvested plants such as corn, sorghum, beans, and sweet potatoes. These are low in TDN (Total Digestible Nutrients) (40-55%) and protein (2-4%). They can be supplemented with small amounts of protein supplements, molasses or urea and will then make adequate ruminant forages.

Fruit and Tuber By-Products

Bananas, plantains, yams, sweet potato, cassava, citrus and other similar surplus fruits or by-products may be fed to ruminants or swine, but these are also primarily carbohydrate feedstuffs, and need supplementation.

Bran, Meal and Cracked Grain Residues

These residues of household preparation or small village mills are valuable high-protein feed supplements and are often available, though usually in small quantities. Used carefully, they can be espe-

cially useful as ration supplements for pregnant or lactating animals, or in some fattening rations.

Sugarcane Tops and Leaves

Small tops can be fed directly as green forage, or stored in silage pits to improve digestibility and to extend the period of use. Young lower leaves can be hand stripped as the plant grows, providing a continuous forage supply without reducing sugar production measurably. A 35,000 kg cane crop could provide up to 3 tons per ha of leaf residues for agricultural use. Most of this is burned at present.

Poultry Litter

This can be bio-fermented and used to replace part of the higher-cost protein supplements.

ii. Agro-Industrial By-products

While most present agro-industrial by-products are unavailable to the small farmer because of cost, changes in the Haitian economy or other factors may make them available at some future date. The following 12 items are the most important ones in Haiti at present.

- (1) Wheat millings (wheat bran, wheat germ, middlings and shorts). A very good quality protein supplement. Must be protected against weather in storage and transit.
- (2) Rice bran good for cattle feed, but of limited use in hog rations.
- (3) Soybean meal. An excellent feed supplement for all classes of livestock, with up to 44% crude protein. The majority is exported at present. Conversion of present sugar cane areas to soybean production of edible oil would greatly increase this supply and the livestock producers (and consumers) could benefit.
- (4) Cottonseed meal. This product could be improved by producers into a high quality cake. Increased production of cotton for export could substantially improve the present erratic supply.

- (5) Molasses. A good, economical energy source. Can be used to increase the palatability of coarse forages such as cane leaves and tops.
- (6) Bagasse. A good rough forage little used at present.

Because they are concentrated at processing plants, many agro-industrial by-products are more appropriate to larger livestock production units and feed lot operations. Transport and storage costs make their availability to the small farmer minimal. Because of the large units of production (by Haitian standards), they offer the potential for substantial increases in livestock sector production. Concentration of the agro-industrial residues at points of production would be an added advantage for commercial dairy operations or small-to-medium size feedlot operations. As cattle of very divergent quality are trucked or walked to market centers at Port-au-Prince and Gonaives, small feedlots to put a light finish on such animals would greatly increase their value to vendors and consumers.

c. Livestock Breed Improvement

Local "Creole" cattle are of mixed ill-defined breeds, largely descended from pioneer stock introduced by French and Spanish colonists. Animals tend to be light, mature cows reaching about 275 kg and mature bulls 325 kg live weight. Conformation is poor and irregular, and animals are rarely finished for slaughter. In consequence, dressing percentages are low.

There has been some effort to introduce Zebu cattle, and some evidence of this bloodline may occasionally be seen in the countryside. Milk cows have received somewhat more attention. Introductions of Brown Swiss, Jersey, and even Holstein germ plasm has been introduced with indifferent success. The new bloodlines, to reach their full effectiveness, require inputs in the form of quality feed and health care not often available to them. A promising breed of milk cow, Jamaica Hope, might be an effective introduction, as it is reported to perform well on similar pasture conditions in Jamaica.

Trying new breed introductions is beyond the reach of individuals in Haiti. A concerted effort to acquire and test promising breeds of milk and dual-purpose cattle would be an important step in improving the welfare of the Haitian peasantry through sale and use of more dairy products, and should be performed by a national research

program.

d. Pasture and Forage Improvements

Use of even steep hillside farm lots for grazing can be compatible with good soil conservation if certain basic principles are observed. Protection of the ground surface from direct raindrop impact requires an adequate soil cover—a thick mantle of vegetation or litter. This is a fairly simple matter with good, deep soils and adequate rainfall. The highly eroded shallow soils on most Haiti hillside farms are quite another matter. Extreme care should be used to insure that the remaining soil is exposed to raindrop impact for the shortest time possible, and that perennial, deep-rooted plants with abundant foliage are grown on every possible square meter of the farm.

The small farmers' tendency to graze cattle in corde rather than free-ranging encourages use of both palatable and unpalatable plants more or less equally, which is much better than the free-choice method which puts extreme pressure on the most palatable plants. If the farmer moves the tethered cow as needed to secure adequate grazing and water, this technique can be beneficial to both the animal and the grazed area. Poor animal condition en corde often results from the farmer's failure to observe this rudimentary principle.

Cut-and-carry forage use is a very effective way to use forage on small, irregular areas, or to use handcut forages such as corn, sorghum, sweet potato vines or tree leaves. Placing the cow in a small pen with partial cover against rain, and with a manger box to contain forage cuttings to avoid wastage, can result in the most efficient use of limited forage, and give the utmost protection to fragile, steep forage-producing areas. This method is very labor intensive, and requires extra care for best results.

Free, direct grazing is not often used on small farms because of limited size and lack of fencing. It is unsuitable, of course, for use with terrace row and alley-cropping schemes where the forage plants occupy narrow contour rows with intervening crops. Direct grazing, because the cow can select the most palatable and nutritious forages, can result in the best animal response provided an adequate forage supply is provided from which to choose. An additional benefit is the return of nutrients to the soil in the form of feces and urine.

A considerable body of information exists on the use of

improved forage grasses and legumes in the humid subtropics. The Agricultural Experiment Station, Puerto Rico, and the AGRO-21 program on Jamaica can provide detailed information on species and cultivars, their establishment, management and forage quality. Their experience could guide the choice of which species should be tested for specific response to Haiti's farm conditions.

On most small farms, an adequate quality feed ration is not available year-long. Cattle and other livestock will of course respond better if they are not faced with an occasional inadequate forage supply, especially during critical periods of pregnancy and lactation. To insure this continuous supply of quality forage, pasture improvement on even small areas would be helpful. As an illustration, Caribbean Guinea grass (Panicum maximum) may be expected to produce 10,000 kg/ha/year with reasonable management. If 0.10 ha were converted to this grass, 1000 kg would be produced in an average year. A 400 kg cow, consuming 2.5% of her body weight per day, would require 10 kg dry weight. The 0.10 ha pasture would thus support the cow for 10 days. On the average small farm, this would probably be an adequate supplement to insure an adequate nutritional plane for the entire year, when added to agricultural residues and other available feed supplies.

Forage grasses and legumes suitable for use in Haiti are listed in Table 48, with production potential and general site requirements.

5. Milk

Cow milk production is estimated to be between 19,000 to 20,000 MT per year, produced by about 100,000 "dairy" cows. In fact most cows in Haiti are considered "dual purpose" and the numbers actually producing milk at any time are open to question. The 1979 survey gave milk production per month as 1,645,306 kg. Earlier estimates by DARNDR put milk production at about 1.9 million kg per month, which may have been high. IICA point out that on the basis of 1,044,304 cattle in 1986 and assuming 35% cows, 30% bulls and 35% young and barren, there would be 365,506 cows. If one assumes one lactation each two years then the yield per cow per lactation would be 108 kg. This is obviously low but in the absence of other reliable yield data the DARNDR data are retained. Estimates of prices are virtually non-existent. One study gave a range of 0.65 to 1.00 Gourde per litre, which at the latter figure would put the total annual value of milk at about \$4,000,000. These prices are undoubtedly retail values. We have therefore taken the 1979 production of milk as representative, and calculated milk production as a constant ratio of the national herd. Prices are then given according to data

TABLE 48

FORAGE PLANTS SUITABLE FOR IMPROVED PASTURES IN HAITI ¹

Scientific/Common Name	Physical Requirements	Potential Production (dry matter)
GRASSES		
<u>Digitaria decumbens</u> Pangola grass	Requires at least 1000 mm rainfall	10,000 to 35,000 kg/ha with fertilizer
<u>Cynodon dactylon</u> Bermudagrass var Coastal Cross-1	Alkaline to neutral soils	10,000 to 14,000 kg/ha without fertilizer
<u>Cynodon Plectostachys</u> Star grass	Prefers alkaline soils up to 2,500 m	10,000 kg/ha without nitrogen, 15,000 kg/ha with Outperforms Pangola grass in animal gain.
<u>Pennisetum maximum</u> Guinea grass, Caribbean variety	900 mm plus ppt. on well-drained soils. Drought resistant	15,000 - 45,000 kg/ha depending on soil, ppt, fertilizer. Liveweight gains less than for Pangola or Stargrass
<u>Pennisetum purpureum</u> Napier grass, Merker var	Needs 1000 mm plus, tolerates wide range of soils, not water-logging.	15,000 kg/ha without fertilizer, 40,000 kg/ha with fertilizer
<u>Pennisetum ciliare</u> Common buffed grass	Lower drier zones. Light to medium texture soils.	
<u>Pennisetum Clandestinum</u> Kikuyu grass	Over 1200 mm, high elevations	Low production, but high with fertilizer
<u>Tripsacum laxum</u> Guatemala grass	Good drought resistance	

Brachiaria decumbens

Good on heavy clays
poorest liveweight gains.

20,000 to 25,000 kg/ha

Melinia sinutiflora
Molasses grass

900 - 2500 m, good on
acid, low P soils

10,000 kg/ha without
fertilizer

LEGUMES

Leucaena leucocephala
vars, "Peru" or
"Cunningham"

600 - 2300 mm, best below
500 m on wide range of
soils and substrata.
Salt tolerant, not to
water-logging. Best in
neutral or alkaline soils,
in acid soils if line-
pelleted and inoculated
with Rhizobium

Marginal crop soils,
no insect control,
8,000 - 13,000 kg/ha,
with control, 10,000-
16,000 kg/ha; Skeletal
soils, no insect
control, 4,000-10,000
kg/ha, with insect
control, 5,000-12,000
kg/ha

Pueraria phaseoloides
Tropical Kudzu

Less than 900 m

Kudzu- Molasses grass,
2 TLU/ha; Kudzu-Napier
grass mix,
fertilizer, 14,000
kg/ha

Macroptilium atropurpureum
(=Phaseolus atropurpureum)
"Siratro"

Dry matter from 3
cuttings, 11,000
kg/ha, a climbing
plant.

Centrosema pubescens

Desmanthus virgatus

Similar to Leucaena

15,000 kg/ha

Desmodium spp

D. discolor

Deep, fertile soils,
or in acid sandy to
loamy soils

12,000 kg/ha

D. distortum

Acid soils

14,000 kg/ha. Yielded
2,000 kg/ha in 2 cut-
tings within 5 months
of planting

D. gyroides

Good in poor soils up
to 1,000 m, drought
tolerant, tolerates
waterlogging

D. nicaraguense

Wet or dry sites,
rocky hillsides

Others include:

Desmodium spp. CIAT-335,

D. tortuosum

D. intortum

D. urcinatum

Stylosanthes hamata

Stilozobium deeringianum

Velvet bean

¹ adapted from USAID/Haiti, Targeted Watershed Management Project

produced by the World Bank reports and data for missing years were calculated according to the CPI.

Some estimates of agricultural production in Haiti have included goat milk. These, however, seem to be estimates based on some formula attributing a certain milk production based on estimates of goat numbers. Persons familiar with Haiti indicate that only rarely in the rural areas would goats be milked and goat milk used for human consumption. In fact, it seems that the does barely have adequate milk for their kids. Therefore, we include no goat milk in our production estimates.

6. Sheep

Most observers estimate sheep numbers at about 100,000 head, a figure that has been fairly constant since 1970. The IHS calculated sheep numbers were 105,503 in 1970 and 105,509 in 1979. This figure had risen sharply from 1950, when the IHS estimated numbers at 51,783. FAO has generally given lower estimates. Starting from a lower base in the mid-1960s, they have increased in numbers quite sharply and then maintained a relatively steady growth in numbers through the data series, never however, exceeding 90,000 head.

Matter gives sheep weights for market values at 50 kg with the most frequently quoted price of \$18.00 per head. This weight seems heavy, although it is consistent with a 1976 report by JWK.

More importantly, no sources estimate offtake rates for sheep. Discussions with people in Haiti who have some knowledge of livestock production suggest that production of the national flock is very low. We have chosen a figure of 15% based on these discussions and personal knowledge of Caribbean sheep production. The figure is less important than for some of the other animals due to the low numbers of sheep in the country. Total production would add \$270,000 to GDP in 1983 values.

7. Fowl

Chickens, ducks, turkeys and guinea fowl are all raised in Haiti. However, except for recent investments in commercial chicken broiler and layer units, most birds are free ranging around rural households and are marketed as live birds direct to consumers in small town and urban markets. Most of the chickens are small, although increasingly one sees the influence of various projects to introduce improved breeds, resulting in several types of crossbred chickens in the country. Disease, which is a serious problem, could be relatively cheaply and easily controlled. Turkeys are small by commercial production standards, probably not exceeding 4 kg. Ducks are grown but not in large numbers, and are generally quite small. A considerable

proportion of the ducks are Muscories. Guinea fowl are found in most areas of the country and seem to have adapted well to Haitian conditions.

a. Chickens

The 1979 survey counted 2,906,589 chickens. This figure was considerably lower than the 1970 estimate of IHS of over 3.8 million birds. The higher figure has generally been accepted by the FAO and they show numbers were up to 4.9 million in 1981. It is hard to make any educated evaluation of the reliability of these numbers as almost no other independent studies have been done. Equally, prices range from \$2.00 to \$5.00 depending on market and quality. Matter gives a most frequently quoted price of \$2.60 in 1983, which is as good an average price as we could find. What number of birds are marketed each year is not given by any of our sources. If a conservative number of 3.5 million are marketed at a \$2.60 average, then annual production would reach \$9.1 million, which is probably conservative. However, it probably represents a reasonable figure of farm-level value if we consider that transport and marketing costs would need to be deducted from market values. This would allow for a marketing ratio to the national flock of slightly over 1.1:1.0.

Egg production is given as 450,000 to 475,000 dozen per month with market prices from \$1.40 to \$1.80 per dozen. This number of eggs equals 5,400,000 per month. Matter puts the annual production of eggs at 45 per hen, about 4 per hen per month. This number would require about 1,350,000 laying hens, about 35-40% of the estimated flock. Assuming a farmgate value for eggs of 50% of market value averaging \$1.60, monthly farm production would be \$360,000, or \$4,320,000 annually. Egg production was given by DARNDR for the years 1977, 1978 and 1979. In 1977, the production of eggs was about 1.35 dozen per bird, and in the latter years it was approximately 1.9 dozen per bird. We have used the former rate to estimate egg production for 1976, and the latter rate to estimate egg production for the 1980 to 1986 period. Our justification for using a higher laying rate in the later years comes from the introduction of considerable numbers of improved breeds for crossbreeding, and the expansion of the commercial layer industry.

b. Ducks

Numbers of ducks in Haiti are estimated by FAO to be around 115,000 to 120,000. This figure runs from 3 to 5 times higher than the estimates from any other source. It is likely that 50,000 is a more reasonable number, al-

though admittedly a guess. If the ducks produce one market bird for each flock member each year, at \$2.00 each, total value would be \$100,000 annually. If farm prices are 50% of this the \$50,000 is not significant for GDP estimates.

c. Turkeys

Turkey numbers appear to be about 180,000. Value of birds are about \$10.00 in the market. Nothing is known about productivity of the flock. If we made the same assumptions as with ducks, then farm level value of production will be \$900,000 per year.

8. Draft Animals

Horses, donkeys, mules and oxen are all used for draft in Haiti. The value of these animals' contribution is not considered anywhere. We can only assume that their contribution through work is subsumed under other categories of agricultural production, value added in marketing or in transportation. For this analysis the contribution of oxen within the agricultural sector is assumed to be included in cattle estimates. Horse numbers have been put as high as 400,000 but the 1979 survey gives only 190,000. Mules are given in the same survey as 102,000, a higher figure than the 80,000 estimated by FAO. Donkey numbers according to the 1979 survey were 185,000, about 20,000 head lower than the number given by FAO. One problem with the equine animals is that people often confuse the animals in observation or when conducting surveys. We can probably say that all three categories comprise between 450,000 and 500,000 head and that the figures have not changed very much for several years.

9. Constraints to Livestock Production

The following constraints are not in strict order of importance, as many were difficult or impossible to quantify. In general, the more serious ones occur first.

1. Farmers are unaware of nutritional needs of livestock, thus are reluctant to invest in balanced rations.
2. Lack of management or planning.
3. Medicine (liver fluke, other internal and external parasites) is expensive and difficult to obtain.
4. Poor nutritive quality of many native plants.
5. Agricultural residues are often low in quality without additional supplements.
6. Animal health problems are little understood, e.g, New-

castle disease of poultry.

7. Breeding programs and schedules are carelessly followed, partly because farmers are unable to detect breeding cycle in females.
8. There is a serious lack of much-needed extension to farmers.
9. Reasonable sanitation is not practiced. For example, pens are often left fouled and feed is scattered on ground instead of in bunkers.
10. Small size and dispersed nature of multi-plot holdings.
11. Shortage of investment capital for capital improvements or production costs, feed, and medicine.
12. Virtual absence of physical infrastructure in rural Haiti; especially roads, water developments, veterinary posts.
13. Lack of a national livestock policy and commitment to improvement of the livestock sector.
14. Lack of available grazing areas due to extreme human population density.
15. Lack of research and extension facilities. Capability to do applied research and extend findings to livestock producers (small farmers) would greatly increase efficiency of production.
16. Pasture improvement grasses and legumes are under-exploited.
17. Farmers consider conservation cropping schemes and associated livestock production as competitive with, rather than complimentary to food production.

Recommendations:

1. Extension efforts should be continued to expand small producers awareness of methods and techniques in animal health, nutrition and marketing needs. Some training for Haitian extension personnel should be made available out of country.
2. Feeding trials should be made and oriented toward more use of local feed resources. Feeding trials using low-cost rations in gestation and lactation periods are especially critical. This work should be carried out under the su-

pervision of an animal nutritionist.

3. Demand for wheat shorts and rice bran already far outstrips anticipated supply. Feasibility of importing feed grains (especially feed sorghum) for both swine and poultry should be considered.
4. Use of soybean meal should be considered in swine rations, provided a local soybean industry develops on land being withdrawn from sugar cane production.
5. A fully operational veterinary diagnostic laboratory is a critical need for Haiti. This should logically be contained within the framework of MARNDR and FAVM, with inputs as needed from the international community.
6. Market research should focus on (a) feed supply and its effect on production costs and constraints; and (b) the impact of imported pork and its effect on pork production in Haiti.
7. An economic study is needed on production and marketing systems appropriate to the new breed of pigs in Haiti, with especial reference to the small producer.
8. Breed improvement efforts should be continued through MARNDR and FAVM (Faculty of Agronomy and Veterinary Medicine), including dissemination of breeding stock to cooperators throughout the country.
9. Extension efforts should be continued to bring techniques and management expertise to the attention of goat raisers.
10. Associated breeding centers should be strengthened by providing adequate improved breeding stock and regular technical support (extension) through MARNDR, FAVM, or other appropriate agency.
11. Distribution of breeding stock should be tied to mandatory training sessions. Cooperators receiving animals should be required to keep adequate records to evaluate success of the program.
12. Continue work on forage trials to determine long-term response of grass-legume association plantings, especially those incorporating Leucaena and siratro (Macroptilium atropurpureum).
13. Evaluate planting, grazing and cutting methods on small hillside holdings to minimize soil loss.
14. Make follow-up studies to evaluate economic potential and

impact of the improved goat breeds. This should be continued for a 3 to 5-year period.

C. Agro-Industry

1. Structure

Traditionally, the major agro-industry in Haiti has been sugar refining. The land devoted to sugar cane amounts to some 45,000 hectares, the decline in recent years being blamed on the price farmers are paid for cane. There are also other smaller industries producing tomato products, vegetable juices, fruit pulps and jams. The country has seen the rise and fall of the sisal industry, having had what was considered to be the largest estate in the world, complete with its own shipping facility. Mangoes are shipped to the U.S. market, as was some meat. Vegetables were flown to Europe for a period although this operation currently appears to be in abeyance.

The recent assessment of Haitian agribusiness (Mott and Mooney, March 1987) commissioned by USAID/OPED described the commodity system as having three components: production, processing, and marketing. An agribusiness is described as an operator or firm which undertakes one or more of these tasks, or which performs operations which link one to the next. Typically, developing-country commodity systems are loosely organized with weak links between the components. This is described as being generally the case in Haiti. Marketing and processing are usually closely coordinated but the links to the producer are weak. Three well-integrated systems are cited: the producers of Famosa tomato products, the La Chapelle vegetable export enterprise, and the Mennonite Development Associates cocoa project.

By not paying enough attention and by devoting the bulk of their resources to the production process, agribusinesses in Haiti do not encourage the farmer. Since they receive a relatively low price for their crop, farmers do not have the incentive to invest in mechanisms of improving their productive capacity. The margins obtained by the trader are calculated to be greater than those of either the processor/exporter or the producer, and their presence weakens the link between producer and market. However, just as the farmer is discouraged from investing due to low prices, similarly the processor has been discouraged by the political and fiscal climate of the past. Hopefully, implementation of the measures discussed in Chapter VII, Marketing, will improve this.

While ideally, a processing industry is easier to manage if it has a proportion of its supplies coming from lands under its own control, successful operations can be maintained using small-farmer suppliers. The sugar cane industry of Haiti has traditionally relied on small farmers, only HASCO having any sizeable

land area of its own. The coffee and cocoa industries have very few examples of large plantings. The difficulties in many small farmer-based industries are those of lack of uniformity of product, the difficulty of smoothing supply, and the difficulty of making and enforcing contracts.

Technical advice to farmers from the official extension services is frequently weak. The type of advice needed in intensive cultivation systems is often of a very specialized nature, requiring skills and expertise beyond those of the average generalist extension worker, even if an adequate system of extension exists. It is proposed in the Agricultural Investment Code that companies be encouraged by tax incentives to provide this service.

2. A Framework for Support

The OPED office has been developing a framework for agribusiness establishment in Haiti and a supporting structure of management training, financing and enabling legislation. The support to agribusiness comes within OPED's broader strategy of private sector development. This support can be divided into three types:

The first is the provision of credit. There was an identified lack of a development finance framework, which was hampering greater industrial and agro-industrial growth. Four development-oriented credit institutions existed but had been operating with limited scope and/or effectiveness. These were:

- o The Institut de Developpement Agricole et Industrielle (IDAI)--later BNDAI;
- o The Bureau de Credit Agricole (BCA);
- o The Haitian Development Foundation (HDF); and
- o The Fonds pour le Developpement Industriel (FDI).

The first two of these are government institutions. The first is not considered a viable source of credit by the business community; the second specializes in lending to the small farmer (see the credit section of this report). The Haitian Development Foundation (discussed below) was aimed at the small entrepreneur. The FDI is a rediscount and loan guaranty fund supported by the World Bank and operated through the established commercial banking network. For various reasons the commercial banks had not been utilizing the funds and A.I.D. considered the market penetration to be limited.

To alleviate this situation, A.I.D. assistance was provided primarily through three institutions directed towards the needs of different sectors of the market:

- a. The Development Finance Corporation (SOFIHDES), an en-

tirely new organization based upon a broad shareholding, with a limit of 10% on the amount of voting shares which any one shareholder may own.

SOFIHDES' loan portfolio consists of larger, medium- to long-term loans from \$50,000 to \$225,000. In addition to its lending capability, SOFIHDES has the back-up of a loan evaluation department which will screen and analyze requests.

In the agricultural field the Project Paper for SOFIHDES foresaw the need for loans to agro-industry. The analysis pointed out that there were precedents in Haiti for agro-industries based on a small-farmer production network, despite the problems that this could present, and that this was seen as the likely future development.

- b. The Haitian Development Foundation (HDF) is an organization created in 1978 following discussions between the Pan American Development Foundation (PADF), the Haitian business community and civic leaders. The objective of the Foundation was to provide access to loan funds to small enterprises. A proposal was submitted to USAID/Haiti and initial funding came in the form of a grant of \$495,000 to PADF to provide technical assistance as well as loan and operational funds for the establishment of the Foundation. The Foundation has had continued funding from A.I.D., the InterAmerican Development Bank (IDB), PADF, and the World Bank-supported Fonds de Developpement Industriel (FDI). Loans from this source are between \$5,000 and \$50,000.
- c. The Banque de Credit Immobilier (BCI) which provides mortgages for housing construction.

The second area of support is in the field of non-traditional exports, and has two main thrusts:

- a. Crafts, which are largely supported by the Crafts Export Resources Center, and
- b. Agro-industry, which is being encouraged principally by the creation of the Association of Agricultural Producers (APA), and the promulgation of an Agribusiness Investment Code. The Association of Agricultural Producers consists of a group of Haitian agribusiness representatives interested in the development of local production and export activities. To help assure the success of APA, the Mission is financing institutional and agronomic technical assistance in the form of an institutional specialist, a horticulturalist to advise on tomato and vegetable growing, a cereal agronomist and a grain storage expert.

The third area of support is designed to take advantage of opportunities under the Caribbean Basin Initiative (CBI). Three bodies have been created:

- a. The Industrial Development Center (PROMINEX) was created in August 1986. During the first phase it is intended that local manufacturing for export be expanded. In the second phase an outreach effort will be mounted to recruit investors from overseas. PROMINEX will provide three types of services:
 - 1) Information gathering and data provision to improve competitive export capability, and media communications assistance to improve the business image of Haiti;
 - 2) Reception and support facilities to process assembly and other investor requests, particularly as they pertain to the CBI; and
 - 3) Promotional efforts to create new assembly contracts and investor interest in Haiti.
- b. The Management and Productivity Center (CMP) is concerned with providing management training and management services. The weak management capability in many Haitian businesses has had a negative influence on the ability of Haiti's industries to respond to increased production needs, opening of new markets, and presentation of attractive opportunities for outside investors. The new center will offer training for businesses of all sizes.
- c. The Consultative Mixed Committee for Industrial Development (CMCID) is the body which provides a forum for private/public sector dialogue and through which policy issues are addressed. This is the successor body to the Permanent Mixed Committee for Investment Promotion (PMC) created in 1984 with the encouragement and support of the U.S. government following the passage of the CBI. There was a period when this body ceased operations when it criticized the Duvalier regime, but key private sector PMC members and technical consultants continued to meet informally and a new decree was drafted for the creation of the new body when the new government was formed.

3. Agro-Industrial Development

The Agribusiness and Small Rural Enterprises Assessment divided the constraints to agribusiness development under three headings--Natural, Infrastructure and Management. Taking these in turn:

Natural constraints were categorized as availability of land and water. Land availability and quality is discussed in more detail elsewhere in this report. The scarcity of good land and its subdivision among a large number of farmers--600,000 farmers, over 90% of whom have less than 3 hectares of land, and of these 45% have less than 1/3 hectare--is a severe problem which will only worsen. These farmers have a total of 1.4 million hectares, 61 percent of which the World Bank estimates to be in the mountainous areas. The report estimates the total plains land to be between 350,000 and 490,000 hectares; of this, some of the prime land is unused.

For agribusiness, this is hardly an ideal situation since the delivery of inputs and technical advice and the production of outputs are made more difficult and expensive by small, dispersed units of production.

Haiti is subjected to a wide-range of micro-climatic conditions as the result of its mountainous terrain, so that rainfall is uncertain. The World Bank estimates the area of irrigable land to be 180,000 hectares of which some 80,000 are currently irrigated, although some systems are in need of repair or reconstruction. (See discussion in Chapter II.)

Infrastructure constraints include those which are most obvious--roads and telecommunications--as well as the less visible ones of power costs and freight limitations.

Despite a series of A.I.D.-funded road building and improvement projects, the road system consists of the paved road from Les Cayes, through Port-au-Prince to Cap Haitien and on towards Fort Liberte, some other short lengths of paved road, and a network of dirt roads of varying quality. The consultants comment in their report that the common way to pay for transport is by the time taken, rather than the ton/kilometer; this system tends to damage vehicles more rapidly and encourage the reckless driving in poorly maintained vehicles seen everywhere in Haiti.

The cost of electric power is said to be high, although comparative data for neighboring countries was not given. Supply is unreliable. Some companies install their own generating capability in order to avoid high costs and breakdowns.

Air freight facilities are good from Port-au-Prince, and Cap Haitien has been used by one company flying vegetables out to Europe. Other airport facilities are primitive.

The two major ports are Port-au-Prince and Cap Haitien. Whereas the former can accept vessels of almost unlimited tonnage, the latter can take vessels of no more than 10 feet draught. The port of Cap Haitien is only one day's sail from Miami so that

perishables can easily be transported under refrigeration from there. Cold storage facilities do exist at Cap Haitien, and the port at Port-au-Prince has power connections for refrigerated containers.

Telephone services are poor and costly, even though Haiti boasted having the first automatic exchange in South America. Calls within Port-au-Prince are frequently delayed for long periods of time and calls to provincial towns are impossible at certain times of the day. There are over 400 telex lines, but none, for example, at Jacmel.

Market information is difficult for exporters to obtain and for farmers there is only limited broadcasting of coffee prices. For other price information farmers rely on traders, neighbors and visits to markets. Similarly, dissemination of technical delivery is poor, since the extension service is quite limited.

Recommendation:

That USAID immediately review the infrastructure impediments to development, not only of agro-industry but of internal marketing as well, and urgently devise a strategy, in collaboration with other donors, to alleviate those constraints. The strategy should include improvements to roads, ports, airports and telecommunications.

The necessary management skills to run sophisticated agricultural processing plant are lacking. There is a lack of institutions to train and develop farm managers and mid-level operating personnel. Skilled technicians are not available; the consultants cite HASCO's having built and equipped a research station but being unable to find anyone to staff it, and Famosa bringing in a foreign technician for five months each year to operate their plant.

Management support in the form of advice on identifying and packaging for the financing of an agribusiness proposal is not available. Nor, say the consultants, is there any institute of higher education focusing on management training for agribusiness, although the Faculty of Agriculture and Veterinary Medicine claims that it is now offering a degree option in post-harvest technology, which includes agribusiness.

One cannot provide more land, although a start can be made on what is available, or might become available as people seek to move out of production of sugar cane and cereals. The areas currently in rice and sugar cane are among the most fertile and, in the case of rice, support a population accustomed to intensive cultivation. Infrastructure can be provided and brought up to modern standards so that Haitian farmers and businessmen can compete with the rest of the world. The institutions which are

being developed in the OPED portfolio should help to remedy some of the management and financing constraints, through OPED's current plans to integrate the portfolio to implement a rural private enterprise development program.

Recommendations:

That an in-depth study be made of existing agro-industries to determine what the constraints are to their expansion. Possible reasons are poor presentation, lack of contact with larger markets, lack of suitable local product, lack of the desire to expand. Assistance should be given to those which can be expanded, which offer Haitian farmers an outlet for their produce and, where feasible, use labor-intensive techniques.

Assist PROMINEX to investigate and assess the prospects for agricultural exports. Reinforce this organization's agricultural capacity on a long-term basis.

4. The Investment Codes

The socioeconomic climate within which the desired strategies must be implemented is of the utmost importance. The potential expatriate investor has a choice of countries in which to locate a business, many of them without the string of constraints listed above. The Haitians "voted with their feet" in the early 1980s, and if they did not leave themselves, there was a considerable flight of capital. To persuade either Haitians or expatriates to invest in Haiti they must be assured both of the opportunity to obtain a return on their capital, and that the capital itself will not be expropriated.

The Industrial Investment Code is clearly aimed more at purely industrial operations than is the proposed Agribusiness Investment Code. Nevertheless, there are elements of the Industrial Code which might make investment under it more beneficial to agricultural businesses than the Agricultural Code. Particularly relevant is the provision for a complete or partial tax exemption for the preferential income of businesses which establish themselves outside Port-au-Prince.

A draft Agribusiness Investment Code was prepared by Arthur D. Little in July 1986 for OPED. In their discussion of the rationale for a code they say that although food-processing and transformation of raw materials is covered by the Industrial Investment Code, agricultural production (including fisheries, livestock and forestry) is not. Therefore, the need for a code is justified on the following grounds (Arthur D. Little, July 1986):

- (1) That although agriculture is critical to Haiti, the lack of investment in the sector has led to general stagnation;

- (2) Compared to industry, agricultural projects carry a number of special risk factors. Special incentives might therefore be needed to compensate for the unique characteristics of agriculture;
- (3) The importance of looking at agricultural production, not as an end in itself but as the beginning of an integrated agribusiness chain. Successful stimulation of agricultural production is likely to be a function of the ability to encourage enterprises with access to markets and/or inputs to invest in Haiti and link themselves in an integrated fashion with producers.

The report identified the constraints to investment as being those discussed earlier and saw the need for a code which would take into account the special needs of agriculture and place a premium on those investors with an integrated approach. By that they meant those who would purchase, process and market the produce of others and possibly contribute in terms of credit, research and development, extension, marketing, infrastructure development and transport.

The principal feature of the proposed code is that there should be a special status for export-oriented packaging, processing, and marketing and particularly for those activities most likely to benefit small farmers. Those who propose activities likely to prove deleterious to the soil should not qualify.

The major incentives proposed are:

- (1) The ability of exporters to retain foreign earnings and free utilization of these funds to purchase needed inputs and pay local costs;
- (2) The deduction (for tax purposes) of investments in agribusiness related companies from the taxable income earned by other companies;
- (3) The ability to import or to export with the minimum of permits, regulations and delays;
- (4) Production credit insurance for those companies that provide credit to independent agricultural producers, this insurance scheme to be backed by the Central Bank;
- (5) Tax credits to the total value of the technical assistance provided to small producers; and
- (6) Accelerated depreciation.

With these investment incentives and the bodies discussed ear-

lier, the institutional framework would be in place. The infrastructural constraints would remain, however.

CHAPTER IV

LAND DISTRIBUTION AND LAND TENURE

A. Farm Size

It has frequently been observed that there is an inverse correlation between farm size and productivity in Latin American agriculture. Smaller farms use land more intensively, have higher labor inputs per hectare, show more complex patterns of intercropping and crop rotation and thus have a greater potential to satisfy the needs of an ever increasing population. However, it must be stressed that this picture holds true only at the most general level of aggregate data analysis. This section of the report will demonstrate that land distribution in Haiti is significantly different from what is prevalent elsewhere in Latin America, that farm land has become ever more fragmented over the last few decades, and that the small average farm size poses a serious constraint to increased productivity and erosion control.

The pattern of land distribution in South America is well known. Large estates have never commanded all of the national territory but they do constitute a dominant economic and political force in many countries. Let us just consider the area taken up by estates of over 1000 hectares, according to the Statistical Abstract of Latin America (as reported by Busey, 1985:25). In Argentina, such large properties constitute only 6% of the total number of farms yet they cover about 75% of the arable land. In Brazil, less than 1% of the farms fall into this category, yet they occupy 40% of the land. In Chile, the figures are given as 1.3% of the farms occupying 72.7% of the land. For Peru, Uruguay and Venezuela the distributions are similar in that between 0.3% and 5.2% of the farms cover between 58% and 72% of the total arable land. The land monopolies implied by such a disparity of farm land distribution has several effects which shall later be considered in the context of Haitian rural development. First, the families controlling huge estates have usually been successful in monopolizing not only the most but also the best land. The best land is thus administered by individuals who have little incentive to maximize food crop production on it. For example, in Argentina the rich black soil is largely used for extensive cattle grazing because it is easier, less expensive and less risky to use large estates in this way. Secondly, without the availability of land there is no base for an independent peasantry. Vast numbers of the rural poor find themselves without any other alternative than to work as laborers on large estates. This has the effect of depressing their wages and probably also at the same time, the wages of the urban industrial workers (Harrison, 1980:5). Thirdly, the protracted extensive use of good land prevents the upgrading of agricultural land which has always been a condition sine qua non of highly productive agriculture. Finally, the monopoly over good land has led to a situation where large numbers of people have to eke out a living by planting steep hills in annual food crops. There is thus a link between land distribution patterns and the poten-

tial for accelerated soil erosion.

As Table 49 shows, land distribution in smaller Central American nations is very different from what we have just seen in South America. Farms of over 1000 hectares are so few that they do not warrant an independent statistical category. Even farms exceeding 500 hectares clearly do not constitute a monopoly. While they may constitute only a small fraction of all farms, they occupy over 40% of the land only in Somosa's Nicaragua (1963 figures) and as little as 15.3% in El Salvador. This may in part be due to the overall small size and the mountainous topography of these countries. Whatever the historical determinants and evolution of this phenomenon, medium sized farms and peasants play a much larger role in Central America than on the South American continent. Land distribution in the Dominican Republic in many ways resembles that in Central America. Minifundia predominate while at the same time there are a small number of large estates which occupy a considerable part of the best land. More than four-fifths of all farms measure five hectares or less and collectively they occupy only 12.8% of the land. The 345 estates of more than 500 hectares, on the other hand, cover 723,000 hectares, or 27%, of the land.

In contrast to all the examples given above, the land distribution in Haiti appears much more egalitarian (see Table 49 and Figure IV-1). This is in part due to the inadequacy of information available. In the absence of cadastres, most information on land distribution in Haiti is based on census data going back to 1950, 1971 and 1982. (Project ADS-II is currently carrying out a national survey of agriculture which may in the future provide such data). The methodology of questioning farmers about their land holdings and accepting unverified information and, in the case of the 1971 and 1982 data, using a sampling methodology, made the Haitian censuses less than reliable. In addition, the censuses have systematically excluded large landholdings and probably also much of the state land. Their results can, therefore not be compared directly to those for other countries. But whatever the shortcomings of the Haitian census, its results are the only ones available on a national level and will have to be used in the foreseeable future.

While the census does not provide an accurate picture, it nevertheless leaves us with the impression that a large majority of rural Haitian families own at least some land. Higher quality data from social science studies of individual communities tend to confirm this result. Zuvekas (1978) has scrutinized twelve studies published during the 1970's. The proportion of landowning families reported in these studies varies between 56% and 100% of the local population.

Figure IV-2 shows some data collected during the 1980's for some of the communities (listed in Table 50). The data in these studies are, by and large, vastly superior to what we have in the census. Not only do the authors show much greater awareness of the complexity of land tenure arrangements, they also generally refused to accept unverified information given by farmers to outside enumerators. The best of these

TABLE 49

LAND DISTRIBUTION BY FARM SIZE AND NUMBERS OF FARMS,
CENSUS OF HAITI, 1950, 1971 AND 1982 (1)

NATIONAL TOTALS , 1950 and 1971 (Numbers)

Farm Size (Carreaux)	1950		1971	
	Farms	Area	Farms	Area
-0.99	222,702	124,819	437,995	217,175
1.0 - 1.99	171,171	256,757	110,260	175,030
2.0 - 4.99	136,973	417,690	57,180	180,590
5.0 +	34,619	332,820	11,275	95,900
TOTAL	565,495	1,132,086	616,710	669,395

(Percent)

-0.99	39.4	11.0	71.0	32.5
1.0 - 1.99	30.3	22.7	17.9	26.1
2.0 - 4.99	24.2	36.9	9.3	27.1
5.0+	6.1	29.4	1.8	14.3
TOTAL	100.0	100.0	100.0	100.0

DEPARTEMENT DU SUD AND DEPARTEMENT GRANDE ANSE COMBINED (2)

Farm Size (Carreaux)	1982 (Numbers)		1982 (Percent)	
	Farms	Area	Farms	Area
-0.49	31,506	7,354	20.9	3.8
0.5 - 1.54	81,512	69,747	54.2	35.9
1.55 - 4.99	32,928	80,733	21.9	41.5
5.0 - 9.99	3,618	21,147	2.4	10.9
10.0+	870	15,484	100.0	100.0
TOTAL	150,434	194,468	100.0	100.0

NOTES: (1) Large estates were generally excluded in 1950 and 1971, and probably also in 1982.

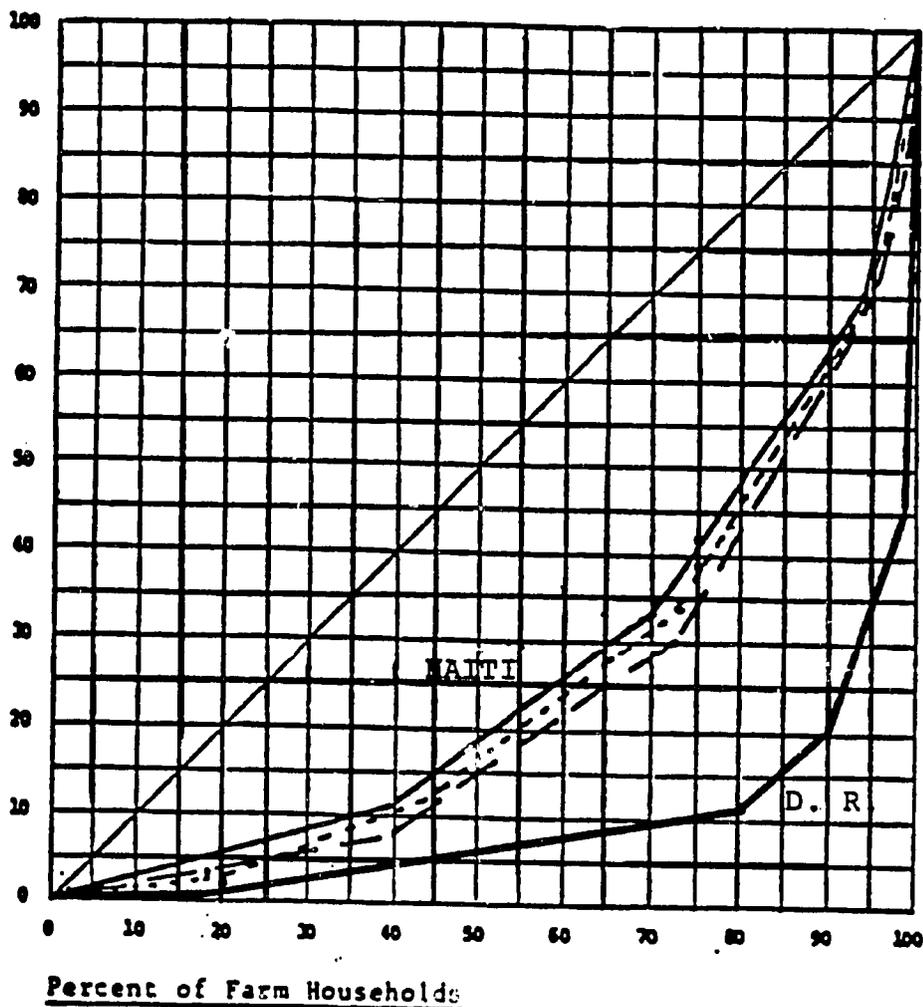
(2) 1982 data are available for two departments only. Unfortunately, the size breakdowns of the published data do not match those of 1950 and 1971.

SOURCES: Haiti, IHS, 1955; 1973
IHS, 1986.
Zuvekas, 1978: 93-94.

FIGURE IV-1

LAND DISTRIBUTION IN HAITI ACCORDING TO THE CENSUS, 1950, 1971 AND 1982, AND IN THE DOMINICAN REPUBLIC, 1981

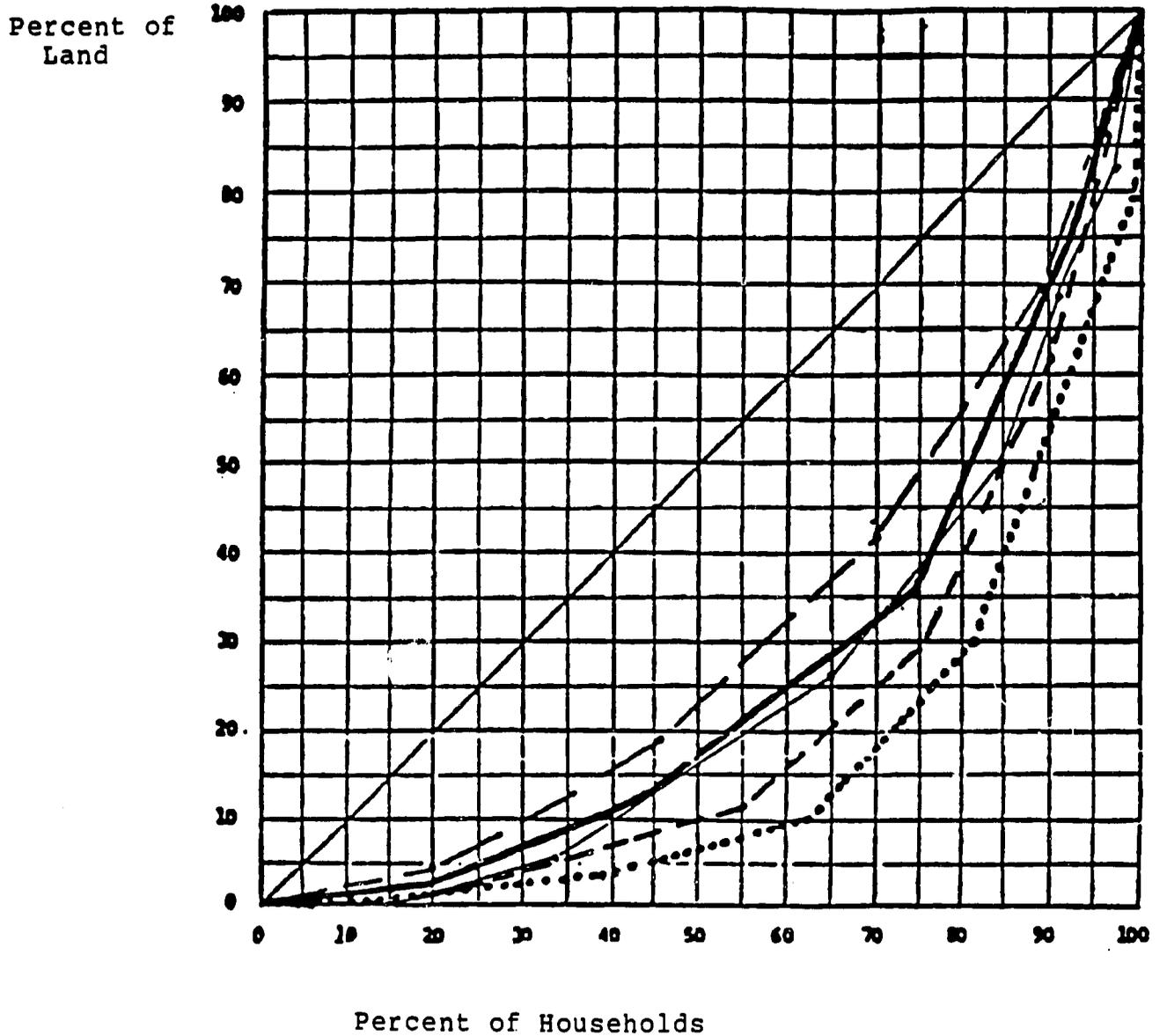
Percent of Land Owned



- Haiti, IHS, Census of 1950 (Haiti)
- Haiti, IHS, Census of 1971 (Haiti, 10% sample)
- Haiti, IHSI, Census of 1982 (Departement du Sud only)
- Dominican Republic, Republica Dominicana en Cifras, 1981

FIGURE IV-2

DISTRIBUTION OF LAND IN FIVE COMMUNITIES



- Fonds des Negres, 1980 (land owned)
- Chambellan, 1984 (land owned)
- . - . La Hatte Cadette, 1973 (land worked)
- L'Artichaud (pseud.), ca 1979 (land owned)
- Dubreuil, 1985 (land owned)

Sources: Jaffe, 1985; Locher, 1984; Lowenthal, 1987; Murray, 1977; Smucker, 1982.

TABLE 50

LAND OWNERSHIP DATA FOR HAITI BY YEAR, LOCATION,
AUTHOR, TYPE OF DATA AND SOURCE

Year	Location	Author	Type of data	Source
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1950	Haiti	IHS	Census	IHSI census vols.
1971	Haiti	IHS	Census	IHSI census vols.
1982	Haiti	IHSI	Census	IHSI census vols.
1980	Fonds-des- Negres	Lowenthal	Survey	Lowenthal, 1987
1981	Bayonnais	Pierre	Census	Locher, 1983
1982	L'Artichaud (pseud.)	Smucker	Census	Smucker, 1984
1982	Bas Boen	Darisme	Survey	Darisme, 1983
1984	Chambellan	Locher	Census	Locher, 1984
1984	Mirebalais	?	?	Raynolds, 1985
1985	Foscave	Raynolds	Census	Raynolds, 1985
1985	Dubreuil	Jaffe	Census	Locher, 1985

studies provide land distribution data as good as we are ever likely to get in Haiti. The data themselves are given here for only one study because that one is as yet unpublished (see Table 51). The following points summarize some results from these studies.

1. Land distribution is much more egalitarian than has been found elsewhere in Latin America. Large estates are virtually absent in these communities, though they are known to exist elsewhere in the country.
2. Most farmers own at least some land but the amount owned is very small. Average farm size is said to be somewhere between 1.0 and 1.5 hectares.
3. Most farms consist of several generally non-contiguous plots. On average, a farmer will own three plots each of which measures less than 0.5 hectares.
4. Farm operations are not limited to land owned. Many farmers hold land simultaneously under a variety of tenure arrangements.
5. Few of these studies go into the question of land quality and most do not even distinguish between irrigated and dry land. Where such distinctions are made, the distribution of higher-quality and irrigated land appears to be much less egalitarian than that of land in general.
6. Most studies do not establish any relationship between the distribution of land and other resources and consumption items. However, where the documentation has been made available, the distribution of animals and consumption items is much less egalitarian than that of land; it approximates the distribution of irrigated land (see Figure IV-3).

There is no reliable source concerning the evolution of land holdings over time. Several authors have warned against basing conclusions on census data alone (Zuvekas, 1978; Block et al., 1987). Nevertheless, two major trends are really beyond any doubt, namely, the increased fragmentation of landholdings in general and the increasing concentration of land ownership in some of the irrigated plains. Increasing fragmentation is not suggested only by our interpretation of population increases, inheritance patterns and census tables; sophisticated anthropological analyses, such as the one for a village in the Cul de Sac plain (Murray, 1977), come to the same conclusion. Concentration of landholdings in connection with irrigation has been documented in many countries but never in any reliable way for Haiti. However, two recent studies of newly-installed or renovated irrigation systems in the Les Cayes plain leave little doubt that the process of land concentration is also under way here (Raynolds, 1985).

Why is small farm size a constraint for increasing farm productivity? It is surprising to see that none of the previous agricultural sector

TABLE 51

LAND DISTRIBUTION BY FARM SIZE AND NUMBER OF FARMS
 ACCORDING TO ONE RECENT VILLAGE SURVEY
 (FONDS-DES-NEGRES), 1980

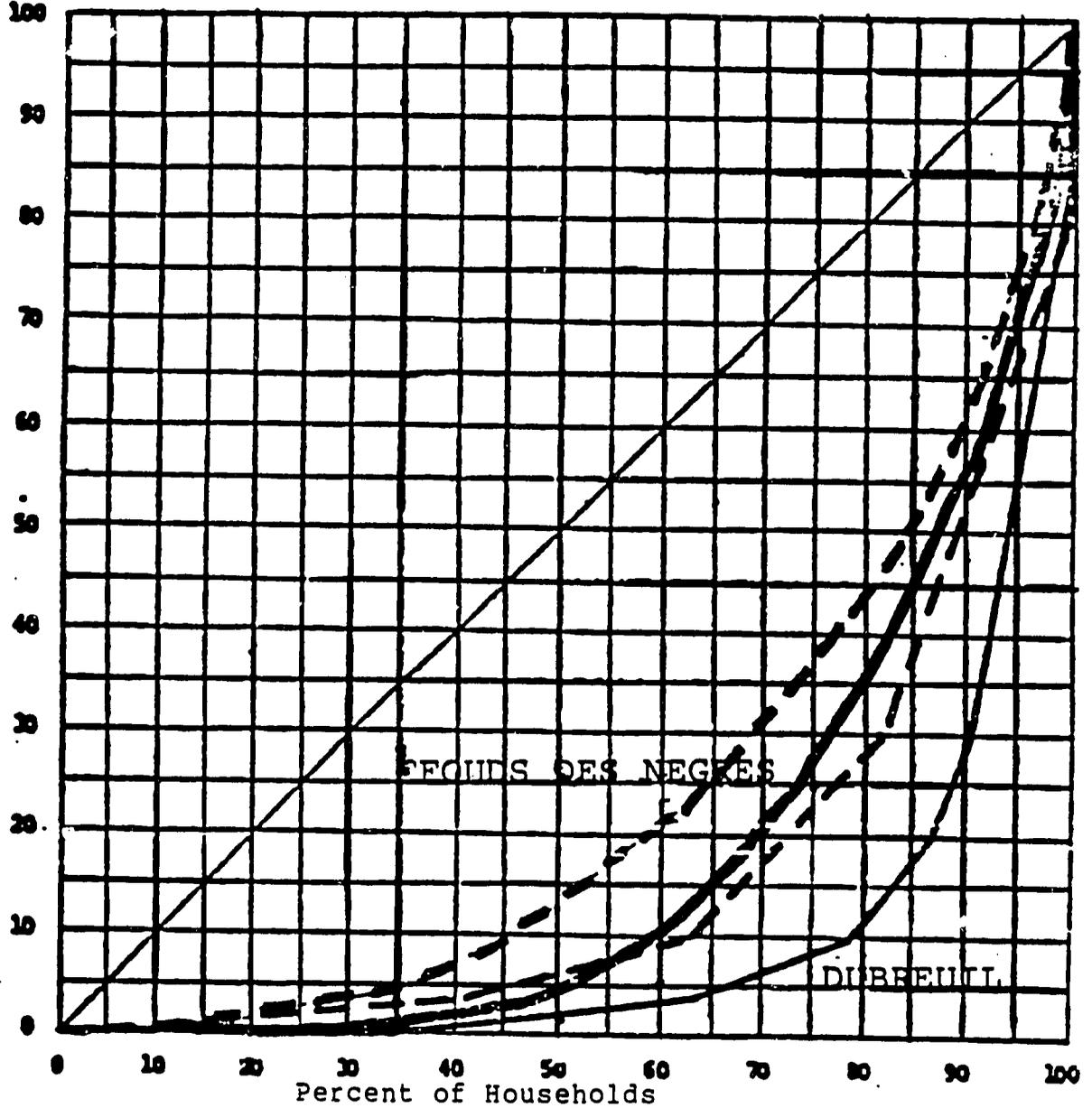
Farm Size (Carreaux)	Numbers		Percent	
	Farms	Area	Farms	Area
-0.49	58	8.9	46.0	9.1
0.5 - 1.54	51	44.8	40.4	46.1
1.55 - 4.99	16	38.3	12.7	39.3
5.0 - 9.99	1	5.4	0.8	5.5
10.0+	-	-	-	-
TOTAL	126	97.4	100.0	100.0

SOURCE: Lowenthal, 1987.

FIGURE IV-3

DISTRIBUTION OF LAND AND ANIMAL RESOURCES
IN TWO COMMUNITIES

Percent of
Resources



- Fonds des Negres: Total value of animals owned
- - - - - Fonds des Negres: Total area of land owned
- Dubreuil: Total value of animals owned
- - - - - Dubreuil: Total area of land owned

Sources: Lowenthal, 1987; Jaffe and Locher, 1985.

assessments have explicitly addressed this question (Le Beau, 1974; Zuvekas, 1978; Eriksson and Nicholson, 1982; World Bank, 1985). There is no single answer to the question but several factors can be pointed out which operate both independently and in conjunction with each other. In the broadest sense, small and fragmented farm holdings make economies of scale virtually impossible. The cost of using any kind of farm machinery, even plows, becomes prohibitive and the use of fertilizer and pesticides entails proportionally higher labor costs on small and dispersed plots.

Another factor is the well-known connection between the need to produce annual food crops and land erosion on steep hillsides. Because farms are too small to sustain a family adequately, farmers employ abusive practices in order to avoid starvation. This includes the replacement of perennial by annual crops, the suppression of fallow periods, and the planting of hillsides much too steep to be safely planted, given current levels of Haitian agricultural technology. Below a certain farm size, peasants will almost be forced to abuse the land.

The need to provide at least some cash income and food production year round dictates patterns of intercropping and an agricultural calendar which do not favor increased productivity. Having neither crop insurance nor savings, many farmers cannot place productivity increases and/or income maximization at the top of their priority lists. They operate so close to the margin of survival that they must practice risk aversion above all.

If we identify small farm size as a serious constraint to increased agricultural productivity, at least for many farmers in the current Haitian environments, the obvious question is: what can be done about it? Several possible solutions come to mind and have been tried in a variety of locations. First, there is the option of land reform by breaking up large estates. Although politically not feasible in most countries, this option has a certain statistical attractiveness in countries where land distribution is extremely skewed. This is, however, not the case in Haiti; there are simply not very many large estates and the amount of land under their control is not large enough to make a serious dent in the overall land distribution. Even if all holdings over 5 carreaux were broken up and given to farmers holding less than one carreau, most of them would still not have a farm unit capable of producing enough surplus to feed a family adequately (in terms of Haitian peasant standards).

A second possible solution is the distribution of state-owned lands to small farmers. Since the current size and distribution of state holdings are not known, it is difficult to say anything about such an alternative. Observational data lead one to conclude, however, that state lands are located in the hills rather than the plains and are already being farmed in minifundia. Large state plots are routinely broken up and sublet by the state's tenants. Redistribution of state land, therefore, would mean in the first place taking land away from

small farmers and then formally re-assigning it to perhaps these very same individuals. Without a true land reform there seems to be very little point in engaging in such an endeavor, even if it was politically feasible.

A third alternative is one which could be an unintended consequence of current policies. By allowing increased imports of lower-cost food, be it PL 480, contraband or legal grain imports, large numbers of small peasants might be forced into bankruptcy, leaving their land to be bought up and consolidated into larger units. But it is doubtful whether this can be a viable long-term solution. Even if one half of all farmers were to be forced out of business and farm units were brought up to twice their present size, the potential for increased income and improved erosion control will be limited unless the remaining farmers have access to better technology and incentives to adopt it. One must also, of course, consider the need to provide alternative employment opportunities to displaced farmers.

It may well be that the only realistic approach is not to aim at larger farm sizes but rather at a change in cultivation practices. Small farm size is, after all, only one of the determinants of today's abusive and ultimately counterproductive farm practices. Several projects (including A.I.D. co-financed projects in the Ferme de Fort Jacques area, in Jacmel, in Chambellan and in many of the agroforestry sub-projects) have successfully demonstrated that these practices can be changed and returns can be increased without any change in average farm size.

B. Land Tenure

1. Overview

The history of Haiti has followed a unique pattern and the evolution of peasant land tenure must be understood in the context of this history. The French colony of Saint-Domingue (1697-1803) was based on the combination of large scale plantation and slave labor. Before the revolt of 1791, close to 450,000 slaves produced a variety of export crops, including coffee, sugar and indigo, on plantations covering, on average, some 100 hectares—small by today's Latin American standards. Some of these export crops were phenomenally lucrative. They provided the basis for the wealth of several French cities and made Saint-Domingue into France's most profitable colony. Virtually all plantation land was given over to export crop production; foodstuffs for the huge slave population had to be produced by the slaves themselves. They were allowed and/or forced to work their own gardens in the hills on Sundays. Seasonal and regional variations in food production were balanced out by the emerging internal market system. Created by the colonists' greed, this system became one of the causes of their demise. The revolting slaves of Saint-Domingue were not stultified plantation cattle but experienced agriculturalists perfectly capable of surviving in

marooned colonies and of feeding themselves even after the plantations had been destroyed.

Following revolution and nationhood in 1804, Haiti's leaders at first attempted to re-install plantations, this time based on serf labor rather than slaves. But this was not to last. Starting in 1809, president Alexandre Petion (in the Southern half of Haiti) redistributed large land holdings, followed ten years later by King Henri Christophe (ruling the North). Next to the revolution this has been the most fateful process in Haitian history. In a matter of only one generation, the nation was effectively transformed into a loosely-structured agglomeration of free peasants, most of whom had access to land in one form or another. Leyburn (1966) has estimated that by the middle of the 19th century roughly one third of the population were peasant landowners, one third were squatters and most of the remainder were sharecroppers. Throughout Haitian history, a number of constitutions, rural codes and laws have attempted to settle the question of rural property rights. But the emergence of a "soft state" and other forces have combined to prevent law from regulating and regularizing the property rights of many peasants. Today we observe the co-existence of two property systems. One is formal, legal and follows French traditions going back to the Napoleonic Code, while the other is informal, extra-legal and based upon peasant customs and traditions.

The constitution of 1804 stated that no foreigner could own land in Haiti, a provision frequently reasserted in subsequent documents. All untitled land effectively became state property and part of it has remained so up to this date. Nobody knows just how much land the state distributed during the 19th century, nor is there any reliable information about the amount of land still remaining with the state today. One frequently hears the estimate of one third of all land being state land but this clearly does not hold in any of the plains. On the basis of recent observations and the spotty evidence reviewed by Zuvekas (1978), the following generalizations seem justified.

- The state is the largest single owner of land and probably also of agricultural land, but much of this land is marginal and mountainous.
- The state leases much of its land on a long-term basis, and the "cessions" frequently stay within a family for generations and can be sublet and, occasionally, even be sold.
- The squatter's right to title after a fixed number of years of uninterrupted occupation of state land, although enshrined in codes such as the Code Rural Francois Duvalier, has not become a mechanism of distributing state land titles to small farmers.

- As long as the extremely low rental fees are paid, the state takes no interest in the management of its land, despite the fact that erosion control is one of the general conditions implied in state leases.

Some of the older studies have tried to distinguish among Haitian farmers according to tenure status. Traditionally this has resulted in tables enumerating owner-operators, sharecroppers, etc.. Underlying such presentations there is a profound misunderstanding of Haitian land tenure (one of the first modern scholars to emphatically denounce such misunderstandings was Murray, in 1977). What is characteristic of the system here is the mixed pattern of land tenure; most farmers engage simultaneously and/or consecutively in several kinds of tenure. The same farmer may own, rent and sharecrop land at one and the same time, and the same person may go through his life cycle starting off as a sharecropper, then becoming (predominantly) an owner and, finally, renting some land after having sold or lent out what had been his own.

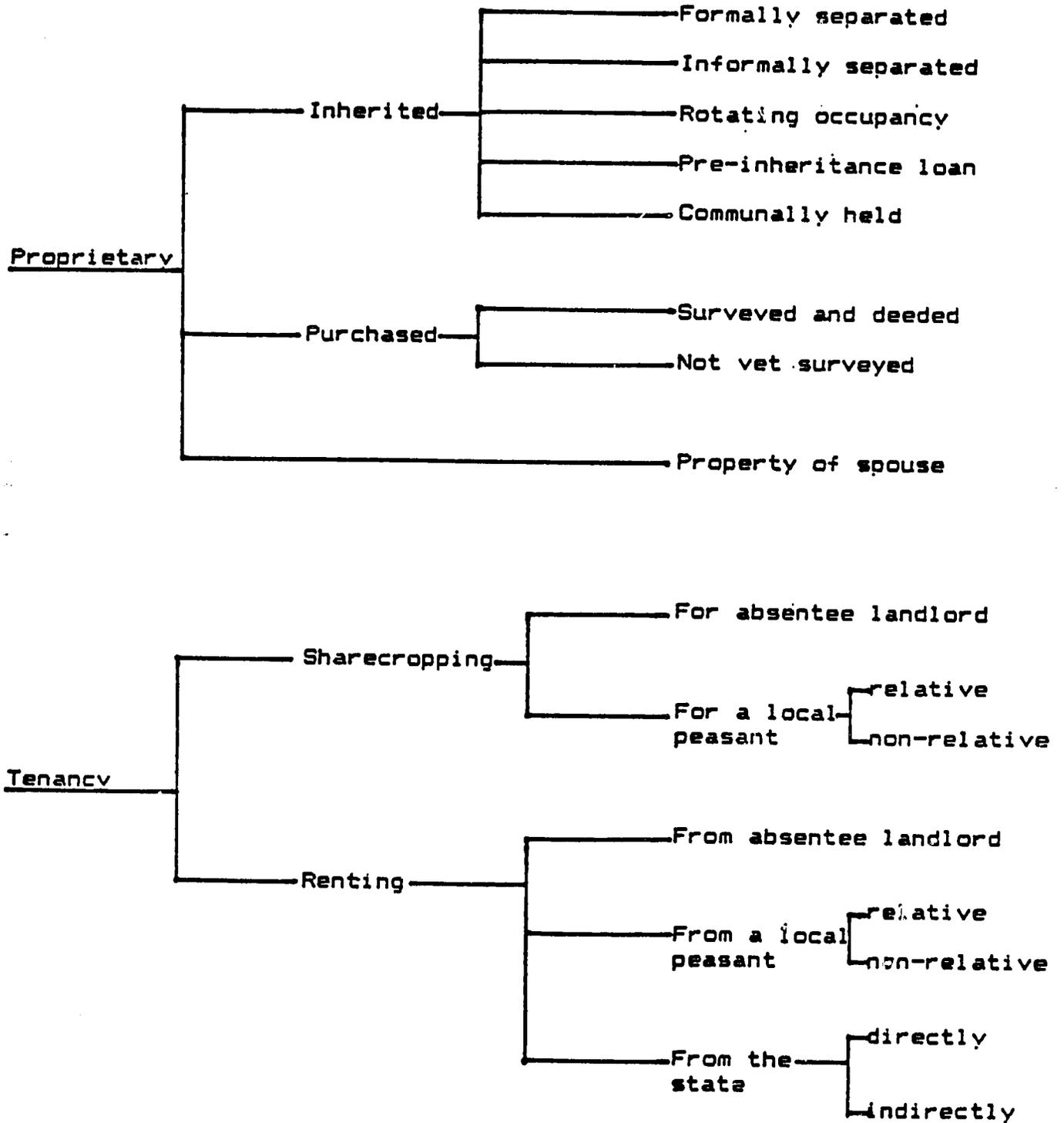
Many recent discussions of Haitian land tenure have adopted a diagram first presented by Murray (1978) which is reproduced in modified form as Figure IV-4 of this report. We shall briefly discuss the tenure modes according to this diagram and then attempt to assess the quantitative incidence of the various modes of tenure.

2. Owned land

An individual may gain access to land either by purchase or inheritance. The latter usually leads to informal division of land among siblings although the formal separation by a surveyor is clearly the goal of most peasants. In some cases, land may be held communally or occupied in rotation. In other cases, the owner may pass land to his offspring in the form of a pre-inheritance loan. Since such a loan is made informally, it does not fall under the laws regulating usufruct in Haiti. Sometimes it is hard to distinguish between a simple loan (for a given time period) and a pre-inheritance loan (without time limitation). In some areas of Haiti, inter-generational sharecropping arrangements seem to be a common form of setting up offspring for their future independent agricultural operations (Murray, 1977). Normally, all children of an owner will inherit equal shares of land but two exceptions to this rule are observed quite frequently. First, inheritance from a father is contingent upon being officially recognized as a child by this father. Children who are commonly known to descend from a landowner but have not been recognized by him have no claim. Secondly, migrants sometimes lose out in their claims for inherited land if they have not maintained contact for prolonged periods.

FIGURE IV-4

MOST COMMON TENURE MODES GOVERNING HAITIAN PLOTS



Source: Adapted from Murray, 1978.

Purchased land comes in two large categories, namely, surveyed and titled land and land which has not (yet) been surveyed. Land purchases can concern entire plots as well as shares of undivided inherited land and plots subject to many kinds of entailments.

The property of a spouse may become an integral part of a farm operation or be handled separately and held by the partner in a variety of tenancy arrangements.

3. Rented Land

Renting land is a very common form of tenancy, whether for one or several years. Whether the owner be absentee or local, relative or non-relative, all forms of rental have two things in common: that the fee is fixed and in some direct relation to the productive potential of the land, and that the duration is limited.

Renting from the state is a different matter entirely. Here the rental fee is so low as to have virtually no relation to the productive potential of the land; we have heard of state land leased for only a few dollars per year and hectare. Rental from the state implies automatic renewal of the lease as long as fees are being paid. Many people, however, do not gain access to state land at these low rents but have to sublease from a larger landowner who holds the state lease. In such circumstances the rent is raised to represent market value, which may be up to 20 times more than the state receives.

4. Sharecropped Land

Sharecropping is an arrangement which is short term, usually limited to one growing season only. Sharecropping for an absentee landlord often resembles rental arrangements in that it is quite formal and prearranged. Sharecropping for local owners usually is part of a more extensive social relationship between landlord and tenant, an economic correlation of patron-client or kinship relations predating the sharecropping itself. Together with the frequently quite flexible arrangements for providing inputs and dividing up harvests and labor costs, these social aspects convey upon sharecropping a kind of partnership between owner and tenant which appears to be absent in most of South America.

5. Tenure Security

Perhaps the most important issue surrounding land tenure is the question of security of occupation. Most writers have deplored the generalized insecurity of land ownership in the absence of a national cadaster. It has to be recognized, however, that not all landholding is equally insecure. Many researchers have

described a continuum or scale of land tenure security ranging from outright individual ownership (most secure when accompanied by a title), to rights to undivided family land (less secure), to rental and finally to sharecropped land (least secure). But it is clear that security of tenure is not just an attribute of the plot but also of the person gaining access. The powerful, the highly educated, and the well-connected have a much greater chance of making their claims to land stick when disputes arise than their weaker neighbors. Besides, the level of security attributed to a tenure mode can be changed by investments made upon a plot. As always, property rights are not above, but rather an expression of, social and political relationships.

6. Tenure Patterns, Production, and Erosion

Despite the fascination of anthropological research in recent years with modes of land tenure in Haiti, virtually no study has provided any quantitative evidence on the prevalence of various tenure modes. One of the exceptions is a study of the village of Fonds-des-Negres (Lowenthal, 1987). Its evidence will have to stand until larger-scale data collections (such as project ADS-II's national survey) address the question. The evidence provided for this community (Table 52) allows the following conclusions:

- o A large majority of farmers own at least some land. Only 14.3% are truly landless (types E and F) and of these, 11.9% have entered into some kind of tenancy arrangement.
- o The farmer (type A) who works only his own land (the so-called owner-operator of conventional statistical tables) makes up only a small minority of the total, 9.5%.
- o The two most prevalent types of farmers own land, let land and may also at the same time take in land under some kind of tenancy arrangement (types C and D).
- o If land ownership and animal resources can stand as proxies of economic status, type D farmers appear to be the best off while types E and F rank at the bottom of the scale.

The most important message of Table 52 may well be that among those farmers who own land (85.7%), there is no strong and systematic relationship between tenancy types and economic status. Other results from the same study (not presented), confirm this result. Even among farmers in the highest land ownership category, almost two thirds are simultaneously owners and tenants. This is not to say that there is no economic stratification of the village population but, rather, that this stratification is not strongly linked to land tenure types. Stratification itself has a certain permanence, while tenure

TABLE 52

MEAN OWNERSHIP OF LAND AND ANIMAL RESOURCES BY
 FARMER TYPE, ACCORDING TO ONE RECENT VILLAGE SURVEY (1980)

Farmer type		Mean land owner- ship (ha)	Mean value of animals (US\$)	Farmers	
				%	number
A	owner, non-tenant, non-lessor	0.8	231	9.5	12
B	owner, tenant, non-lessor	1.0	342	17.5	22
C	owner, non-tenant, lessor	1.4	252	27.8	35
D	owner, tenant, lessor	1.8	323	31.0	39
E	non-owner, tenant	0.0	202	11.9	15
F	non-owner, non-tenant	0.0	110	2.4	3
Total		152.1	35,067	100.0	126

modes may change from one year to the next.

Table 53 provides an image of the variety of tenure conditions under which individual fields can be worked. In Fonds-des-Negres only one-third of the fields are worked by the owner or co-owner while various forms of tenancy account for roughly one-half of all the fields. Fifteen percent of the plots have been found to be in fallow, an expression of the fact that this village is one of the better-off areas of Haiti. The Fonds-des-Negres data appear highly reliable since they are based upon painstaking anthropological field work and verification of all claims. The data for the Departement du Sud given in the same Table is of much lower quality although probably still considerably better than census data. The low training levels of interviewers and the absence of verification procedures have led to an inflation of ownership claims in relation to all other tenancy modes. The contrast between the two data collections is typical of what has hampered research and planning in rural Haiti for many decades. High quality studies are usually limited to a single village and their results may or may not be applicable to other parts of the country. Large-scale studies, on the other hand, provide unreliable and unverified data warranting little more than the most superficial conclusions.

Why should land tenure be considered a constraint for increasing production and productivity? Answers to this question generally focus on two aspects, namely, on the low investments likely to be made on land held for short periods of time, and, on land erosion as the result of abusive agricultural practices. The latter is a vastly more important problem and accordingly receives more attention here.

Land tenure is directly related to production and erosion. Sharecropping and rental arrangements frequently preclude investment in perennial crops. Annuals have a higher erosion effect under common patterns of cultivation and intercropping. Land erosion reduces the value of plots as well as profit levels. This has led to the common notion that erosion poses the most severe threat to state land, a lesser threat to sharecropped and rented land, and the least threat to personally owned land (e.g., Ehrlich *et al.*, 1986:91). The rationale underlying this argument is that on state land the owner neither works nor cares, on sharecropped and rented land the owner has a partial interest in methods of cultivation, and on individually owned land the owner is himself the victim of induced erosion or, conversely, will gain directly from erosion control measures. Since this question is of critical importance for most of Haiti, it deserves some special attention. Evidence from two small but carefully monitored studies leads us to seriously question the logic of the conventional wisdom.

First, it is not very convincing to assign the same erosion

TABLE 53

TENURE STATUS OF FIELDS AS DOCUMENTED IN TWO STUDIES

	FONDS-DES-NEGRES (1)		DEPARTEMENT DU SUD (2)	
	number	percent	number	percent
Fields worked by owner or co-owner	112	33.6	145.162	60.8
Fields sharecropped	59	17.7	68.155	28.6
Fields rented from individuals (short or long term lease)	22	6.6	14.456	6.1
Fields rented from the state	-	-	7,936	3.3
Fields worked for spouse	45	13.5		
Fields in free usufruct	45	13.5	-	-
Fields in fallow	50	15.0	-	-
Other	-	-	2.756	1.2
Total number of fields	333	100	238.468	100
Total area in hectares	129.8		122.397	

(1) Sample survey of 126 adults constituting 63% of the adult population of the area defined as a village.

(2) Sample survey of 2,500 landowning households constituting close to 1.9% of the department's households. All numbers are extrapolated to represent the total population of the department.

potential to both rented and sharecropped land. If sharecropped land still has some good potential, would we not expect the user to try for a good return this year and in future years, especially if the owner is a family relation of his? In other words, we should expect sharecropped land to be rather well protected, perhaps even as well protected as bought land (generally considered to be in the "best" tenure situation). If, however, land is already eroded and has a reduced potential at best, would it not be preferable for the owner to rent it out at a fixed fee, rather than risking a probably marginal return? We should expect rented land to be in worse condition than sharecropped land.

Secondly, it is not very convincing to assign the same erosion potential to land owned individually and collectively. Since erosion represents a cost, we should ask who must bear this cost. In a collectively held plot, the cost of erosion is spread over a number of people. The number of owners, therefore, can be a determinant of erosion, erosion control and planting patterns. At one extreme, we can imagine a single individual working his own land; he would want to lower the cost of erosion. At the other extreme we have observed an undivided family plot with literally hundreds of owners. Nobody would lose much in any given year by even rapid soil erosion. We should expect undivided land to be in worse shape than individually owned plots.

The data from the Dubreuil study (Table 54) confirm our argument. Rented land is most often eroded, individually held land and sharecropped land is least eroded, and undivided family land falls in-between. There was no state land in this particular area but since the "cessions" are often collectively held, one would expect state land to rank similarly to undivided family land. Observation by several teams has confirmed that the highly eroded condition of state land is most often a consequence of degree, slope and soil type of a plot, rather than of tenure status. Some state land is neither eroded nor otherwise abused.

TABLE 54

EVIDENCE OF EROSION BY LAND TENURE

	Undivided Family plots	Individually held plots	Sharecropped plots	Rented plots
% of plots sharing evidence of erosion	64.3	43.5	45.5	77.8
No. of plots	28	23	33	11

Source: Gaffe, 1985.

We should not confuse cause and effect of land tenure and degree of erosion. The data in Table 54 do not indicate that land tenure determines erosion. It might well be that the degree of erosion already achieved on a plot has an effect upon the tenure condition under which it will be worked. But if it is impossible at the present time to establish a causal link pointing from tenure mode to erosion, it is at least possible to establish the causality between tenure mode and erosion control measures. Two kinds of evidence help to prove this causality. First, the PADF agroforestry project which counts erosion control as its most significant by-product, has found that farmers are unwilling to plant trees and hedgerows anywhere but on individually owned plots. Thus, tenure mode in this project, the largest such effort in Haitian history, determines whether plots will be singled out for erosion control measures. Secondly, the La Valle de Jacmel project described by Pierre-Jean and Tremblay (1986) has monitored the sequence in which farmers built erosion control devices in a sub-watershed singled out for treatment. In the first year of the project, 69% of the individually-owned plots were improved, 43% of the undivided family plots, 33% of the sharecropped plots and 25% of the rented plots. It can be assumed that the treatment of the other plots did not only happen later but was also less thorough, unless project management made a deliberate attempt to assure equal treatment of all plots.

There can thus be little doubt that land tenure is linked to land erosion and that land erosion control measures are contingent upon tenure modes or, more precisely, upon the security of land tenure which assures the farmer that he will be the beneficiary of erosion control measures he puts in place. Since such measures lead to significant increases in productivity, the link between productivity and land tenure cannot be questioned.

CHAPTER V

POPULATION RESOURCES

A. Population and Development

Outside of population planning circles there has, so far, not been much systematic thinking about the implications of Haiti's demographic evolution for development. Yet in theory, the per capita GNP increases sought by development planners could be achieved just as well by reducing population and population growth as by increasing production in the economy. Probably the most effective approach would be to both reduce population growth and strive for an increase in the production of goods and services at the same time. Haiti's population planning efforts so far have been few and far between and the results have been dismal. There is no reason to assume that efforts will be much more successful during the next decade. The population can thus be expected to continue to grow rapidly, virtually at the same 2.2% net rate per year which has been observed for the last two decades. (Before discounting for net emigration, the annual rate of increase for 1980-85 was 2.53%.)

The purpose of this chapter is not to explore different population alternatives nor to argue about what can be done to reduce population growth. Rather, the purpose is to explore the effects of the anticipated population increase upon Haiti's resources and the structure and distribution of the population. One of the main conclusions of this section is that while Haiti's population today is still largely rural, this will and must change over the next generation. Thirty years from now, the population of Haiti will be predominantly urban.

B. Population and Demographic Trends

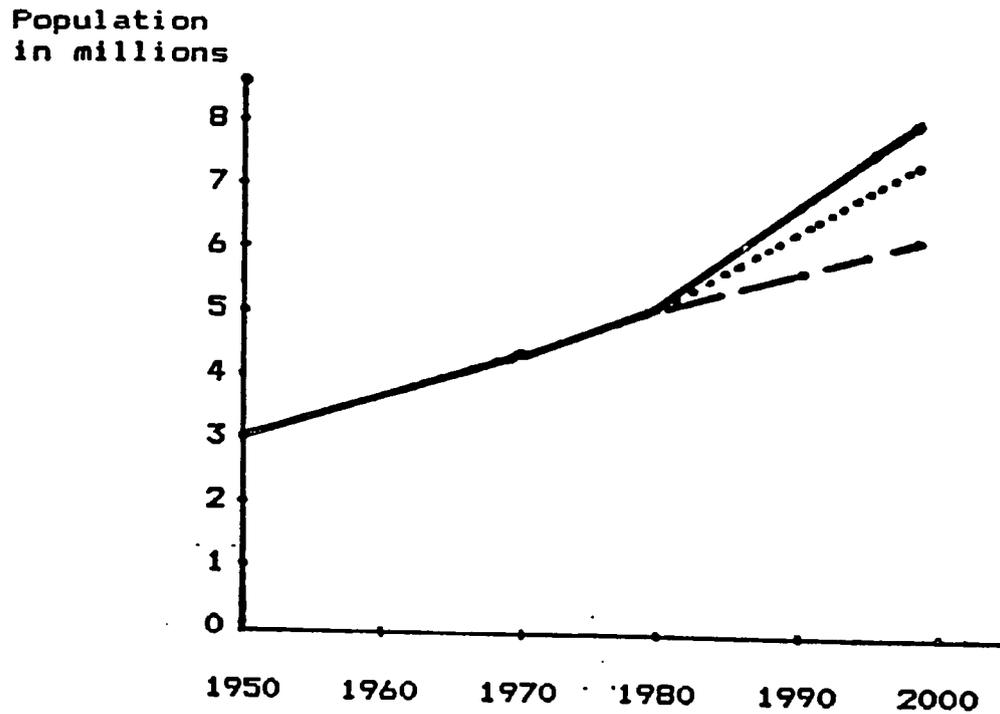
1. Population Increases, 1950 to 2000

Haiti's population today stands at six million and is growing rapidly. Despite the somewhat unreliable documentation by the census, there is really no disagreement among demographers about the approximate extent and the projection of future population growth. Where there is debate, it mainly concerns the interpretation of the causes behind the population increase and the variations in more or less optimistic scenarios for the future, should major efforts be made in population planning. The presentation here will basically follow the arguments outlined by demographers at

The Futures Group (n.d., b.), although the present discussion shall ignore their projected fertility decline scenarios and use more recent data wherever available.

Haiti's population will reach 7.7 million by the year 2000 and continue to grow rapidly after that (see Figure V-1). This means

FIGURE V-1
 POPULATION GROWTH IN HAITI
 1950 - 2000



-183-

- Evolution according to 1950, 1971 and 1982 census; projection according to Population Reference Bureau.
- ——— Medium projection by the Rapid II Project, assuming a reduction of the TFR from the present 4.8 to 2.0 by the year 2002.
- Rapid II projection assuming no change in current parameters.

Sources: Haiti, IHSI, Census for 1950, 1971 and 1982.
 Population Reference Bureau, Population Data Sheet, 1987.
 The Futures Group, Rapid II Project, n.d.

that some 1.7 million people will be added to the present population in only 13 years. Over the previous 13 years, from 1974 to 1987, only 1.4 million were added; the 13 years before that, from 1961 to 1974, saw an increase of only 0.7 million.

The causes of this population increase are known. Death rates have declined from 24 to about 14 per thousand between 1950 and 1980. One of the sharpest declines has been in the infant mortality rate which has come down from more than 220 to about 140. The decline in the death rate was due mainly to increased availability of potable water throughout the country, increased availability of food in rural areas during slack seasons, and, better control of some contagious diseases.

At the same time annual birth rates have shown a much more modest decline than death rates. The birth rate was approximately 40.3 in 1950 and is currently around 37.5 per thousand. The difference between birth rates and death rates has thus increased from 1.6% in 1950 to 2.3% in 1980. If it were not for emigration, the Haitian population would be growing by this much every year.

The total fertility rate (TFR), the average number of births per woman, was still 5.02 in 1980. Why are Haitian women having that many children? The main reasons are the following:

- a. High infant mortality rates in themselves lead to high birth rates since parents must have more children if they need 3 or 4 to survive and take care of them in old age. The absence of effective pensions and social security schemes is thus one cause of high fertility.
- b. Three quarters of the Haitian population are engaged in agriculture. The economic value of children in agriculture is considerable, whether they be used for herding animals, carrying water or working in the fields. A farmer without children is at an economic disadvantage. The economic structure of the country is thus one cause of its high fertility rates.
- c. Low levels of urbanization are a strong determinant of high fertility rates. Lower economic value of children, higher costs of raising them, different patterns of female employment, lower levels of infant mortality and other factors combine to reduce fertility rates in an urban population.
- d. Education of women alone has some effect and combined with urbanization it reduces fertility rates. A highly educated urban population will always have fewer children.
- e. Extremely low levels of family planning services and

health services in general mean that women interested in birth control cannot get the necessary services in many parts of Haiti.

2. Age Structure and Fertility

The population of Haiti has an age structure typical of many underdeveloped countries. Figure V-2 shows an age/sex pyramid which is very wide at the bottom and narrow at the top, indicating a large proportion of children as compared to the total population. Such an age structure has a built-in legacy for the future. As the children grow up and enter their reproductive years, they will again produce large numbers of children, even if the average number of children per woman were to drop drastically. In effect, if fertility levels were to drop to replacement levels (TFR=2.1) overnight — which they have never done anywhere — a stabilization of the population could not be expected for another half century. The "echo effect" of today's large young generations will be seen on population pyramids of the future and will be felt in the inevitable increases of population and density.

One of the most important aspects of today's age distribution is the dependency ratio. The two components of the dependency ratio are children under 15 and adults over 64. Over 40% of Haiti's population is made up of dependent children while adult dependents constitute only 8%. This relationship is not likely to change much in the near future, if present trends continue. As relatively few older people die, large numbers of children are added every year.

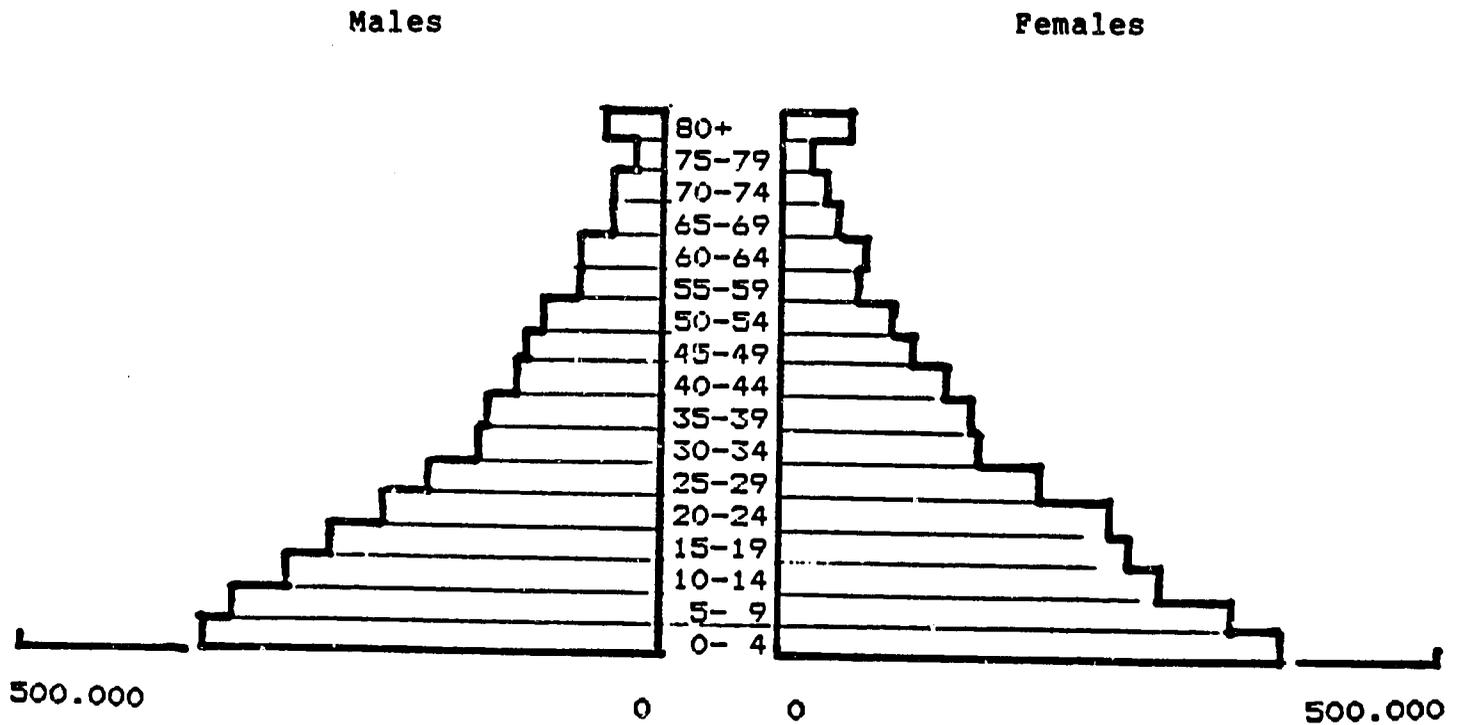
If we define the age group 16-64 as the economically active population, we realize the huge burden of dependents carried by this group. On average, each economically active person must carry a load of 0.85 young and old dependents. This load is about 25% heavier than in advanced industrialized countries where high productivity makes it easier to carry anyway. A dependent population also has infrastructural needs different from the population at large. For example, the investment in schools can be considered as investment unavailable for direct short-term stimulation of the economy. Haiti's large dependent population is thus one of the factors which keeps its economy from expanding in the short- and medium-term.

3. Fertility Levels in Comparative Perspective

All Caribbean populations have expanded rapidly during this century, but Haiti's prospects look gloomy by comparison. Table 55 provides the total fertility rates (TFR's) estimated for the 1950-1985 period for five Caribbean countries, namely, Guyana, Martinique, Trinidad and Tobago, the Dominican Republic and Haiti. The TFR is an estimate of the average number of children

FIGURE V-2

AGE/SEX PYRAMID FOR HAITI
1982



Source: Haiti, IHSI, Census 1982 and The Future Group, n.d.

TABLE 55

COMPARISON OF TOTAL FEASIBILITY RATES IN
FIVE CARIBBEAN COUNTRIES
1950 - 1955 TO 1980 - 1985

Period	Guyana	Martinique & Tobago	Trinidad	Dominican Republic	Háiti
1950-55	5.37	5.35	5.01	5.01	6.01
1955-60	5.66	5.67	5.28	6.32	6.00
1960-65	5.86	5.58	5.41	6.68	5.95
1965-70	5.48	5.13	4.34	6.82	5.83
1970-75	4.63	4.09	3.48	5.50	5.67
1975-80	3.02	2.57	3.15	3.54	5.43
1980-85	2.60	2.10	2.90	3.20	5.10

Source: The Futures Group, Rapid II Project.

that would be born to each woman if the current age-specific birth rates remained constant. In and of itself at any given point of time, the TFR is somewhat fictitious. Age-specific birth rates never remain constant in countries undergoing economic and demographic change. However, the recalculation of the rate with each census does provide changes over time. This facilitates an assessment investigating the structural changes occurring in a country which have brought fertility levels down.

All five countries in Table 55 have had very high TFRs for the 1950-1955 period. Variations are between a low of 5.01 in the Dominican Republic and a high of 6.01 in Haiti. But these rates have fallen dramatically in four of the five countries, with Guyana and Martinique bringing them down to less than half of their previous levels and the Dominican Republic, Trinidad and Tobago also reducing them by very large margins. Only Haiti failed to bring the TFR down significantly; the decrease from 6.01 to 5.10 leaves the rate higher than that of the Dominican Republic thirty years earlier.

All the other countries had some fluctuations of the TFR between 1950 and 1970, followed by a rapid decline over the following decade. The Haitian decline so far has been so slow and so limited that it must still be considered as part of the period of fluctuation at high TFR levels rather than as the beginning of the rapid decline in fertility. All countries in the world have now embarked upon the process of the "demographic transition", i.e., the transition from a stage where both mortality and fertility rates are high to a later stage where both of them are low. Since the fertility decline generally follows the mortality decline only after a lag of one or more generations, the intervening transition period is one of "population explosion". Haiti appears to have remained in this transition phase for much longer than other Caribbean nations and it is certainly still several generations away from the last stage of the demographic transition and a stabilized population.

4. Migration and Urbanization

Both the processes of migration and urbanization must be seen in a wider context in order to be fully understood. In the case of migration, this includes the migration of some 200,000 Haitians to work on American plantations in Cuba at the beginning of this century and the emigration, according to some estimates of at least 300,000 Haitians since World War II, mainly to North America.²¹ Haitians migrate within extensive family networks spanning many rural, urban and international destinations. In the case of urbanization the wider context is the economic

21. Annual net migration was 30,000 from 1976-84 but much lower before that for an estimated total of 300,000 since 1945.

transformation of Haiti from an agricultural economy based on coffee and sugar to a more diversified one in which agriculture's contribution to GDP is only 34%.²² The chief cause of urbanization at this time is these two linked migration processes.

Two findings of the 1971 and 1982 censuses merit immediate mention. The great majority of the population is stable, with 93% residing in their communities of birth. This stability is primarily a characteristic of rural Haiti. Fully 40% of the urban population are migrants. By the year 2000, approximately 50% of the Haitian population will be concentrated in the former Departement de l'Ouest, comprising the central part of the country.

Interdepartmental migration is hard to assess because the five former departments have been replaced by nine new ones, and the migration section of the 1982 census is seriously flawed. But the major streams of migration are nevertheless clearly recognizable, and they all point towards Port-au-Prince. Numerically, the most important stream goes from the Southern peninsula to the capital city. In itself, this stream comprises almost as many migrants as all other migration streams in Haiti combined. Second in importance is the migration from the North towards Port-au-Prince. While migration from the South is mostly direct and final, movement from the North frequently takes place in stages, with the Artibonite valley serving as a stage in the migration towards Port-au-Prince. Net migration rates are negative for all of Haiti, with two exceptions, namely, Port-au-Prince and the Artibonite. If migratory exchanges can be taken as indicators of economic development, these two regions are the only "healthy" ones in Haiti. This should, however, not be understood as an indication of a massive transfer of the rural populations towards Port-au-Prince. All rural areas of Haiti continue to grow and it is only one part of the natural population increase which is being transferred towards the cities. There is thus no rural exodus in the true sense of the word in Haiti. Most rural Haitians remain where they were born, and the rural population is growing throughout the country.

What role does migration play in urban growth? Applying the estimation method first described by Davis (1965), we find that between 1950 and 1971 rural-urban migration accounted for 59% of urban growth while natural population increase accounted for only 18%. Migration was the key factor during that period. However, as both the total and urban populations continue to grow, the proportions become reversed. Extrapolating figures for the years 1990 and 2000, the increase in urban population during that decade will be due more to natural population increase

22. In current prices, 1985 GDP, see Table 3.

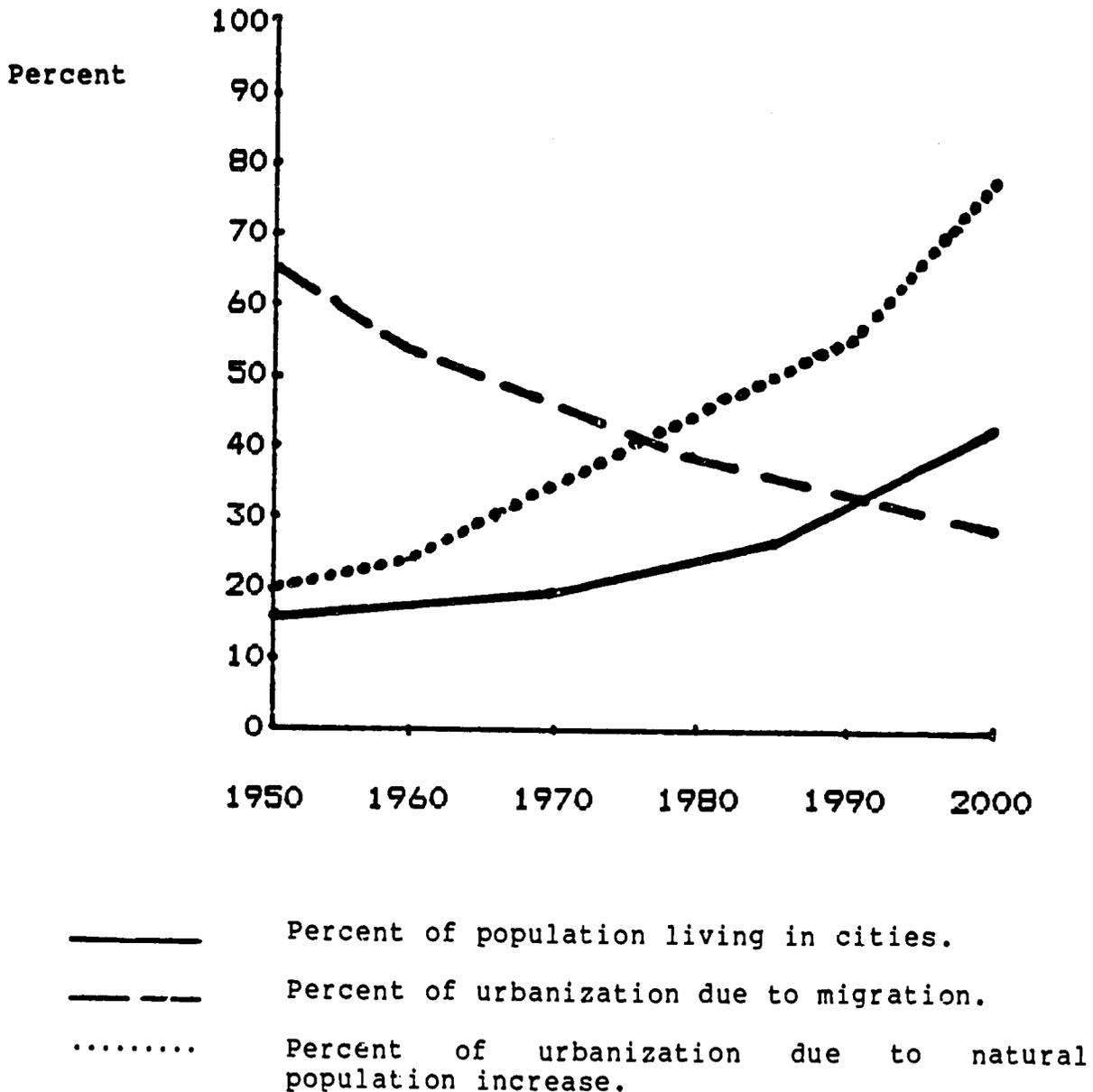
(55%) than to migration (38%). Haiti, the least urbanized country of the Western hemisphere, will thus come to display a trend typical of the rest of the World (see Figure V-3).

Rural-urban migration in Haiti is highly favored by women, with a sex ratio of only 49 men per 100 women migrants. This migration is primarily directed towards Port-au-Prince. Migrations toward rural destinations consist of a majority of men, especially in streams which originate in cities. Explanations for this pronounced sex selectivity can be found in the occupational opportunity structures characteristic of rural and urban areas. The domestic service, commercial and light manufacturing sectors in the city offer much more employment to women than to men. Conversely, paid agricultural work in Haiti is primarily carried out by men.

Another type of migrant selectivity is socio-economic and is specifically based on formal education. Rural education levels are generally extremely low. However, individuals with above-average levels are more likely to move towards the city. Ahlers' (1979) findings on this point confirmed what has generally been found to be true in most countries. However, this should not lead one to view education as a cause of migration. It is more likely that families able to send their children to school are also capable of locating and realizing urban opportunities outside of agriculture. Furthermore, as rural Haiti progressively declines, many families find it indispensable to relocate at least some of their members to Port-au-Prince, in order to maintain their overall economic status. They send their most promising offspring which, often, are the most educated ones.

While at an individual level, poverty cannot be seen as a direct cause of migration to the cities, at a structural level it most certainly does play this role. Rural Haiti is less and less able to feed even the rural population, let alone the cities. The land base is shrinking in terms of both productive areas and soil fertility. There can be no doubt that Port-au-Prince exercises an attraction felt throughout the country. There is more new employment there, the wages are higher, the starvation less pronounced, general levels of morbidity and mortality lower, and the prospects for economic betterment are higher. The reasons for this are at least partially political. The capital city has long been successful in imposing its demand for produce and cheap labor on the countryside. The situation has recently become exacerbated by the massive levels of contraband and other food imports. The mechanisms of direct and indirect taxation, as well as the integration of all of rural Haiti into one market system, serve to concentrate advantages in the city without redistributing benefits to the countryside. This process is cumulative in that every increase in urban dominance lowers the competitiveness of rural Haiti. Migration is one of the processes by which rural Haiti hands over its human and material

FIGURE V-3
 URBANIZATION IN HAITI
 1950 - 2000 AND COMPONENTS OF URBANIZATION
 (IN PERCENT)



Sources: Haiti, IHSI, Census 1950, 1971 and 1982.
 Population Reference Bureau, Population Data Sheet.
 Calculations by the author, following procedures
 described in Davis, K., 1965.

resources to the city.

Migration resolves regional economic imbalances. With the base of Haiti's agricultural economy literally eroding away, migration to cities can be expected to increase sharply over the coming decades. Only very massive investments in agriculture have the potential to reverse this trend, but such investments are unlikely to be made and/or to be successful on the eroded hillsides. Whatever one may think of the rapidly expanding poverty belt around Port-au-Prince, migration to this city must be permitted, tolerated and probably even stimulated in order to avert worse outcomes for rural Haiti. Urban unemployment and underemployment are reaching staggering proportions, certainly no less than 40%, and there will be no sufficient investment to match job creation with labor force growth in the near future.

C. Effects of Population Growth

1. Agriculture and Forests

Interactive effects between population growth and all other variables make it hard to predict the effects of such growth but since we are projecting developments only to the year 2000 we shall ignore interaction effects in this part of the report. Profound structural changes in either economic or demographic trends are not on the horizon; the realistic scenario, therefore, coincides with a "worst-case" scenario.

Fuelwood and charcoal are not likely to be replaced as prime energy sources over the next 13 years. Since there are still some forest reserves left one can assume consumption of wood-based energy will increase proportionately to population increase. In 1967, 3.4 million cubic meters of fuelwood and charcoal were produced in Haiti. The annual per capita consumption was 0.74 cubic meters. At a constant per capita consumption the total production will thus have to grow to 5.7 million cubic meters (Table 56). Haiti's wood reserves might be able to absorb this, but not for much longer. Despite all efforts at reforestation, the pressure on the wood reserves will increase much faster than efforts to relieve this pressure, and in the absence of other erosion control techniques, soil erosion will accelerate.

While there may be alternate energy sources to be used after the depletion of forest reserves, there are really no alternatives as far as agricultural land is concerned. In 1950 the amount of arable land per capita was still 0.38 hectares while by the year 2000 it will be less than half that, at 0.16 hectares. The methods of agricultural production will, therefore, be even more labor-intensive and the soil-erosion effect could be much greater. Once the soil is totally eroded, land has to be abandoned. Approximately 210,000 hectares had been abandoned by 1938

TABLE 56
 PROJECTED EFFECTS OF POPULATION GROWTH
 UPON HAITIAN RESOURCES

	base year	base year quant.	year 2000 quant.
Fuelwood and charcoal in million cu.m.	1967	3.4	5.7
Arable land in ha. per capita	1950	0.38	0.18
Economically active population in millions	1971	2.0	3.3
Annual new job requirements in thousands	1980	46	68
Primary school age children in millions	1980	1.2	1.9
Population at high health risk in millions	1980	1.9	2.8

Source: The Futures Group, n.d.

but more than twice that in 1954. If present trends continue, more than half of the Haitian land area will have to be abandoned by the year 2000.

There is also a political side to this decline of Haitian agriculture. As urban slum populations expand, there is a great temptation for the government to keep food prices low by allowing unlimited imports. While this solution does tend to keep urban unrest low in Haiti at this time, it may well be ultimately counterproductive. The collapsing food prices have made farmers suffer and domestic food production decline, thereby increasing the need for food imports and food aid. As rural/urban disparities grow, migration will accelerate and swell the urban slums even more--although it must be recognized that not all migrants become slum dwellers and not many Port-au-Prince slums have remained slums for more than 10 years. Rapid population increase leaves a shaky government with very few options.

2. Labor and Employment

Between 1971 and 2000, the economically active population in Haiti will have risen from 2.0 million to 3.3 million. About 68,000 jobs would have to be created every year in order to maintain current levels of employment. Only 14% of the population are currently reported as unemployed, but underemployment is estimated to be close to 50% in the agricultural sector.

Traditionally the Haitian population has had the safety valve of emigration to cope with the ever-increasing labor supply. Over the last 15 years, an estimated 30,000 to 40,000 people left Haiti every year in order to take up residence in North America. Current restrictions on immigration make it unlikely that more than 25,000 Haitians could leave the country annually. Emigration cannot be the solution to population increase in the long run.

One of the effects of the overabundance of labor is to keep wages low. Agricultural wages for a six-hour "day" in rural Haiti are still around \$1.00; they have risen much more slowly than urban wages. With wages remaining so low, levels of investment, consumption and savings are also staying low. One way out of this situation would be to attract large numbers of offshore assembly plants to Port-au-Prince, a trend which was started in the early 1970s. The "factory" jobs tend to be well paid--a good worker can make \$6.00 per day and there are multiplier effects felt throughout the urban economy. However, political instability and the beginnings of labor organization and unrest have lately led to plant closings and it is unclear how far this segment of the private sector can develop over the next few years. A more likely outcome, in the present situation of population increase coupled with economic stagnation, is a general decline in employment and living standards.

The rapid increase in the labor force should not let us forget that the number of dependent children is increasing even more rapidly. The ratio of members of the labor force to dependent children is worsening. While in 1980 it was still 1.2 workers per child, in the year 2000 there will be only 1.1 workers supporting one child. If there are no productivity increases to match this development, dependent children will be worse off.

3. Education

Figure V-4 illustrates the significant progress which has been made in Haitian education since 1971. The rates for both literacy and school attendance have increased to the point where today adult literacy stands at 23% and primary school enrollment approaches 40% of the relevant age group. The situation is considerably better in Port-au-Prince than anywhere else, but even in the smaller towns most children will nowadays attend school for at least a few years. In 1971, three quarters of the population had never been to school; by the 1982 census this proportion had fallen to 65%.

Population increases projected to 2000 include an increase in the number of primary school-age children from 1.2 million (1980) to 1.9 million (2000). If Haiti wants to maintain an overall average ratio of one teacher per 40 students, the number of teachers will have to go up to 47,500 (2000) from an estimated 10,600 (1976). Primary school enrollment of 100% by 2000 would necessitate 46,000 teachers, over three times more than there are presently. It should be noted that this is extremely unlikely to happen.

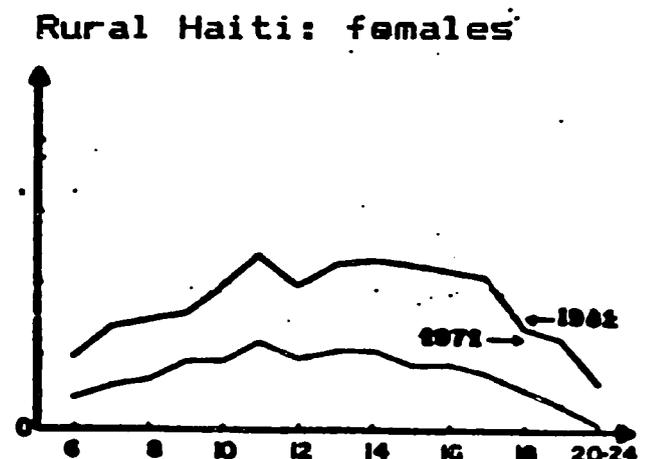
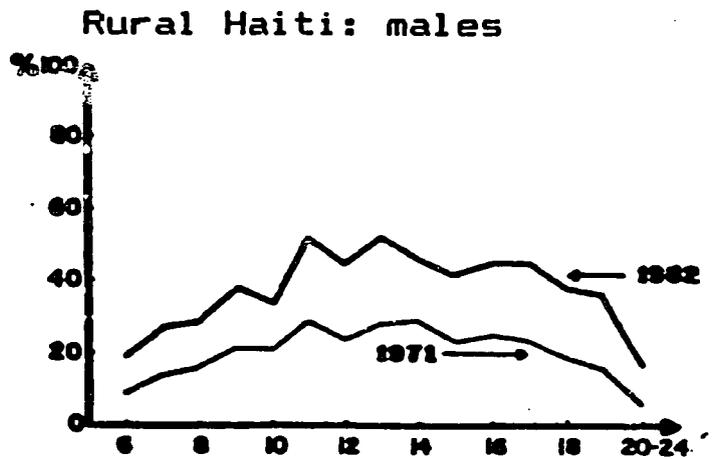
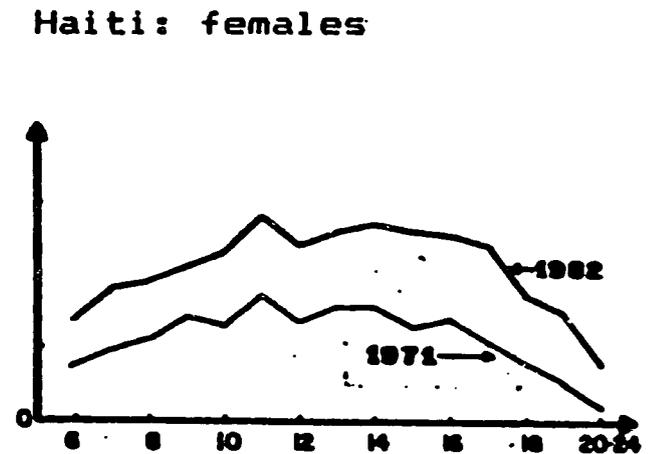
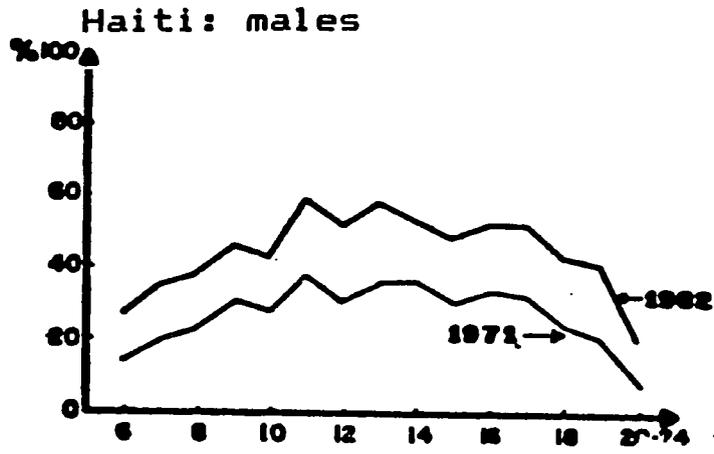
4. Health

Malnutrition has increased in Haiti over the past decades as a result of increased population and poverty. There has also been an increase in morbidity levels without a concomitant increase in health facilities and numbers of health personnel.

In 1976 there was one physician for every 8,500 Haitians, and one nurse and seven hospital beds as well. But these numbers tell only part of the story. Close to two-thirds of all medical facilities and health professionals are actually located in Port-au-Prince, where only 20% of all Haitians live. The ratios of health services to population in rural Haiti are thus much worse, approximating levels found in low-income African nations. In order to maintain the present low levels of health services, about 900 new physicians will be needed and an equivalent number of nurses. This would mean that virtually all graduating doctors and nurses would have to remain in Haiti over the next 13 years, yet health professionals have had some of the highest emigration rates of all Haitian groups. Two-thirds of them have tended to

FIGURE V-4

PERCENT CURRENTLY ATTENDING SCHOOL IN HAITI AND IN RURAL HAITI
BY SEX AND AGE (1971 AND 1982)



-196-

Source: Haiti, IHSI - Division d'analyse et de recherches demographiques, La scolarisation en

leave in the past and, in the case of one graduating class at the local medical faculty, 40 out of 41 young doctors had left the country within 10 years of graduation. The combination of high educational levels (for independent migrants), long-established migration networks (for sponsored migrants), and the continued shortage of health professionals in rural North America will make it likely that Haiti will continue to supply large numbers of doctors and nurses to Canada and the United States.

Women at reproductive age and children under 6 years are generally considered population segments at high health risk. Their combined numbers in 1980 were 1.9 million. By 2000 this population will have swollen to 2.8 million. As urbanization is progressing at the same time, a larger proportion of these women and children will have access to urban health care facilities. Overall, however, there will be much more of a strain on these facilities. Since health professionals will most certainly not increase their numbers as fast as the population segment at high health risk, this population will be served less well than it is today.

Dramatic increases in health services could be achieved if one were to relocate many health professionals to rural areas. The government does actually have some rural residency requirements for young doctors. Other solutions proposed have been to abandon medical specializations in favor of general practice and the increased use of traditional practitioners such as midwives and herbalists. None of these solutions stands a realistic chance of being implemented in the near future.

CHAPTER VI

AGRICULTURAL INSTITUTIONS

A. Rural Organizations

The history of formal and informal rural organizations in Haiti is complex and much researched. Key to understanding the present situation, and the set of formal, decentralized institutions mandated by the 1987 Constitution, is an awareness that a significant number of attempts have been made in the past to develop base-level organizations. Most of these efforts have been made by donor organizations, both official, bilateral agencies, such as A.I.D. and C.I.D.A., as well as NGOs. The GOH has also, at various points in time, issued laws and codes governing the formation, roles and activities of rural organizations--especially the Code Rural Dr. Francois Duvalier of 1962--of which the 1987 Constitution is only the most recent.

1. Councils and Groupements

As in other countries, governmental and non-governmental projects and programs in Haiti have sought a means of interacting efficiently with the rural population, for the provision of services in health and agriculture, for more generalized, community development purposes, and for the extraction of taxes and other resources, such as public-sector labor. In many of these projects and programs, self-help has been an important element, either through the provision of communal labor, or other contributions "in kind" as counterparts to the services rendered by the project.

From the point of view of the GOH, local organizations were the lowest tier of government administration (conseils d'administration), and this approach goes back at least to the rural code of 1864. While these are civilian organizations, as will be those mandated by the new Constitution, under prior regimes actual administration of rural sections has been the role of the military under Army command (Conway, 1986).

This is an important distinction to be kept in mind for future project design. If a project is to be based on working through base-level organizations, a great deal will depend on whether a newly-elected GOH really proposes that government will be administered through the mandated local government structure, or remain a function of the Army along the lines described by Garcia-Zamor:

...in Haiti, two parallel systems, civil and military, are used to govern the nation and each one of these two systems employs a certain number of people at the local level. While the civil system divides the country geographically into departements, arrondissements, com-

munes and sections rurales, the military system divides the country into departments, districts and subdistricts.

...The Haitian peasant has few links to the city and, for the most part, fears such links. The most important man for the peasant is the chef de section, who represents the government in all its functions, from tax collector to policeman. He is consulted in all matters....His word is final. The man literally has the power of life and death. To the peasant, he is the government (Garcia-Zamor, 1986: p. 80).

Apart from the impact of the military and police control in the rural sections, Haitian governments have, over time, frequently been unable or unwilling to deal closely with the peasant majority. A key exception was the move toward nationwide community development, organized through government-created councils.

In the 1981-1986 Five-Year Plan, community development was enshrined as the way to provide "the relevant population" with

une aide technique relevant de la competence de differents secteurs, en attendant le developpement a long terme de la capacite operationnelle de ces derniers dans les milieux non encore desservis (MOP cited in Delatour et al, 1984).

Among the programs formulated under this very broad definition of community development was one that was conceived as "the basis" for agricultural development--the Organization et Promotion de la Vie Rurale. Twenty years before this, in 1961, however, the GOH had created the National Office of Community Education (ONEC) which briefly competed with the Ministry of Agriculture's Service d'Animation Rurale (SAR). In 1969, a new Office National d'Alphabetisation et d'Action Communautaire (ONAAC) was created. ONAAC, in addition to running literacy campaigns, was to promote the creation of Community Action Councils (CAC). Delatour et al give information about the conflicts in the data as to how many of these CACs were actually created, and an assessment of their viability and performance (1984, p. 80 ff.).

Studies (Gow, 1977 and others) indicate that the CACs, at least, probably never reached the bottom layer of the rural population with membership tending to be restricted to those with higher incomes. The landless particularly are said not to have participated, and given the rules for some versions of these groups, could not by definition since they did not own land. However, several recent empirical studies have shown the reach of the CACs to be very broad, and the social stratification expressed in CAC membership to be less pronounced than that expressed by religious affiliation.

2. Donor Agencies and Councils

In any event, and especially when donor organizations are concerned, local councils (conseils d'action communautaire) and their subsidiary groupements, have formally been enabled to deal with outside sources of services, inputs, and other assets. This model has been implemented by the numerous NGOs operating in Haiti, both indigenous and expatriate-based. There are or have been community development, rural health literacy, and other purpose committees. The community development model described by Lowenthal has largely taken a non-Haitian model of communal role equality, and superimposed it on local social differentiation. The resulting groups are self-dividing into center and periphery, with a small number of elected officers, and an organizationally undifferentiated mass of members.

This sort of theoretically participatory organization, in which people maintain membership over time, provides, according to Lowenthal, "an experience with no real precedent for most peasants", whose decision-making universe in recent years has been limited largely to the nuclear household (Lowenthal, 1978). This is when there is a groupement or conseil that really allows roles for members aside from the central core of elected officers. Even where this is the intention of the donor or other organizers of the group, Lowenthal notes that:

In terms of participation in planning and decision-making, the large body of the council presents problems. [It] does not seem to provide an appropriate form for the development of the skills and attitudes necessary for making independent, individual contributions to public discussions and debate nor, as is the case with voluntary labor, encourage the view that one's individual contribution is necessary to the successful functioning of the group. Cultural patterns of respect and deference, and the avoidance of open public conflict or disagreement, when combined with the heterogeneity of the council with respect to socioeconomic status, authority, age, etc., make the expression of individual opinions unlikely. This is especially true on the part of the poorer, younger and less powerful who may be in attendance (1978, p. F2-b-5).

Amelioration of the problem of non-participation through councils was, to some extent, achieved in the use of groupements or subcommittees in some NGO projects. These smaller groupings, based on a common activity, and composed of more homogeneous members in terms of age, socioeconomic status and local residence, seem to have performed better in general, and especially in terms of providing for genuine discussion among members and communal decision-making (Lowenthal, op. cit.).

Smucker (1986) summarizes the recent status of the community councils under the Jean-Claude Duvalier regime as follows:

In the last analysis, the function of community councils is something more than a neutral channel for community development services. The rhetoric of community councils is one of voluntary participation rather than official conscription, yet many people take out nominal membership for their own protection on the grounds that community councils are official government policy. Councils do not have any real power as voluntary organizations, and they exercise no control over tax revenues. There is a growing tendency to use peasant councils for partisan political ends...[The government does] use the community council network for certain fundamental objectives: to lobby for increased levels of foreign subsidy, to integrate peasants more closely into the apparatus of the state, to harness cheap labor for tertiary public works, to channel government spokesmen and official propaganda into rural areas, and to enlarge government job patronage as well as political patronage (Smucker, 1986, p. 109-110).

The impact of donor assistance going directly to CACs in some areas and at some times through recognized conseils or groupements is addressed in Delatour et al (1984). They cite a broad range of studies which point up the problems of the CACs and similar organizations in the then-present political environment of Haiti. Nevertheless, indigenous and foreign PVOs continue to work through local-level organizations of this kind, which persist at least in order to receive those resources and services. The advantages and disadvantages of A.I.D. funding of agricultural related activities through such PVOs and their related committees and councils are discussed below.

It is helpful, at this point, to establish the pervasiveness of the ideas of community development and participation among donors--especially A.I.D. and the multitudinous NGOs--as distinct from the reality that existed under the Duvalier regimes. This will serve to point up the problems that are likely to ensue if the same formal groupings, with the same types of membership requirements, are built into the Constitution and form the locus of donor project implementation, but the political reality does not change substantially.

3. Cooperatives

Cooperatives appear to have been started with support from the government in the 1930s as part of the community development movement. The first cooperative is said to have been created in October 1937 in the North at Port-a-Piment (Vernet, 1969; in Delatour, 1984). Each rural section, under the 1939 code, was

supposed to be organized into "cooperatives agricoles de production" whose membership would be open to all residents of the rural section as well as non-resident landowners. Services for coops were linked initially to the Ministry of Agriculture, and the 1939 code established the Conseil National de Cooperation as the accrediting body, under the Ministry of Commerce. This was a short-lived approach, however. In the 1950s, cooperatives were tried again, but this time under the aegis of foreign donors. The first program began at Jacmel, under UNESCO sponsorship. A.I.D.'s predecessor organization became involved in the 1950s with the Pote Cole program. In 1953, the law creating the Conseil National de la Cooperation (CNC) was enacted. The CNC was to provide recognition to cooperatives created in the country. After 1974, the CNC became affiliated to the Ministry of Plan. Delatour et al (1984) among others, note that despite lip service paid to cooperation, cooperatives have "not really received full government support except for projects backed with foreign assistance. The scale of the latter has not been trivial, especially with respect to technical cooperation" (pp.119 ff).

In the 1960s, the government seems to have devoted more attention to the community development model described above, than to cooperatives, although legislation relating to rural development and organization continued to mention cooperatives (Smucker: 1986). A.I.D.'s approach to cooperatives in Haiti has been intermittent and of limited success. Various organizations have attempted, according to the documentation available, building on traditional cooperative labor institutions (combites, escouades) to create pre-cooperatives and cooperatives. The majority of the cooperative-like groupings that have been organized by NGOs and bilateral donors have stayed at the pre-cooperative stage, either because of inability to take the next organizational steps for reasons internal to the groups themselves or, frequently, because of GOH refusal to accredit the groups as full-fledged cooperatives.

Delatour et al, in reviewing the available data in 1984 on registered (accredited) cooperatives, noted that there was a great deal of uncertainty. The then-newly revamped CNC had officially recognized 22 cooperatives—12 in coffee, 6 caisses populaires, one each in housing, handicrafts, milk collection and one "Union" (CNC: 1982 in Delatour et al, 1984, p. 120). On the other hand, FAO estimated the number at 63 in 1977, with 11 in coffee, 22 caisses populaires, 15 irrigation cooperatives with 2,000 members (see below) and 16 coops involved in grain purchase and storage and agricultural inputs.

The most politically and economically significant of these cooperatives tend to be those in coffee and the caisses populaires, the latter having apparently been introduced into Haiti by the Oblate Fathers in 1946. It is noted that the

problem of credit availability has had a lot to do with the creation of coops of various kinds in Haiti. Many supervised credit programs have been channeled through pre-coops or coops, including the SACs of the BCA (see section on credit).

The fairly close association between outside donors and technical assistance and the still weak cooperative movement in Haiti is assessed by Wolf and Jean-Julien (1978) as cited in Delatour et al as follows:

A lack of resources in most communities makes it difficult for the cooperative to achieve financial and administrative independence. In many cases, the cooperatives were started with foreign ideas, capital and management inputs without which they would have never existed. The need for high level management skills and contact with external markets and organizations gives rise to different patterns of dependency on outsiders and/or outside organizations (Ibid., p. 123).

Lundahl, in a brief review of the cooperative experience in Haiti, indicates that successes along the lines of building on traditional structures are few in practice, but cites MODECBO in Le Borgne as one exception. Overall, however, he posits--given the political environment that has been common in Haiti--that "a genuinely co-operative mass movement in Haiti would have to come into existence not with the aid of the government but in opposition to it....Co-operation would require that the masses are allowed to make decisions in questions concerning their welfare without detrimental interference by the government, and that the government would not permit" (1983, p. 233).

Toward the end of the Jean-Claude Duvalier regime, some positive achievements were beginning to be made in the cooperative area, under two A.I.D.-funded projects, the Coffee Cooperative Project working through the Coffee Coop Federation (CCH), and the Mennonite Economic Development Associates' (MEDA) Cocoa Production and Marketing Project.

Representatives of A.P.A. were strongly of the opinion that the way forward for the Haitian farmer lay with cooperatives.

4. Coffee Coop Federation

Organized in 1979, CCH has 60 member cooperatives and 20 pre-cooperatives with a total of 30,000 individual members. These member cooperatives still have substantial need for management capacity strengthening, and support to develop into viable local organizations. There is a concomitant need for improvements to coffee production so that deliveries to the cooperatives, and thus farmer-member revenues, will increase.

CCH has sections for cooperative management services and uses field agents to provide management training and organizational development training. It is proposed that under a follow-on project, market information services be added, as well as further efforts at organizational development and continuing support to the coffee processing component of CCH activities. Additional cooperatives are to be organized, as well as a regional union in the Grand-Anse area.

A.I.D.'s activities with the coffee coops have been characterized by considerable ambivalence, but on the whole, the present trend, given the new PID for coffee cooperative development (1987), demonstrate a strong continuing support. The recent grant to CLUSA to work with CCH seems to have achieved sufficient results, in combination with the policy reform removing the coffee tax, that there is a belief that more can be achieved using essentially the same model.

Group lending through Societes Agricoles de Credit (SACs) by BCA has, despite problems, also been fairly successful, and has demonstrated that working through groups can be a viable approach in Haiti, even where there is a risk that benefits and group management may be hijacked by elites. There seems to be reason to believe that the revolving credit fund approach through the coffee cooperatives is more successful than the BCA approach attempted under the Marketing Project.

Conclusions reached in a Title III-funded assessment of the impact of the coffee tax reduction regarding the coffee co-ops are essentially positive:

Despite the fact that CCH and the cooperatives are not at their full potential, it is obvious that they have had an effect on the coffee market in those areas where they operate. Data confirm that: 1) prices paid to cooperative member producers by the local cooperative are higher than prices paid to producers in those same localities by speculators, 2) prices paid to local cooperatives by CCH are higher than those received by speculators from exporters, and 3) producer prices in regions where cooperatives are in significant numbers and well-established are higher than producer prices in those regions where there is little or no cooperative activity (Seguino: 1987, p. 11).

5. Mennonite Economic Development Associates (MEDA)

A recent evaluation of the MEDA Cocoa Production and Marketing Project (May 1985) indicates positive results. In discussing impact, it is noted that:

The cooperatives' principle [sic] attraction is economic. People join the cooperative primarily for the sake of dividend and interest payments. Members also understand the cooperative is responsible for the price rise of cocoa. Without these economic advantages the cooperatives would likely cease to exist.

People also recognize that the cooperative offers technical benefits--the agricultural extension services. There is considerable interest among the membership in increasing cocoa yields....The availability of cocoa seedlings through the cooperatives' nurseries is also an attraction (J.N. Smucker, 1985, p. 4).

Smucker notes that these cooperatives permit speculateurs to be members which has advantages since the speculateurs bring their business acumen, sell to the cooperatives, and are likely to put energy into the cooperative rather than compete with it.

Despite these positive points, the evaluation expresses concern about a comparative lack of attention to the democratic, participatory aspects of cooperation, and to the educational needs in this area. Additionally, as with the coffee coops, there is a further need for management capacity building and ensuring that all the members understand the basic financing and management systems. The author points out that it is both:

...tempting and possible to neglect the cooperative formation phase. With subsidies, cooperatives can conduct business on an artificially created structural base. Furthermore, cooperative formation takes time and does not produce the immediate tangible results preferred by donor agencies. To do this, however, is to jeopardize the cooperatives' long term success. Once leadership is established without a genuine constituency, it is difficult to replace it with more representative leadership without disrupting the cooperative's functioning. Where democratic process is lacking, the membership is more vulnerable to domination by a corrupt or self-serving leadership. Also, an artificially established structure is likely to collapse once subsidies are removed (ibid., p. 7).

These caveats are worth noting, since there has been such a long history in Haiti of short-cutting the participatory process under the guise of creating participatory and egalitarian local institutions. A.I.D.-funded activities, as well as those of some of the self-funded NGOs have been no exception, despite good intentions. CLUSA technical assistance indicates that, for example, the code that governs cooperatives should be amended under a new GOH to ensure that pre-cooperatives qualifying on substantive and organizational grounds can be accredited even if

they do not include as leaders members of the local elite. Assurance of accreditation would be especially important when they are likely, individually and in unions and federations, to provide a challenge to monopsonistic or oligopsonistic marketing situations, as has been the case with the coffee cooperatives.

Recommendation:

That A.I.D., in the light of its experience with cooperatives in Haiti and elsewhere, should assist GOH in formulating a more satisfactory legal framework for farmer cooperatives. A.I.D. should actively examine the practicality of widening cooperative activity both in output and input marketing. More pressure should not be placed on the coffee coops, however, by adding to their existing efforts in the short-term.

6. Water User Associations

One of the policy reform provisions of the Title III Agreement signed in 1985 concerns the development and legitimization of water user associations. The idea was that during the first year of Title III implementation (1985-86), the GOH would prepare legislation enabling the formation of local water user associations that demonstrate the capacity to maintain irrigation systems either partially or completely. These associations would be able to collect and retain usage fees to be applied to the maintenance of the systems. The membership and operating procedures for these associations would be defined in the legislation which would be finalized by the end of the second year of the program. Further, the GOH was to assist local water user groups to develop and function under the new legislation during the third year of the Title III program.

According to evaluation reports of Title III²³ the Agricultural Faculty had been asked to prepare a study proposal on the present system of water management. This study was then to provide recommendations that would underlie the preparation of the appropriate legislation governing the management of irrigation water.

As of September 1986, most of the study steps had been carried out, and data were ready for analysis. This was regarded as a good performance, particularly since activities had only started in August. However, progress was slower during the following reporting period. The final study report, to have been ready by March 1987, was not finished, although questionnaire data had been analyzed, and the field verification of results had been accomplished. The final report was to be available in May, and

23. The evaluation report in question covered Title III up through the end of March 1987.

the legislation drafted in May-June 1987; at the time of the writing of this report (November), this had not yet taken place.

The idea of creating water user associations to have responsibility for water management and system maintenance at the most local level, benefiting from user fees collected, is one which has a relatively long history in Haiti. Hauge, in an A.I.D.-funded study of irrigation management and water user association potential (June 1984), presents a very comprehensive description and analysis of the various management systems that have been attempted, including a variety which used farmer labor, cash payments, bond purchase, and management for system construction and maintenance.

Given the substantial amount of on-going funding for irrigation system rehabilitation, and the continued paucity of public sector funds for infrastructure maintenance in Haiti, it would appear that this is an institutional reform measure that should be pursued by A.I.D. and maintained in the Title III SHMs. At the same time, the difficulties inherent in instituting effective on-farm water management and O&M by inexperienced and often under-capitalized water user associations in Haiti as well as in other countries should be kept in mind. Also to be remembered are general experiences with local groups and poor precedents in local infrastructure maintenance programs using food for work where benefits or access have been co-opted in the past (Ribyat, 1985).

These caveats notwithstanding, Hauge provides evidence that water user associations of various types have been successful in managing the tertiary levels of even large schemes, and particularly successful in managing smaller ones. She concludes that:

In the absence of continued donor support, the irrigation systems most likely to be maintained and maintainable by users are those which are relatively small and simple and which can be maintained primarily by hand labor. Some observers would argue that other important factors include whether or not the users had a hand in building the system and whether they contributed to the costs of construction. On the other hand, water users associations have operated and maintained more complex systems such as pumping of underground water as the record of the Cul-de-Sac water water cooperatives makes clear. However, such systems, at least later in their life cycle, are more often vulnerable to breakdowns involving difficult to obtain servicing or spare parts. Furthermore, the increasing expenses associated with petroleum dependence may bring such farmers to the point, as it did in the Cul-de-Sac, where they prefer to irrigate less. The capacity of large water users associations, such as those being organized for the

Canal d'Avezac, Dubreuil and the ODPG pumps, to finance necessary operations and maintenance requiring significant amounts in cash contributions or user fees remains untested. The Cul-de-Sac water cooperatives handled thousands of dollars a year in cash but they were able to get such user contributions in great part because their members could not get irrigation water without paying cash first. In most non-pump irrigation systems reviewed there is, at least periodically enough water available, even if it has to be illegally diverted at some cost, for individual farmers to be able to refuse to pay user fees and still get water. The ability of water users associations to raise fees in cash is thus likely to depend on (1) the regularity of the water distributed to members because of the water users associations' administration of the system and (2) the ability, both technical and institutional, of the water users association to cut off water or apply other pressure to farmers not paying their user fees (Hauge, 1984, pp. 3-4).

The evidence adduced by Hauge and others seems to indicate sufficient successes in local-level system operation and maintenance--as well as user fee collection by water user associations in Haiti--that the Mission should continue to press for the implementation of the Title III SHM on water user legislative development. However, in project design and implementation, attention should be given to the caveats cited in the quotation above, as well as to the possibilities for cooptation and hijacking of both assets and benefits.

It may be worth adding that the two major new (i.e. rebuilt) irrigation systems in the Les Cayes plain provide a test case of sorts. The d'Avezac system has placed great emphasis on the organization of water user groups from the beginning, while at Dubreuil, the reconstruction was pushed ahead under the "build first, organize later" principle. Predictions for the maintenance and the socio-economic effects of irrigation canals can be modestly optimistic only for d'Avezac if experiments made elsewhere with water user associations are any indication. Hauge, however, notes that participating farmers at d'Avezac objected to three years of organizational development in the absence of tangible infrastructure and benefits (Hauge, 1984). There are also reports that the process at d'Avezac is bogged down because the Ministry of Economy and Finance will not permit the charging of realistic water rates.

7. Local-Level PVOs

Indigenous and local-level private voluntary organizations are a pervasive feature of rural Haitian social life and have been used as a basis for the community development, cooperative, caisse populaire and other developmental movements over time

with varying success. A good deal of consideration has been given in the literature on rural Haiti and on local-level development to the role of the Catholic church and Protestant denominations at the local level, and associated PVOs. There is a disparity of views among observers, some of whom (Delatour et al. for example), describe the Catholic priest in the local context as a foreigner, while others make a broader distinction between groups whose origin is Haitian, even if their funding, ideas, and animation come from outside, and those that are based outside the country. The latter are discussed elsewhere in Chapter VIII.

It is obvious that Catholic orders themselves are transnational institutions and thus qualify in the latter (expatriate) category. However, local Catholic religious leaders and the groups of rural Haitians they animate and work with seem to be legitimately classifiable as indigenous or local.

Murray (1986), summarizes the situation in a description of the A.I.D.-funded Agroforestry Outreach Project:

In Haiti, the vast majority of local PVOs are affiliated with one or another church. The Catholic Church has the largest number of adherents in Haiti...Perhaps to a much larger degree than is true in many other Latin American countries, local affiliates of the Catholic Church are involved in development activities all over Haiti. The major internal distinction is between the diocesan structure and the structure of religious orders. The former is under the direction of the bishops, all of whom are now Haitian, and has as its major development arm a series of diocesan CARITAS organizations. The latter is represented by several religious orders, most of which have a heavy contingent of foreign missionaries, generally of Canadian or European extraction, and virtually all of which provide some form of local development service as part of their activities in Haiti.

Most of the numerous Protestant denominations, in contrast, receive the bulk of their material support and personnel from the United States. These too are heavily involved in rural development. Whatever their resource levels or specific program objectives, most of these PVOs are in contact with local peasant groups (p. 205-206).

As in the respective discussions by Lowenthal and Smucker cited above, the conclusion drawn by Murray is that, on the whole, working with small, relatively homogeneous and locally-coherent groupements (groupman) has been one of the major reasons for the effectiveness of the outreach portion of the AOP. This conclusion is reinforced in a recent evaluation of the project (USAID/Haiti, April, 1986).

Recommendation:

A.I.D. should continue to explore various project implementation modalities which effectively combine private and public sector skills and services. The key criterion is real ability to deliver benefits effectively to rural beneficiaries as directly as possible. Questions of institutionalizing such delivery capacity should be carefully addressed in both design and implementation stages. The models presented by the AOP and TWMP should continue to be closely monitored.

Projects that are to be implemented through local government structures--whatever these may be called when the project reaches the implementation stage--should be designed so as to ensure that the reality of base-level control and participation is commensurate with the appearance. In order to do this, A.I.D. should continue to fund well-defined studies which describe and analyze social and institutional behavior in the rural sector.

B. Ministry of Agriculture, Natural Resources and Rural Development (MARNDR)

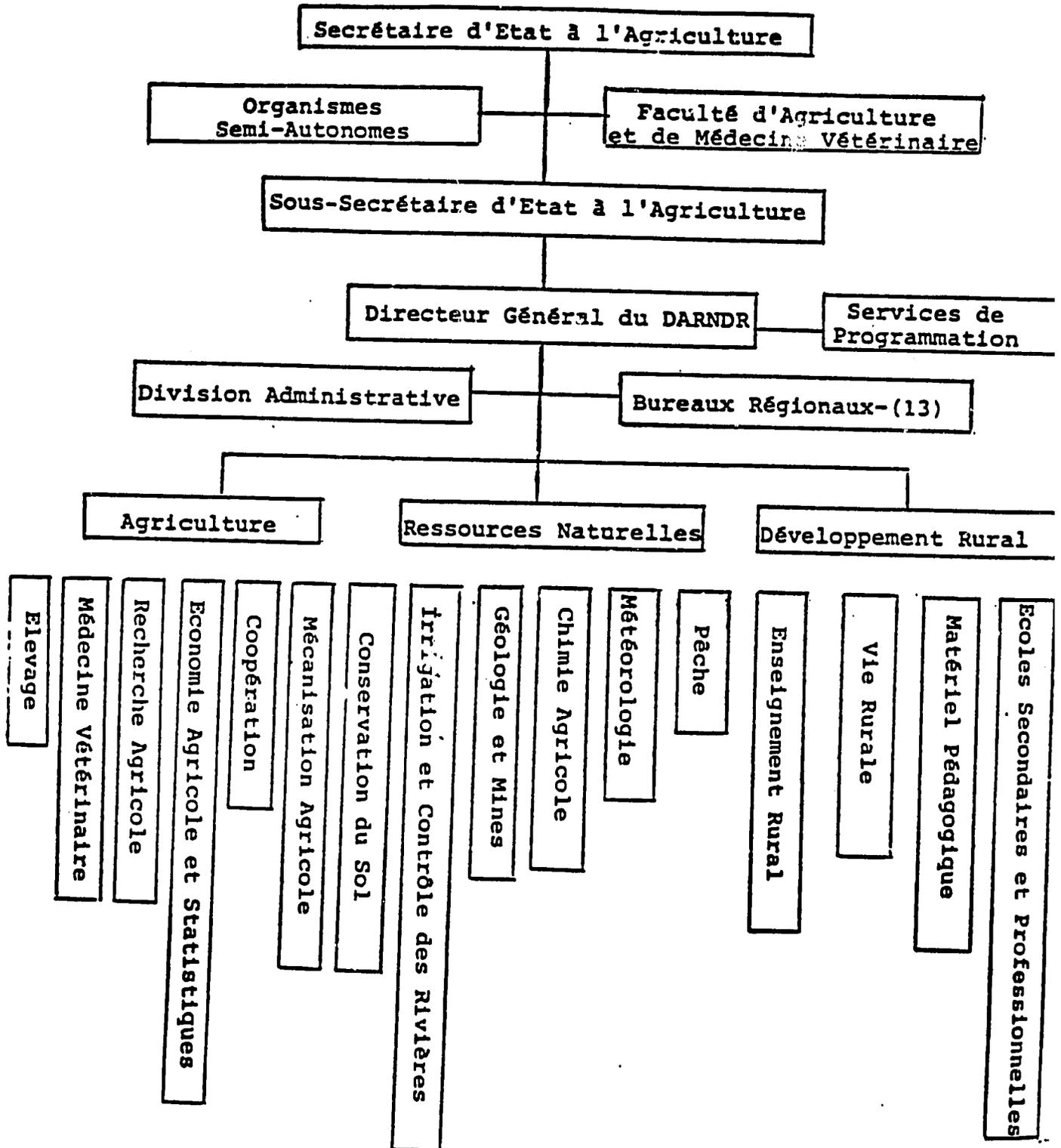
1. Structure

The Ministry of Agriculture, whose headquarters are located at Damien, just outside Port-au-Prince, was once one of the most impressive institutions in the Republic of Haiti. It carried out basic and applied agronomic research, and supervised an Agricultural College, now the Faculty of Agronomy and Veterinary Medicine (FAMV). After the U.S. occupation, Agronomes educated at Damien began to take over their own agricultural policy development as well as design and implementation of ongoing research activities and projects in rural animation, agricultural extension, rural roads, irrigation, natural resources development, and credit.

In more recent years, Damien has been criticized for stagnation, conservatism, and over-centralization, as well as poor allocation of scarce resources. An A.I.D.-funded study of the institutional system of the then-DARNDR carried out in 1976 came to the following conclusions (see Figure VI-1):

- a. The functional deficiencies of the Ministry of Agriculture have been discussed in a number of A.I.D. evaluation reports, and in the context of the GOH Five-Year Development Plan. These constraints, caused by insufficient funding, translate into recruitment of poorly qualified personnel and poor personnel performance, as well as poor utilization of support structures.

FIGURE VI-1
 DARNDR ORGANIZATION CHART
 (1976)



Source: MASI, 1976.

- b. The Ministry of Agriculture is organized in a complex but logical manner. However, the infrastructure is based on a theoretical division of labor, since the decision-making hierarchy is confused and responsibilities are not sufficiently well defined.
- c. The inadequacy of the rural road network is due, to a large extent, to the above-mentioned factors.
- d. Despite the current problems, the Ministry of Agriculture would be the logical organism through which all rural and agricultural development programs should be implemented. The means of communication between this department and the rural areas of the country are restricted compared to the networks established by the autonomous programs financed by external donors.
- e. The functional organization of this ministry could be improved if the appropriate resources were given it. There is within this organization a core of competent and dedicated technicians which could be enlarged by recruitment of other qualified specialists while at the same time implementing an improved system of incentives, promotions, management and monitoring.
- f. Interested donors who wish to increase the effectiveness and the capacity of the Ministry should understand that this is a long-term process. Short-term funding and technical assistance programs tend to cause more problems than they solve (MASI, 1976, pp.1-2; our translation from French version).

With the exception of the remarks on roads, unfortunately, most of these observations still apply. The 1982 A.I.D. agricultural sector assessment, while pointing up the necessity for improving national-level capacity to support local and regional level development projects and entities, tended to present a series of options in all of which the MARNDR was essentially left out. This was so despite the statement characterizing the Ministry as one whose "internal operations must be vastly improved in view of the increasing number of tasks in the field that it is obliged to support." Thus, the assessment accepts the

...complementarity between projects on the ground and so-called institution building. Both must proceed apace if there is progress to be made. The multiplication of field projects lends special urgency to changes at the national level which need to be brought about. It also suggests, however, that the appropriate role for the center is service and support on the one hand, and policy guidance on the other. Detailed, day-to-day management control is inappropriate (ASA, 1982, p. 183).

2. Present Situation

The present organization chart of the MARNDR is shown in Figure VI-2. Unfortunately, a variety of efforts, funded under PL 480 Title I and the subsequent Title III program to improve the performance of MARNDR, as well as to assist it to improve its internal management and to decentralize its operations, have been only marginally successful. At the same time, the senior Agronomes at Damien have been among those who have most strenuously attempted to defend their Ministry's autonomy against the encroachments of the Ministry of Plan, and now of the Commissariat a la Promotion National et l'Administration Publique, which has the same planning and budgetary oversight functions as those exercised by its predecessor. Although there have been poor management, waste of scarce resources, and bureaucratic incompetence and chicanery throughout the civil service structures of the GOH under the Duvalier regimes and before, MARNDR has been subjected to exceptional levels of criticism in these areas.

The World Bank Agricultural Sector Study (May 1985), summarized the problems of the Ministry as follows:

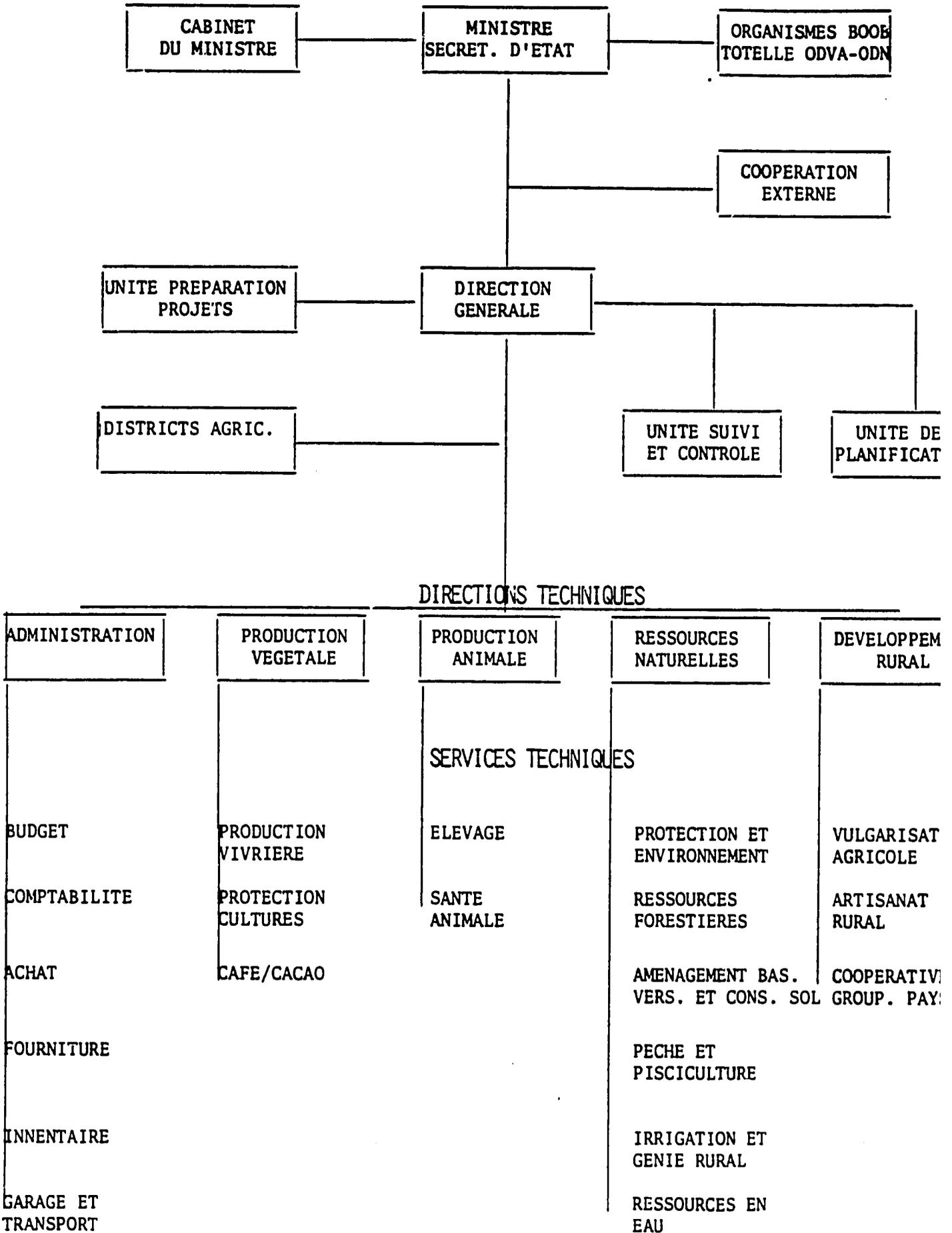
The Ministry of Agriculture has been well known to be inefficient and relatively ineffective. More than 50% of higher-level staff are located in the Port-au-Prince headquarters, many of them in administrative positions. Key staff have changed frequently; there has been [sic] eight changes of Ministers in as many years and few people view employment in the Ministry as a permanent career path. It has also suffered from a persistent shortage of operating funds, for fuel and maintenance of vehicles, supplies and even for staff salaries. Compounding the difficulties, the Ministry has an impossibly heavy workload, with almost 100 foreign-financed projects, 65 of which are under implementation (World Bank, 1985, p. iv).

A recent report prepared by a member of the planning staff of the Ministry attempts to demonstrate that at least in the area of staff decentralization, more progress has been made than is usually acknowledged. This report shows that of all the Agronomes available in Haiti, 58% are actually posted in the provinces (Victor, 1987, p. 10). Of these, however, a significant number are not, in fact, working for the Ministry (88 out of 171). Twenty-two are working for NGOs, 29 for other private sector organizations, and 34 for other GOH agencies. This, as Victor points out, already represents considerable decentralization, when the 171 Agronomes working for MARNDR in the provinces are also included.

However, as the author himself points out, being assigned to a

FIGURE VI-2

MARNDR ORGANIZATION CHART, SEPTEMBER 1986



provincial city and actually working with local farmers are not synonymous. He describes provincially-posted staff as coming for the weekend to Port-au-Prince on Friday, returning Monday, and starting to work on Tuesday.

On the other hand, he makes the point that those Agronomes who are posted to Damien tend to be those who represent specialties which are most rare, and are needed for national-level programs. Further, he points out that of a total of 446 Agronomes working in Haiti at present, 46% (204) work for organizations other than MARNDR.

Aside from staffing inadequacies, and a cumbersome internal organization, MARNDR has traditionally suffered from under-funding from the GOH operating budget. This has created the tendency, as in other GOH ministries, to try to pay for operating costs--especially staff salaries--out of the development budget, which is supposed to be for project/program investment. In the development budget for 1987, 21% is allocated to agriculture. Most of this budget is made up of project-related funding by donors and the Title III program funds.

This relates to a persistent complaint from the MARNDR, which is also voiced in the recent Victor report. The complaint is that the Ministry has been hamstrung in trying to improve its performance due to underfunding as well as understaffing, and because external funding goes through autonomous agencies and projects. This funding approach, it is argued, depletes the capacity of the Ministry in two ways. First, it means that there is almost no funding left for program development. Second, because the pay scales for project staff jobs and at autonomous institutions tend to be significantly better than at the Ministry, the best and most talented Agronomes are wooed away from the Ministry to the projects, regional autonomous agencies (e.g., ODN), NGOs, and agro-industries.

While this is a well-justified complaint given donor choices over the past decade at least, it represents only one interpretation of what has become a vicious circle. Poor performance on the part of GOH institutions in general, and MARNDR in particular, tends to sour donors on working through GOH agencies. When poor performance is added to fiscal mismanagement and diversion of funds, the tendency is to stop working through GOH structures at all, and to create project-level entities, or simply to wholesale funds through PVOs. This practice, in turn, makes it even more difficult for the Ministry to perform effectively. Meanwhile, through strong support by A.I.D., for example, to the Ministry of Plan and the Ministry of Finance, MARNDR tends to be excluded from the policy-making and planning process as well as in program and project implementation.

It is not clear that this tendency on the part of donors will

lessen in the near term, even if MARNDR manages to carry out the policy reform measure of effective decentralization that is called for under Title III. There is too little confidence in the Haitian Civil Service, and too little progress has been made to date in administrative reform to cause donors--and especially A.I.D.--to change their approach and increase funding flows to agriculture and rural development through the Ministry. And yet, if a new elected government were actively and effectively to pursue administrative reform, as is the stated intention of the Commissariat under the CNG, and to sustain improved fiscal probity, there is no a priori reason why A.I.D. should not then provide funding to agriculture through the Ministry for research and training, as well as for some limited extension services.

3. New MARNDR Strategy Proposals

A recent outline of MARNDR's proposed strategy (January 1987), makes a number of brief statements about basic principles and objectives as follows:

Principles: 1) The respect and "flowering" [epanouissement] of the social and cultural values of the Haitian people; 2) a search for stability in land tenure and in agricultural prices; and 3) a harmonious equilibrium between some protectionism by the State and respect for free enterprise and free competition.

General Objectives: 1) Food self-sufficiency and its corollary, increased consumption of local production; 2) diversification of cash crops for export and promotion of commodities of interest for local agro-industries; and 3) rational exploitation of natural resources and protection of the environment (MARNDR, January 1987, pp. 22-23).

This is followed by a brief presentation of five programs that will require investment, with attendant estimated costs. These are, in an abbreviated listing:

Program 1: Institutional Improvement -- 160 million Gourdes;

Program 2: Food Crop Production Promotion -- 480 million Gourdes;

Program 3: Diversification and Promotion of Cash Crops for Export and Agro-Industry--160 million Gourdes;

Program 4: Conservation of Soil and Water Resources--480 million Gourdes; and

Program 5: Rehabilitation of Agricultural Infrastructure -- 320 million Gourdes.

The report points out that this is not an exhaustive list, since

this is a draft document, and that project ideas will be elaborated in the final version. These are envisioned, in large part, as national programs, but with specific projects that are location-specific. Meanwhile, there is evidence that the CNG is interested in having donors focus their efforts more intensively in particular geographic areas. This, however, is reminiscent of area development approach which was not particularly successful in the past (see Brinkerhoff, 1986 inter alia).

Recommendation:

Title III local currency should continue to go toward the financing those of key MARNDR activities which are, of their nature, national in scope. This could include increased funding for applied agricultural research, for extension training, and for costs associated with the development of water user associations for irrigation schemes traditionally managed by MARNDR. Related SHMs and fiscal reforms should, however, be maintained as preconditions for the disbursement of these funds, and progress more closely monitored than has previously been the case. If no progress is forthcoming, funding should be stopped.

C. Research

Prior to 1983 the agricultural research function was the responsibility of a Service of the Ministry of Agriculture, the Service of Rural Research²⁴ called S.E.R.A. However, this Service apparently was always short of money, had very little or no direction, functioned without policy guidelines and with few personnel or resources. From all observations and reports, it appears that for the most part agricultural research was nonexistent. In fact, from what we observed it appears that at no time has agricultural research, including research on livestock production, ever received any high priority in funding, prestige or position in Haiti despite the competence and desires of Damien-trained Agronomes.

In January, 1983 the Minister of Agriculture created the Center of Research and Agricultural Documentation (CRDA)²⁵ within the Faculty of Agronomy and Veterinary Medicine (FAMV). The intention of the Ministry in moving research to the Faculty of Agriculture was to put scientific research into the organization that has the staff with the most training. Additionally, by putting research into the Faculty, the Minister gave it legitimacy among the elite of the agricultural community.

The structure under which CRDA operates is as follows:

24. Service du Ministere de l'Agriculture des Ressources Naturels et du Developpement Rural, Service de Recherches Agricoles.

25. Centre de Recherche et de Documentation Agricoles in the Faculte d'Agronomie et de Medecine Veterinaire.

- o An advisory committee on general orientation: This group has the responsibility to insure that the research activities of CRDA fit within the general framework of the objectives of the Ministry of Agriculture.
- o An office of coordination and supervision: This office has the responsibility for coordinating and supervising research at the national level.
- o A technical council: This council has the responsibility to assess the technical rigor of the research being undertaken.
- o An administrative section: A unit with administrative responsibilities including supplying equipment and financing.
- o A consultative committee: This committee is supposed to act as an intermediary between the researcher in the field and the supervisory committee.
- o The office of coordination of the research units: This unit has the responsibility of coordination of information and scientific activities between researchers and those seeking information about the research.

Within the context of research at the present time, little more than an organizational structure exists. The MARNDR reports that they have about ten farms or research stations, but almost nothing is being done on these stations by either the Ministry or the Faculty of Agronomy and Veterinary Medicine. In some cases there is some testing of maize varieties in conjunction with IICA. However, most of the work is simply seed multiplication. Research is also being conducted on a limited scale through the efforts of NGOs and bilateral and multi-lateral aid missions. However, this work is not coordinated nor directed toward any national policy or objective. The efforts of the USAID in agricultural research have been limited to work in farming systems. It appears the main effort here is to test some new varieties of rice and maize and to do some work on different cropping patterns. No efforts seem to have been made to link the work with that of the national research system. It should be made clear that farming systems research is not a substitute for more traditional research in agriculture. Farming systems research, without being backstopped by a good source of basic research, is little more than another form of extension service.

At this juncture in Haiti's agricultural transformation, research is absolutely essential. There is no way that Haiti can rely on foreign investors to bring with them the scientific knowledge that is needed to transform low intensive, low production agriculture into a high intensive, high output system. Given the small holdings in Haiti and the reluctance to allow foreign investors to work in agriculture, Haiti must rely on internal mechanisms to develop the scientific foundations

that agriculture so desperately needs in the country. This will have to be done by some research system within Haiti. What is needed is an organization that is capable of formulating long-term research plans based on obvious needs and to implement those plans through short- and medium-term programs. That clearly is not happening at this time.

D. Agricultural Extension

As of 1985, MARNDR had 175 extension staff, with 120 assigned to the field and 55 to headquarters. This staff was comprised, according to the World Bank, primarily of paratechnicians. The ratio of farmers to extension staff was an "alarming 2800:1, assuming that the agents work full-time on extension. In practice, their duties often include other activities such as crop reporting and seed distribution" (World Bank, 1985, p. 7). Fortunately, at the present time, they do not have responsibility for credit delivery and collection, as is the case in many countries.

According to the strategy outline document of the MARNDR itself, prepared in January 1987, there were in the country 1,450 extension agents (vulgarisateurs), while their need is for 2,300 if a target of one agent per 300 families is to be attained. As the authors note, achieving this target, would diversify and improve the extension coverage, widen the range of technical qualifications and backgrounds on the part of these extension agents, and lengthen the range of their advice. To some extent, this is probably both viable and creative, allowing for continued experimentation. On the other hand, it compounds the risk that what is extended may be both inconsistent and inappropriate, and that farmers will become resistant to any extension input at all.

It seems fairly certain that the GOH will never be able to afford the development and maintenance of a Ministry-run extension service that would attain complete coverage, provide sufficient pay incentives to rural agents, and provide sufficient funds for fuel, vehicles and supplies, as well as the funds necessary for applied research utilizing these extension personnel.

This may, in some senses, be all to the good. State-run extension in the absence of a reliable rural tax base, timely and appropriate applied research, available inputs, relatively secure land tenure, and adaptive technologies, is often more harmful than constructive. Haiti, where donors have already fostered a system of decentralized, PVO-sponsored project activities, with related extension components, has a chance of adopting a generally private-sector, demand-driven approach to extension, where technical advice is provided by input suppliers, cooperatives, and other entities involved in the rural sector. The Ministry's role thus could best be to foster the type of adaptive research that would yield extendible messages. It could, if funds were available, also have a role in formulating those messages for mass and more tailored dissemination.

With the encouragement by the CNG of commercial importation and distribution of agricultural inputs, this sort of approach seems more plausible in contemporary Haiti than in some other countries where it has been suggested. There would still be a need for quality control of private sector extension and for training of extension agents. Either or both of these functions could remain with MARNDR, depending on the policy adopted by the GOH and the relevant donors, and funding made available by the latter.

Recommendation:

A.I.D. should not fund efforts at establishing a nationwide extension capability within the MARNDR. It should, however, provide funding for increased and better training of extension agents, whether they will ultimately be hired by public or by private sector organizations.

E. Agricultural Credit

The main sources of formal agricultural credit are the Agricultural Credit Bureau (BCA) within the MARNDR and the National Bank for the Development of Agriculture and Industry (BNDAI). Rural credit is also available from several regional development organizations and through mutual cooperatives, although the latter source is very limited. Traditional sources of credit are also open, but all observers identify a general lack of credit throughout the rural sector.

1. The Agricultural Credit Bureau (BCA)

The predecessor of the BCA was the Bureau de Credit Rural Supervise (BCRS) which was created as a subsidiary of the DARNDR extension service. This was supported by a United States Overseas Mission (USOM) grant. The lending was mainly medium-term for the purchase of coffee, cocoa and banana plants, the construction of buildings and land terracing.

The BCRS was replaced by the BCA in 1959 and was again supported by a USOM grant. The new organization remained a subsidiary of the extension service but its role was expanded to support several area development schemes all of which were, or had been, U.S.-supported. In 1962 the U.S. withdrew its development support from Haiti and the BCA was forced to make numerous changes to its activities with the abrupt loss of external financing. First, the BCA became a semi-autonomous credit institution with an Administrative Council to provide policy guidance. The council is chaired by the Minister of Agriculture, with representation from the Ministries of Plan, Commerce and the Central Bank. The head office of BCA remained within the DARNDR but it opened several regional and local offices at this time, thus taking the first steps towards decentralization.

The major change, however, was that from medium-term to short-term lending due to financial constraints. These constraints

also forced a more careful choice of clients in order to prevent decapitalization as a result of bad debts.

In 1965 the concept of group lending was devised. Farmers were encouraged to form small groups of between seven and fifteen members. These groups were termed Societes Agricoles de Credit (SACs). The farmers themselves choose the membership and the officers. The members of a SAC formulate their requests for loans and submit these to the agent. The amount that each person in the group requests need not be equal but is theoretically approved by the other members, since they are mutually responsible for the debt. The BCA nevertheless examines each person's request to verify its rationale. The request must have the approval of a committee consisting of the regional BCA director, the district agronomist and a local dignitary. Discussions with agricultural service personnel suggest that the committee system was not always used, and often the BCA representative made the decisions alone. The credit contract then drawn up is between the BCA and the SAC. This approach was seen as administratively cost-effective, and it was believed that the joint liability would lower the number of bad debts.

BCA continued lending at a low level until external funding was reintroduced in 1974. DARNDR and A.I.D. determined that a program for coffee production had high priority and the project designed to strengthen it had a credit component under the aegis of BCA. The coffee project proved to have limited success in terms of achieving the lending levels expected (\$1.3 million out of an anticipated \$5.6 million); the record on defaults was also poor--an estimated 40% of the coffee project loan portfolio was uncollectable. However, the project was judged to have made three very positive contributions to BCA and its operations. First, the coffee program provided funds for BCA to expand both its staff and infrastructure. Second, the amount of money available for the Pret Ordinaire portfolio rose from \$74,000 in 1974 to \$1,500,000 in 1980. Third, under the coffee program there was a major component for advisory services under which BCA was able to make substantial progress in administration and management. This latter supported more effective and efficient credit operations. It was estimated that in 1981 there were 1,730 SACs with a total membership of about 15,500 farmers who would receive \$3 million in credits.

The rationale that the availability of formal credit services in rural Haiti was very limited led to the approval, in July 1981, of the Strengthening Rural Credit Services project. At that time there were agricultural production credits available through the Institut de Developpement Agricole et Industriel (IDAI), the BCA, and several regional development organizations, as well as savings and credit through a relatively small credit union movement. It was estimated that less than 10% of Haitian rural households had access to these formal services.

It was claimed that the limitation on availability of formal financial services severely constrained the process of rural development. Thus, to provide for the increases in rural private sector investments during the 1980s and 1990s, a solid foundation for rural development banking had to be established. Five major factors were considered with respect to rural banking development. These were:

- a. that the malnutrition affecting rural Haitians necessitated food production credits as a first near-term priority;
- b. given the immensity of the investment requirements over the longer term, rural savings mobilization needed to be introduced to complement external and urban based capital;
- c. since there was no commercial rural financial sector, rural development banking would remain a function of the public sector;
- d. recognizing the inability of the GOH to subsidize operating costs, and thereby constrain expansion, the operating losses of rural development banking must be minimized; and
- e. given its involvement with small farmer groups and its emphasis on traditional food crop production, its improvements in efficiency and effectiveness, and the initiatives in reorganization and control which had been undertaken, the BCA was seen to be the organization to serve as the foundation for a broadly-based rural development banking network.

The A.I.D. grant for the project was \$2.4 million over three years. This sum was to cover long- and short-term technical assistance, training, commodities, construction, the implementation of a pilot savings program, evaluation and contingencies. The GOH was to contribute \$3,776,000 in local costs over the life of the project which included \$110,000 for commodities, \$2,000,000 for capital, and \$1,666,000 to cover anticipated operating deficits. The capital and commodities contribution were to come from PL 480 funds.

In January 1985 an approval for the extension of the project for a further three years, and an increase of funding by \$2.615 million, was signed. The extension justification claimed that as a result of the actions taken during the first project, progress had been made in five main areas. First, in liquid assets, the 49.4% of the loan portfolio outstanding in 1979 had been reduced to 14.9% by the end of FY 1983, thus surpassing the PP goal of 15%. Second, interest rates had been increased from 9% to 12% in October 1982. In addition, a 2% commission was charged, plus a

2% loan guarantee repayable at the loan's termination. Individual borrowers who were not SAC members paid an interest rate of 15%, plus 2% commission and 2% loan guarantee. Third, quarterly financial reports were being prepared. Fourth, studies of repayment rates and patterns had enabled weeding out of ineffectual staff and showed some promise of reducing default rates. Fifth, the establishment of a bad debt policy constituted an important step in helping BCA to both understand the real costs of its lending activity and to focus on reducing delinquency rates.

However, despite improved liquidity rates and better repayment rates, the overall financial position of BCA had not improved in real terms. Operating expenditures, loan volume, and revenues had not improved to expected levels. Loan volume in FY 1983 was \$4.6 million, rather than the \$5 million estimated in the PP, and it appeared unlikely that BCA would reach the \$8.7 million expected by FY 1984. Operating deficits were \$0.7 million in FY 1983 as opposed to the \$0.57 million projected in the PP (this, however was predicated on an interest charge of 9% on the loan and a 5% dossier fee, rather than the 12% interest charge, 2% commission and the 2% loan guarantee which was applied). Revenues in FY 1983 were 7.3% above PP expectations but still had declined relative to expenditures. Levels of activity lower than predicted in the PP were attributed to the deficit in loan capital provided to the BCA, higher default rates, and lower loan turnover rates than the PP design team expected.

Prior to the project, voluntary savings accounts were virtually non-existent. In response to a savings mobilization scheme, there was an increase in savings from 200,900 Gourdes (which were described as forced savings) to 4.1 million Gourdes by the end of March 1984.

On the basis of the progress made, the project extension was justified with the aim of making the BCA a financially sound and self-sustaining institution, primarily in the areas of financial management, capital development, personnel and organizational management, and secondarily in training and automated data processing.

Under the Title III Program Agreement signed in January 1985, the BCA was to receive \$1.5 million per year for three years. The condition attached to this funding was that by the end of the three-year program, the GOH would reduce the central office operating costs of the BCA to not more than 10% of its operating budget.

A report on the impact of BCA credit on borrowers, prepared by David P. Harmon Jr. in February 1986, concluded that in general BCA clients had benefited. This was borne out by increases in income, production, input usage, area farmed and livestock ownership. In part, he claimed this was because these farmers

(type 3)26 are a good credit risk, do not require subsidization, do not need basic technical assistance, but do require working capital--in some cases to increase inputs and hired labor, and in some cases to start using inputs.

A further study prepared in September 1986 by Jean-Jacques Deschamps and Barbara Skapa assessed the question of the loan delinquency problem at the BCA and proposed a collection strategy. The report explained the problem faced during the events of early 1986, when delinquency rates increased dramatically. The downside of what the Mission Action Plan describes as the opening of a "window of opportunity" presented by the fall of the Duvalier regime was a spirit of rebelliousness against government institutions--including the BCA--on the part of farmers. Interviews with the BCA management confirm that farmers, in the main, were still willing to pay off their own debts but were not prepared to stand as guarantors for others. The events of 1986 had revealed, in some cases, the abuses of the system. Powerful officers of groups had obtained loans considerably larger than other members; subsequently, there was a feeling that the debts were to the old regime and were no longer due. Given the situation in rural Haiti and the repressive conditions under which the peasants lived, the problems which arose cannot be laid wholly at the door of BCA.

The situation at the date of the above report (September 1986) was as follows:

- o 2,700 SAC loans overdue;
- o average SAC loan - 7876 Gourdes;
- o 27,000 SAC members and officers: 18,900 SAC members;
9,100 SAC officers
- o average member loan - 500 Gourdes;
- o average officer loan - 1,450 Gourdes;
- o 1200 individual loans now overdue;
- o average individual loan - 2,500 Gourdes.

Apart from the consequences for the resources of the BCA, many farmers who would wish to borrow find themselves unable to do so since the BCA cannot lend to a member of a SAC if any member is delinquent. Thus, those funds which BCA does have are not being mobilized as they should be.

The report proposed a strategy for the collection of loans which the Mission says has not been implemented. Furthermore, there is concern that the management of BCA is unwilling, or unable, to

26. A type 3 farmer is defined as one who has a small landholding, does not already have access to credit, does not need technical inputs, but does have the potential to produce a profit from the proposed activities.

dispose of the services of unsuitable staff. Furthermore, a study by Development Alternatives Inc., authored by Randy K. Dow (1987), paints a much blacker picture of the operations of BCA, even before the events of February 1986. One of the few positive notes in this report is that the increase of clients' deposits has had a positive impact.

It might appear that A.I.D. has remained loyal to BCA for long enough in the institution's present form. It would seem that the technical assistants and A.I.D.'s project managers were deceived or overly optimistic, and that the personnel of the BCA were dishonest or unable to escape the political pressures with which they were faced. These pressures appear to have been applied at both the SAC and the Ministry level.

2. National Bank for Agricultural and Industrial Development (BNDAI)

Formerly the Institut de Developpement Agricole et Industriel (IDAI), the BNDAI became a bank in 1983. The Institute was funded by the Inter-American Development Bank as a credit and input agency and was basically a means of avoiding the funding of agricultural development through the Ministry of Agriculture.

The IDB has given a good deal of technical support to the institution, but while its performance with agricultural lending is not considered too bad, in the industrial sector the experience has been less positive. It is not IDB's intention to continue funding to the institution²⁷.

3. Private Voluntary Organizations

Several private voluntary organizations run credit programs, some as part of their coffee cooperative activities, some as part of their social development programs. A recent report (Woodson, 1987) described the programs of three such organizations. In each case, the lending program revolved around groups of participants who had a joint responsibility for the debts of individuals; there was heavy reliance on a vetting procedure by fellow members of the cooperative; membership in the cooperative required the purchase of a shareholding; eligibility for loans is based on the borrower having built up savings in a deposit account, and loans did not exceed twice this holding. The lending programs tended to make loans to what were described as "middle class" farmers. The recipients of loans could therefore be described as creditworthy since they had proved their thrift and their acceptability to their peers, to whom they were well known.

27. USAID has funded a financial audit of the BNDAI. The report is classified, and was thus not available to this team.

Repayment rates were of the order of 80% and upwards. Sanctions applied for non-payment started with a formal complaint at group meetings, and progressed through confiscation of the member's shareholding to expulsion from the cooperative, which closed the line of credit.

Interest rates were 12% per annum in each of the cases studied, this being chosen by one organization on the grounds that 1% per month was an easy concept to explain to farmers. All depended, however, on voluntary cooperative officers to run the programs. One of the coffee cooperatives was extending credit during the "dead season" for needs other than those related to the coffee crop. However, this is a very small program and one which, if expanded beyond G.50,000, would require more management capability and subsidization. The other major advantage that programs based on a cash crop have is, of course, that the farmer also wishes to benefit from the better prices that it is hoped the cooperative can obtain.

While these credit organizations undoubtedly help to alleviate the credit problem, their activities are on such a small scale, and in such special circumstances, that they cannot solve the problem nationwide.

4. Traditional Credit

As in all societies there are a number of traditional channels for credit in the Haitian rural and urban sectors. A report prepared by Glen R. Smucker for the Strengthening Rural Credit Services Project in 1983 examined the various sources of funds and the interest rates involved. He concluded that the formal credit institutions, which include BCA, BNDAI, the regional development agencies, agro-industrial companies, cooperative funds, and private development agencies, are accessible to not more than 6% of the 650,000 farm families in Haiti. As for the banks, small farmers are totally excluded, and even better-off farmers generally cannot borrow. The formalities and associated charges involved make it easier even for merchants to borrow from money-lenders and peers rather than from the banks.

Informal credit, on the other hand, is more easily available than formal credit but is inadequate in two ways. First, it is not always available when it is required, and second, the cost can be greater than the potential client can bear.

Smucker points out that the sources of credit are varied and that the relationship between the borrower and lender, as well as the risk involved, determines interest rates which at times appear very high but at others are not. Poulin, in his 1983 analysis of the effective demand for BCA loans, says that the 10-15% per month commonly charged simply reflects the high cost

of providing very small loans to economically marginal farmers.

Many loans are made against anticipated harvests or unborn animals, both of which carry high risks. The period of the loan varies widely, depending on the crop—beans for three months and rice for six, for example. Virtually all other field or tree crops are also sold on credit. The basis on which the loan is made and reimbursed also varies, loans being made in cash and repaid in produce or produce borrowed and returned in produce—seed, for example. Smucker calculates that annual interest rates vary between 100% and 400% for such transactions.

Loans are made against land for varying periods of time and with various conditions attached. In these cases the interest rates are of the order of 100-120%, reflecting the lower risk involved with the existence of sound collateral.

In most rural societies credit is commonly accorded in the marketing chain, and Haiti is no exception. Wholesalers will lend money for the small-scale collector/assembler to buy on his behalf, or will provide the retailer with goods on credit. In some of these cases the interest rates quoted by Smucker calculated on an annual basis are astronomical, but generally the period of the loan is short and some part of the difference may be regarded as trading profit rather than interest on the capital.

Lenders of money include fellow farmers, traders, pawnbrokers, notaries, and moneylenders, both licensed and unlicensed. Lundahl is quoted as saying that the 1979 ratio of borrowers to lenders was 8:1.

5. Future Strategy for BCA

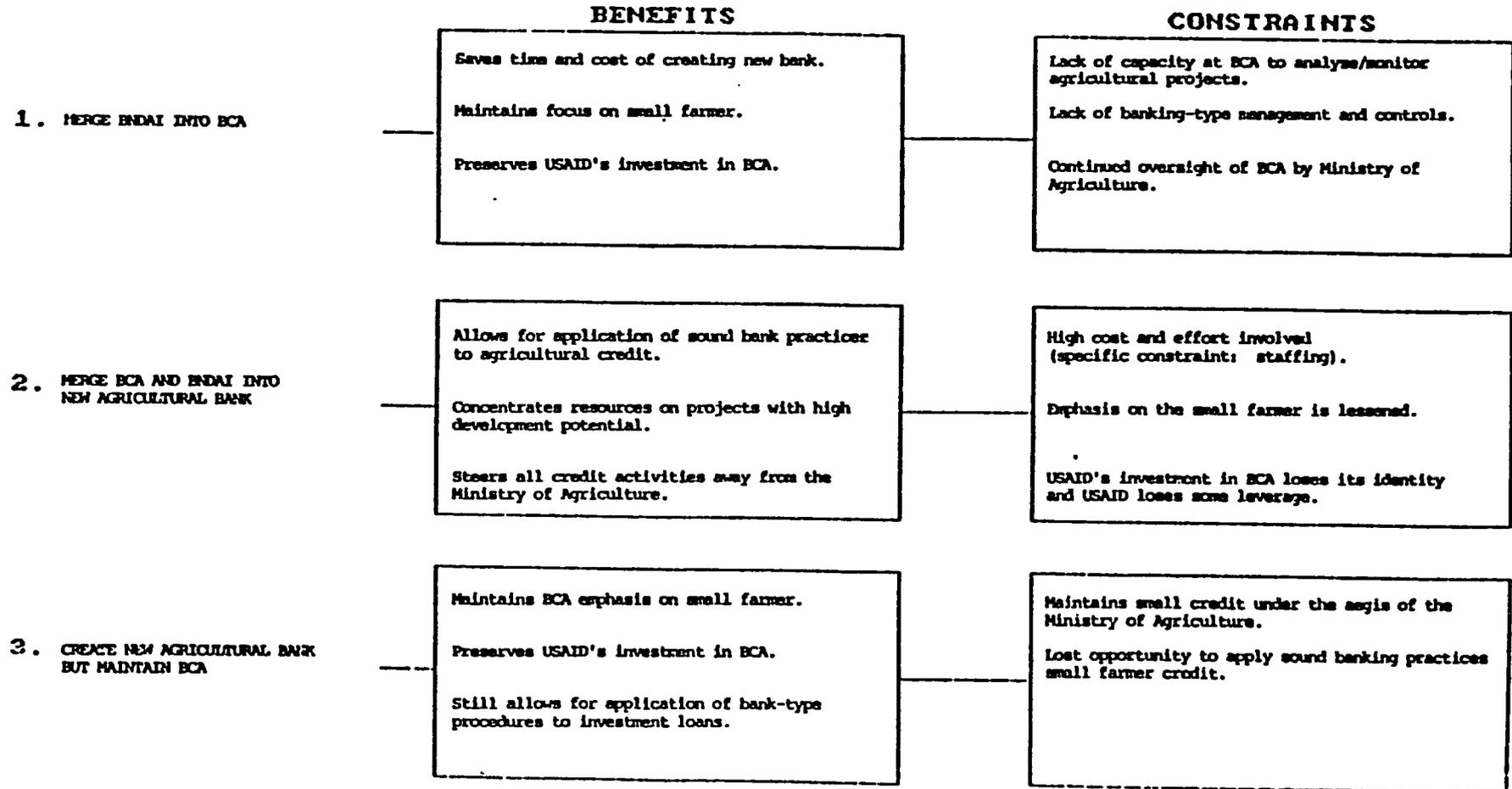
Zuvekas (1978) argued for a merger of the then-IDAI and BCA. Options for future provision of agricultural credit in Haiti have recently been set out in a briefing paper by Jean-Jacques Deschamps and are illustrated in Figure VI-3.

Three possible scenarios are described:

- a. Merge BNDAI into BCA, which would maintain the traditional focus of the latter on small-farmer needs. The organization already exists and has had a lot of investment in training, equipment, and systems. The constraints are listed as the lack of capacity of BCA to monitor and analyze agricultural projects, and the lack of banking-type management and controls. Both of these criticisms are surprising, considering the training and investment A.I.D. has given over a long period. The oversight of the BCA by the Ministry of Agriculture is probably undesirable, given the long-standing weaknesses perceived in this ministry.

FIGURE VI-3

**SUMMARY OF BENEFITS AND CONSTRAINTS
OF VARIOUS INSTITUTIONAL ARRANGEMENTS**



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Source: Deschamps, J-J, Strategy Paper on the Rural Credit System, DAI, August 1986.

- b. Merge BCA and BNDAI into a new agricultural bank which the author of the report believes will facilitate the application of sound banking practices, and concentrate resources on projects with high development potential. Constraints are listed as the high cost and effort involved and specifically that of staffing. Again, it would seem that staff trained under the A.I.D. projects should be capable of providing the nucleus if the past investment in training has yielded any results. The shift of emphasis from the small farmer need not necessarily occur, and will depend on the structure of the bank and the management. There is already criticism that BCA is making only short-term loans, while the farmer is being encouraged to move into perennial crops which have a delayed benefit. The loss of leverage is unlikely if satisfactory management structures are created in which A.I.D., as a major financial contributor, is represented on the Board of Directors.
- c. Create a new bank, but maintain BCA--which seems to be a way of avoiding the hard decisions. To be successful, a new bank will need funding and staff training without bringing on board the benefits from past investments in these areas. The advantages suggested are the allowing of BCA to continue its emphasis on small farmers, while permitting the application of bank-type procedures to investment loans. It would really appear better to have both short- and longer-term funding in one institution so that the borrower may receive the most appropriate financing advice and would be using one institution in whatever circumstance--one in which he can build up a record of creditworthiness.

The conclusion reached by Deschamps (1986) as regards the institutional framework is that the desire of the previous as well as the present, interim, government to create a new agricultural credit bank should be endorsed by A.I.D.

Deschamps feels A.I.D.'s involvement in rural credit should be continued. The study team would agree with this view. Murray made an impassioned plea for credit in conjunction with the TWM Project. While we would agree with A.I.D.'s decision not to set up a separate credit fund for this (given its involvement in BCA), the need is still there.

The BCA system of group lending appears to have had some measure of success and fits in, to a degree, with the concept of Haitian mutual funding systems (sangués). Group lending should probably be retained for short-term unsupervised loans for inputs or immediate consumption needs. For longer-term and larger loans, however, this system is probably inappropriate. The major hurdle yet to be overcome is probably to instill the idea that

loan default is as socially unacceptable as is default on a sangué loan. As one Haitian A.I.D. employee put it, "all money from BCA is seen as government money and not necessarily repayable, whereas sangué or caisses populaires funds belong to known individuals".

Given the history of government institutions in Haiti, it would seem desirable, as Deschamps suggests and the USAID/OPED agrees, to create the new bank as a public institution, but with a Board of Directors controlled by private sector representatives, representatives of the donors, and a minority government presence. This "hands-on" management style is one developed by OPED and should be adopted in this case. It would appear to have the merit of allowing close supervision and limited government involvement without bringing in a foreign organization, as many NGOs do. A.I.D. and other donors should accept (as A.I.D. has until now with its support for BCA) that the institution will require long-term support and control. In this case the constitution should be written to take this into account. If this approach is taken, A.I.D. should hire an individual with banking experience to manage the project.

The type of structure which might be suggested is one in which the "Agricultural Development Bank" has a Board of Directors comprised of the Ministers of Finance, Agriculture and Commerce, together with six private sector members who represent farming, agro-industrial and marketing interests. The board should also include the Mission Director among those donors who are supporting the bank as voting members.

It is questionable whether a bank whose primary purpose was to lend to the small-farm sector would attract major private investors. The Board of Directors therefore could not be chosen from shareholders, as has been the practice with other OPED-funded credit institutions. The savings of small investors might be accumulated over time in schemes such as BCA has been implementing. This is unlikely to be profitable initially but could eventually give farmers a stake in the system, as well as a good credit rating.

The bank should have two divisions which would aim largely at the types of lending currently undertaken by BCA and BNDAL. The first division would be one which undertook financing of a portfolio similar to that of BNDAL. Longer-term and medium-sized loans would require this division to have the capability to appraise proposals and the credit worthiness of the applicant, since loans would be granted on an individual basis. A degree of supervision might also be required for these borrowers. Since shareholders will not be available for appointment, the division's Board of Directors will probably have to be appointed by the main Board. Again, private sector interests should be in the majority, with representatives from the ministries which are

on the main board, and the donors. A general manager would be responsible for the day-to-day running of the division under the direct supervision of the Chairman of the division's Board.

The second division, focusing on loans for the small farmer, would probably continue largely with the BCA systems but would also have a Board of Directors dominated by private-sector representatives drawn in as much as possible from the small farmer sector, together with representation from the ministries and the donors. The general manager of this division would also be directly supervised by the Chairman of the Board of Directors for the division.

An internationally recognized accountancy company would be responsible for assisting the Accountancy Department of the bank to design the appropriate accounting control and management information systems, and for conducting an annual audit on all parts of the bank's operations. The company would be responsible to the main Board.

The creation of a new bank could probably only be staffed by people drawn from the existing BCA and BNDAI. Given the investment in training and systems that both staffs have had, and the scarcity of educated people who could quickly be trained, this is probably the opportunity to weed out the less efficient staff members which ECA has not done in the past. An alternative is to seek to attract back qualified Haitians from North America, as has been done in the Ministry of Finance.

The major concern implied in the creation of a new bank is that a mechanism must be found to bridge the intervening period between the end of the current projects and the formulation of new ones. The IDB estimates this will take about two years, and A.I.D. would probably require a similar time.

Apparently there are already people who are making political capital out of the proposed closure of BNDAI by accusing the government of depriving farmers of sources of credit. The withdrawal of both credit institutions alone would only serve to give them more ammunition.

Recommendation:

The GOH, USAID and the IDB should immediately examine the options and design a strategy for the long-term based on sound banking practice, but which continues to respect the needs of the small farmer who is seldom considered a good risk by the traditional banking community. From the point of view of AID management, it might be preferable to have a manager with banking experience. Short-term access to credit by one means or another will have to be provided, given the current paralysis in both the BCA and the BNDAI. It is also imperative that BCA

deposit holders have confidence that their funds are secure.

F. Requirements for Statistics and Information

Almost every report concerning statistics in Haiti, whether written by a Haitian or an outsider, comments on the abysmal quality or sheer absence of the data. This is true for almost every sector, even including import and export data and national accounts. It is particularly true for agriculture. There is little need to belabor this point. However, it is necessary to repeat what some observers have stated: that policy decisions cannot be made with any confidence based upon studies which derived their conclusions from the data at hand. Simply put, policy decisions based on these data are merely guesses based on intuitive knowledge of Haiti or the theoretical constructs upon which particular policy positions are taken.

A program for firmly establishing a system of collecting and analyzing agricultural statistics must be developed. Specific studies concerning the development of regional plans, markets, or water resources need to be undertaken. Finally, there is a need to re-institute systematic data collection on climate, hydrology of rivers, rainfall and soil erosion. Each of these areas is touched on briefly below. It should be made clear, however, that the development of data is not stressed here simply for the sake of creating data bases. The generation of the data and its analyses should be done only with specific needs in mind.

1. National Agricultural Statistics and Information Systems

Currently the ADS-II project is using the area sampling frame methodology to develop a reliable national agricultural statistics base. Further, they are employing the Geographic Information System to establish a method for compiling data on a geographic basis that can relate various socio-economic and physical information to specific geographic regions of the country. These systems are only beginning. Further work needs to be done to refine them, test their accuracy and maintain updated information in a usable format.

Some observers have commented that the ADS-II system may not have the reliability that is generated by micro studies of farming systems, village profiles, farm typologies in specific zones, and the like. This, of course, is expected. National agricultural data are collected with statistical sampling techniques on a macro level. The principle of this methodology is to collect data to a degree of accuracy that is sufficient for the use intended **at the most economical cost**. Improving on accuracy means increasing data set sizes, increasing training and supervision of data gatherers, and improving instruments for data collection among other things. The point is that the higher level of the accuracy of the data required, the higher will be the cost. Research has been under way by the USDA since the mid-1950s to improve on the quality of agricultural statistics in

the United States without unduly increasing the cost. Given the more homogeneous cropping patterns in the United States, the size of the basic farming units, the confidence that respondents have developed in government data collection systems and the high level of education and training of both enumerators and respondents, it is not surprising that using the same system in Haiti does not produce data with the same degree of quality.

However, given the general absence of data for Haiti, and the overwhelming need for information on which to base policy, the ADS-II systems should be continued. To insure that this happens without losing the continuity of the program we recommend that:

- a. An interim funding be assured by USAID of the area sampling frame, national statistics portion of ADS-II, and its companion CRISE project until the end of FY 1988.
- b. That an evaluation of the two systems be undertaken immediately, coupled with a redesign of the project for another phase. That evaluation should be undertaken by a team composed of people who are:
 1. familiar with area sampling frame technology, either from USDA, a University cooperating with USDA on area sampling frame technology or a private firm that can prove its technical capability in this field;
 2. familiar with yield sampling technology, both in how it operates in the United States and how that technology has been adapted for use in countries with similar small-scale farming systems to those in Haiti, based on heavy intercropping;
 3. familiar with the use of aerial photography interpretation and the use of remote sensing to maintain the area sampling frame;
 4. familiar with the use of geographic information systems and how to improve on their use and punctuality;
 5. familiar with micro computers and programs for use with national and regional data and statistics in agriculture; and
 6. familiar with developing models for analyses of agricultural data on both a macro and a micro level for policy analysis and project evaluation.
- c. That the need for farm-level data be examined and proposals made for its collection, collation and analysis.

The purpose of such an evaluation would be to focus on the technology that is now being employed by ADS-II and assess the quality of the programs and the data being generated. Having accomplished this the same team should then determine what (if any) changes in program design are needed and the length of time required to assure that the program is firmly in place. Finally, they should determine what is the proper repository of the data gathering and analysis system and make recommendations to A.I.D. On the latter point some possibilities include:

- (a) The National Bank;
- (b) The MARNDR, either as a separate department or division or as an integral part of another department such as project management and evaluation, or statistics;
- (c) The National Institute of Statistics;
- (d) The Faculty of Agriculture; or
- (e) The Commissariat a la Promotion National et l'Administration Publique.

Other possibilities may be evident to the team at the time of the evaluation.

2. Collection of Watershed Data

The ADS-II project's CRISE system has potential to be further developed to incorporate watershed data that could possibly aid in the long-term planning and management of Haiti's watersheds. Unfortunately, at this time, most of the data available on individual watersheds is extremely out of date. This includes rainfall data, storm event data, river discharges and sediment loads. A great amount has been written about the effects of deforestation on soil erosion, but almost no data exists to determine the extent of that erosion and how it correlates with grass or tree cover or attempts at establishing erosion control structures. There has also been much said about managing the watersheds in conjunction with any attempts to establish downstream irrigation. Yet no recent information has been collected to establish volumes and duration of run-off from storm events, duration of maximum and minimum flows between rain events, and the relationships between rain intensity and water infiltration. Most of these data were collected between 1919 and 1940 for many of the watersheds in Haiti. A system needs to be established to continue the collection of these data on the major watersheds and to perform analyses relating current relationships with those found 60-70 years back.

3. Regional Planning

In some areas of the country, particularly in the North from Cap Haitien to the border, where relatively flat plains exist along with some smaller valleys and culs de sac, there is a need for more integrated planning and management of the land. Much of the land in the North is currently in sugar cane and will most likely be converted to other crops. Some irrigation exists and more is currently being developed. There are some extensive areas now in grazing, but generally growing up to brush and coarse grasses. This entire area should be incorporated into one large planning region and viewed as an integrated system of hills and plains that needs coordinated management to maximize output. In so doing, data will be needed on the watersheds above the plains, including the hydrological data mentioned in Section 2 above, ground water resources, recharges and drawdowns, irrigation potential, soils and natural vegetation, roads, markets, etc.

Once the data are collected and analyzed they will form the basis for a regional development plan. Developing such a regional planning system should be in line with the stated policies of the government to establish regional centers under the move for decentralization as called for in the Constitution. Similar planning networks could be established around the other large plains areas such as Leogane, Cul-de-Sac, Les Cayes or the Plaine des Gonaives. It seems imperative that systematic planning be established for these areas, and the basis of that planning will need to be sound data and information.

G. Agricultural Inputs

1. Fertilizers, Seeds and Pesticides

Roe (1978) reported that input markets suffered from several problems, including high rural illiteracy rates, farmer's lack of operating capital and historic agricultural patterns. He also pointed out that complementarity of inputs would optimize their benefits, citing an input's (nitrogen) dependence on the productivity of other inputs (phosphate, seeds, soil tillage), all of which may be related to the cost of credit and the timely availability of the inputs.

There appear to have been no reports on the input market more recent than that of Roe, who quotes mainly from Duplan (1975) and Brummitt and Culp (1973). Neither of these earlier studies gives details of the farm-level situation, but Duplan estimated the use of chemical and biological imports for agricultural purposes during 1972-74. These are shown in Table 57.

TABLE 57

IMPORTS OF CHEMICAL AND BIOLOGICAL INPUTS, 1972-74

	<u>1972</u>	<u>1973</u>	<u>1974</u>
Fertilizer (MT)	1324.0	2926.0	3338.0
Pesticides (MT)	116.8	169.4	183.0
Raticides (MT)	11.0	6.0	14.0
Seeds (1000 lbs)			
Corn	31.180	210.550	83.295
Rice	40.540	267.660	11.000
Millet/Sorghum	3.640	129.429	00.92
Potatoes	-	17.490	229.68
Legumes	8.322	32.140	4.476

Source: Duplan, 1975.

The majority of the fertilizer imports were accounted for by three firms, with another seven firms importing most of the rest. The IDAI imported over 63% of the pesticides, with seven private importers accounting for most of the balance. The majority of seed imports were by MARNDR in the context of specific projects or, in the case of rice in 1973, because of unfavorable growing conditions in the Artibonite in 1972.

The MARNDR in its May 1987 report, Elements de Politique et de Strategie, shows quantities of fertilizer, seeds and pesticides imported for the years 1977-82. These data are provided in Table 58.

TABLE 58

IMPORTS OF AGRICULTURAL INPUTS FY 1977/78 - FY 1981/82

	77-78	78-79	79-80	80-81	81-82
Fertilizer (MT)	2,164	7,586	3,708	8,363	5,761
Seeds (kg)	116,616	507,656	94,824	478,948	340,084
Pesticides(kg)	528,620	460,862	649,248	735,338	1,054,210

Source: Administration des Douanes, Haiti.

For fertilizers, MARNDR estimates that 57% is supplied to farmers by the Ministry and BNDAl and the rest is handled by individuals. The data suggest a two-fold increase in fertilizer usage over that reported earlier by Duplan. The Ministry adds that there is some local production by Agricultural Services, S.A. but does not give quantities; nor does the report indicate

if the raw materials for local manufacture are included in the import data. The World Bank reported in 1983 that fertilizer use averaged 7 kg/ha of cultivable land, which is compared with 90 kg/ha in Jamaica and 125 kg/ha in Kenya.

Since local production of seeds has been insufficient to meet demand, the balance is made up of imports.

In the case of pesticides, the imports include those for uses other than agriculture. It is estimated that agriculture absorbs some 24% of the imports.

The relative quantities distributed by the private sector and public sector are not known. There is a network of private agricultural merchants throughout the country and MARNDR also distributes subsidized supplies on what appears to be a haphazard basis, determined largely by the arrival of a gift from some donor. Reports indicate that this is frequently bought by farmers on credit and then resold.

Roe comments on the relatively high marketing margins in the fertilizer market, and states that excess capacity existed at the same time. The provision and cost of inputs for any individual farmer must vary widely, depending upon what source he has to rely on. For example, in the Les Cayes area, the d'Avezac irrigation project has set up two shops, staffed by individuals capable of giving advice on the use of fertilizers and pesticides, as well as for some other goods such as cement. Sales are on a cash, unsubsidized basis and one shop, recently opened, is turning over some \$2,000 per month. The local MARNDR office sells subsidized fertilizer when available. The local agricultural merchants in Les Cayes sell fertilizer, which is apparently often bought by "Tap-tap" drivers on behalf of farmers. The ADS-II Project proposes to give fertilizer to farmers, as well as a motor cultivator, in the rice seed multiplication program. Such inconsistency of policy appears irrational, and in any case forces the agricultural merchant to increase his margins to cover his fixed costs on a low turnover.

The supply of veterinary medicines is also in the hands of various people, with the recent entry into the system of the Union National pour la Promotion d'Elevege (UNAPEL). This is an association of livestock producers, run by a consortium of PVOs which proposes to set up a distribution network. Currently they handle the imports of veterinary medicines brought in under A.I.D. funding, breaking the drugs down into quantities appropriate for small-farmers. Ultimately, it is intended that they will do their own importing. Currently there appears to be little liaison between this group and the agricultural merchants.

In the main, farmers produce crops either from seed they have

saved themselves or from seed bought from a local source. There are also, apparently, some imports of seeds, mainly from the USA. Under the Title III program, an improved seed multiplication program is being funded using a private company to multiply the stock seed produced on the MARNDR farms under a contract with the Faculty of Agriculture and Veterinary Medicine. Work on adaptive research is being conducted by the Faculty in conjunction with CIMMYT.

Recommendation:

Since there appears to be a relatively well developed private sector agricultural input marketing system, the MARNDR and parastatal organizations should be encouraged to withdraw from such activities. Should subsidized inputs be considered desirable, methods should be explored which channel them through the commercial channels. The practicality of supply cooperatives should also be explored.

2. Farm Machinery

Haitian agriculturalists rely largely on hand tools most of which, it seems, are imported. The use of animal traction is limited, largely by topography, but also by the size of the cultivated plots and because these plots are widely scattered. Some manufacture of animal-drawn implements was seen but on a small-scale artisanal level, even though the workshop had been established two generations ago. Mechanized cultivation appears to be limited to larger landowners or some contract operations. Farmers whose land could lend itself to animal traction are said to feel this is "backward" and would wish to have tractors instead if they could afford them.

CHAPTER VII

MARKETING

A. Two Distinct Marketing Systems

In the most general sense, marketing can be defined as the process of coordinating the exchange of resources, goods and services. In an efficient marketing system, the price mechanism tends to regulate the communication of information, resources and manpower in such a way that demand and supply are matched and can influence each other in a continued corrective action. In the Haitian agricultural economy we observe two distinct marketing systems, each of which has its own efficiencies and inefficiencies. One system specializing in export crops (see Figures VII-1 & 2), was studied in the 1970s and 1980s, and has been reasonably well documented (e.g., by Girault, 1981; Capital Consult, 1983; and Seguino, 1985). The second system handles agricultural produce for domestic consumption and has become known as the Internal Market System. After pioneering anthropological studies in the 1950s (Mintz, 1956), this system was thoroughly documented by the Instituto Interamericano de Cooperacion para la Agricultura (IICA) in the 1970s. Since the IICA publications and the economic analysis by Roe (1978), however, subsequent documentation of the internal market system has been lacking. Adaptations of this system to the recent demographic explosion, massive imports of food grains and other major changes are, therefore, basically not known. Our theoretical understanding of how foodstuffs reach the Haitian consumer is thus largely dependent upon old analyses and outdated information. This section of the report concentrates much more on the internal market system than on the marketing of export crops since the latter is both less complex and much better documented. It is important to note that the separation between the two systems is nearly complete in terms of intermediaries, storage, transportation and virtually every other aspect of marketing.

B. The Internal Marketing System

1. Functions

The internal marketing system fulfills a multitude of functions for the Haitian economy. The most basic of these are discussed below.

- a. Bulking of merchandise produced by small dispersed production units is the first link of the marketing chain. A variety of intermediaries fulfill this function, including the madam sara. These travelling women maintain regular social and economic relations (pratik) with producers, and they buy both large and small quantities of a limited number of products for urban markets. It is extremely rare to see even one small truckload of any single product.

FIGURE VII-1
THE INTERNAL MARKET SYSTEM

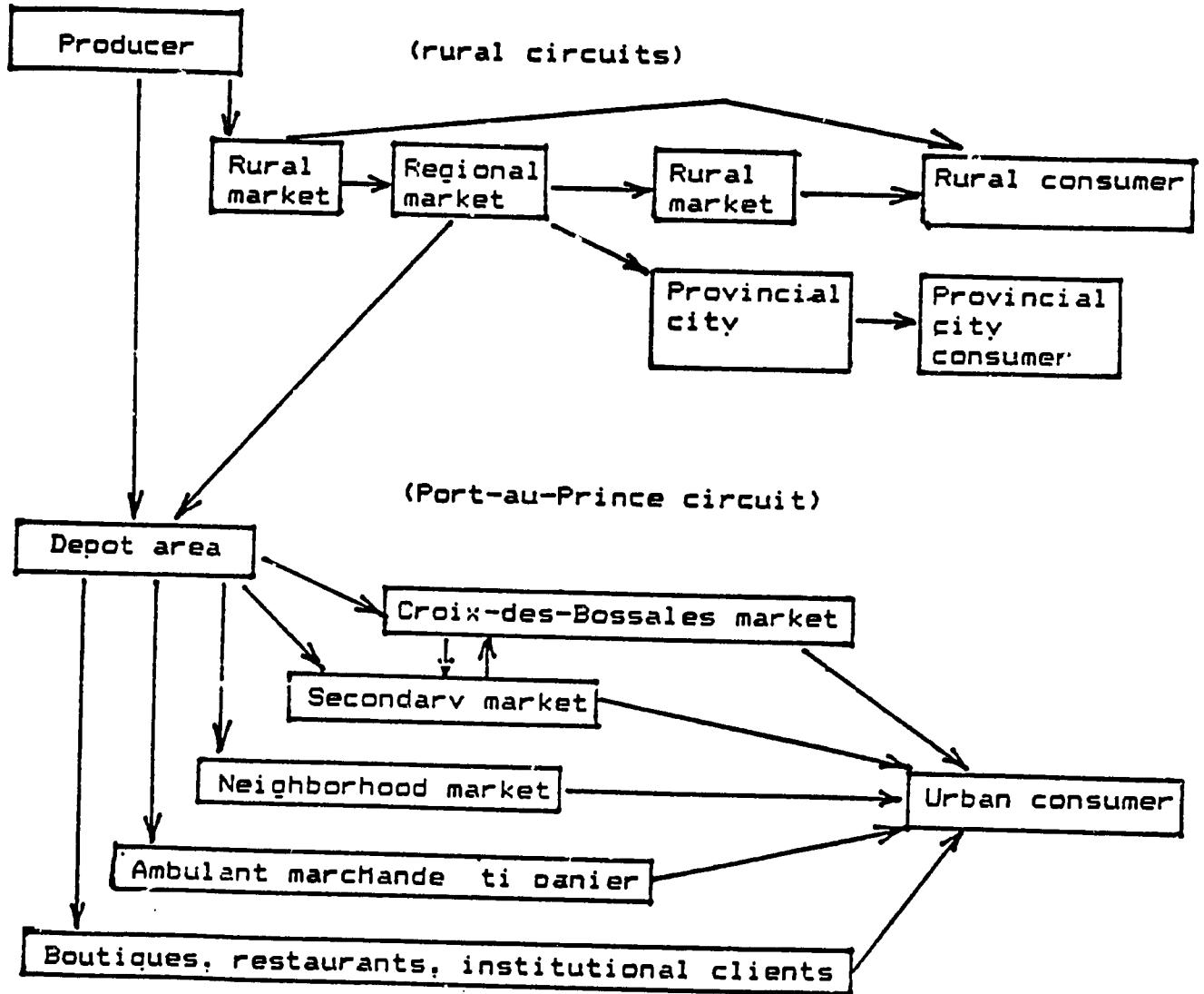
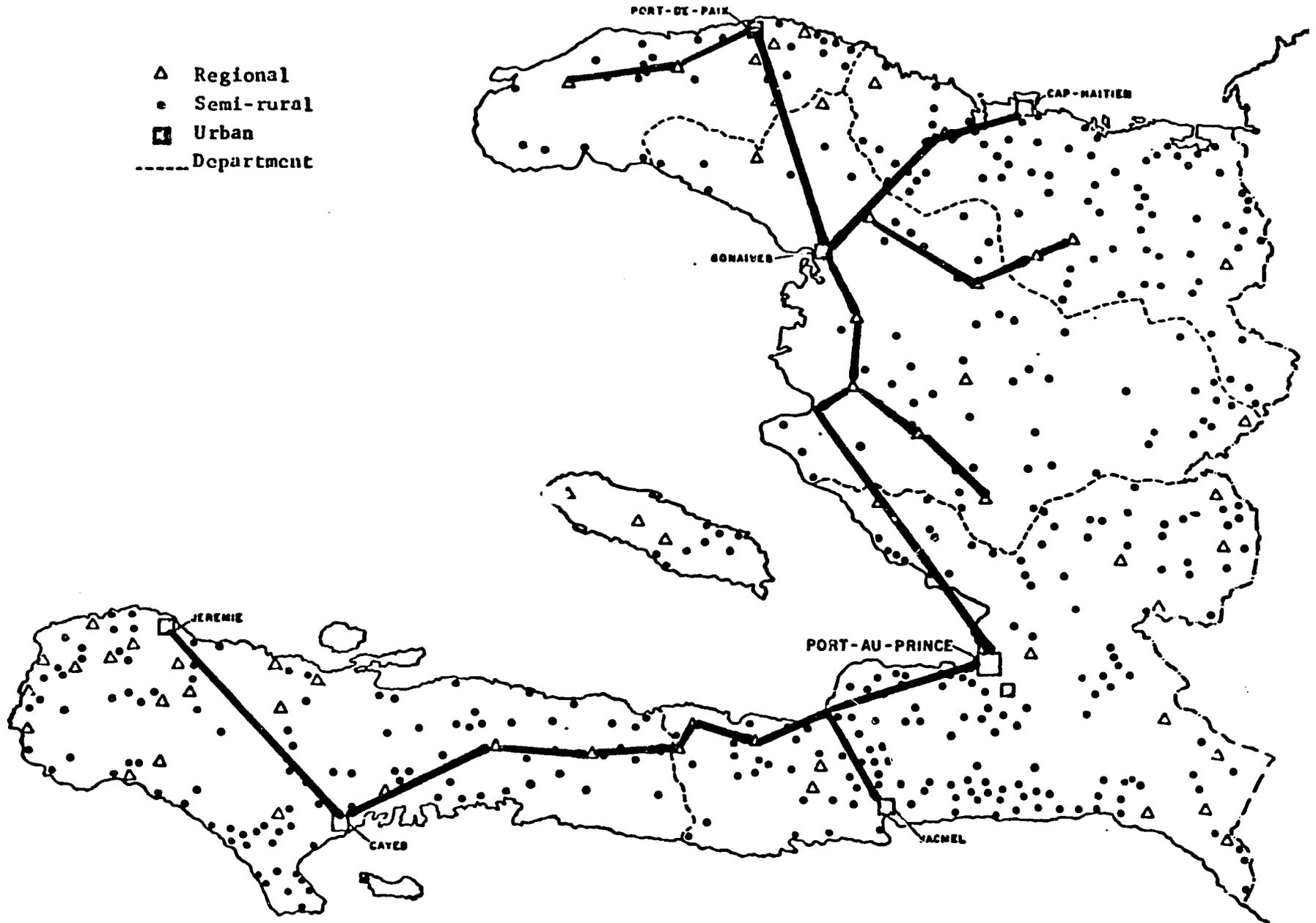


FIGURE VII-2
ROADS AND MARKETS IN HAITI



- b. Bulkbreaking takes place in three locations: the "depots" surrounding some urban markets; the wholesale area of Port-au-Prince where trucks unload; and a very small number of regional markets surrounding Port-au-Prince, such as the markets of Leogane and Croix-des-Bouquets. Most of the merchandise passes from the travelling madam sara to the urban-based marketwomen (revendeuse) and to the retail outlets at the depots.
- c. Long distance transportation is carried out almost exclusively by truck. In the vicinity of the largest cities, smaller camionnettes are also used. Very few products are ever transported by boat, and these include bulky low-cost items such as charcoal, salt and coconuts. Much of the transportation to rural and regional markets is accomplished on animals and human heads. Within the city, most produce travels by camionnette, brouette carts, taxis and, again, on the heads of porters.
- d. The credit function is an integral part of the internal market system and is probably its least known aspect. Many madam sara extend both long-term and short-term credit to farmers as well as to urban based revendeuses. Depot owners, on the other hand, reserve their credit exclusively for urban intermediaries and, occasionally, madam sara. Informal credit by marketing intermediaries is probably the predominant form of credit in the Haitian peasant economy. Interest rates vary greatly but they are never much less than 10% per month and frequently reach 10% per day in the case of urban based marchandes.
- e. Communication in the internal market system is not limited to economic information. Since this system is the only institution spanning all of Haiti and reaching even its most remote mountainsides, it plays a predominant role socially, economically and politically integrating Haiti. A key aspect of this integration is the orientation of peasant production to the needs of the urban consumer. There are no solely subsistence dependant peasants in Haiti; all producers are market-oriented. Because of their need for cash to procure important components of nutrition (oil), personal hygiene (soap), clothing and economic activities (tools), peasants are in no position to refuse the demands of the urban consumer. The pricing mechanism of the internal market system is what communicates and mediates between the two.

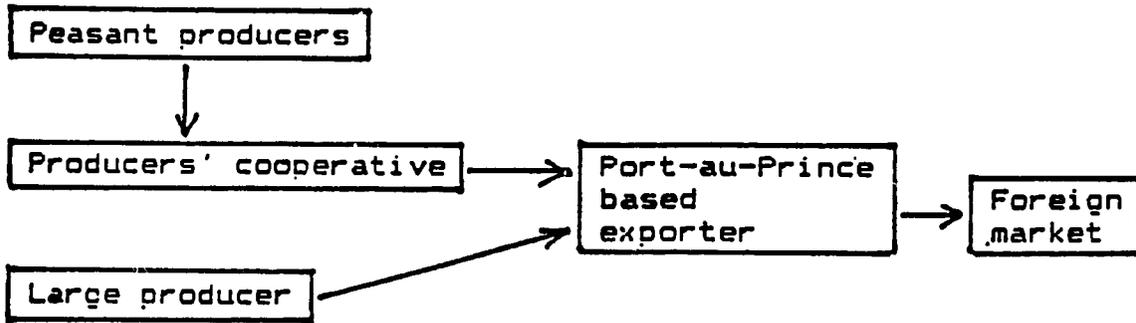
2. Components

Figure VII-3 gives an overall perspective on the system. The key components are local markets, storage depots, transportation facilities and retail outlets. Each one of these employs a mul-

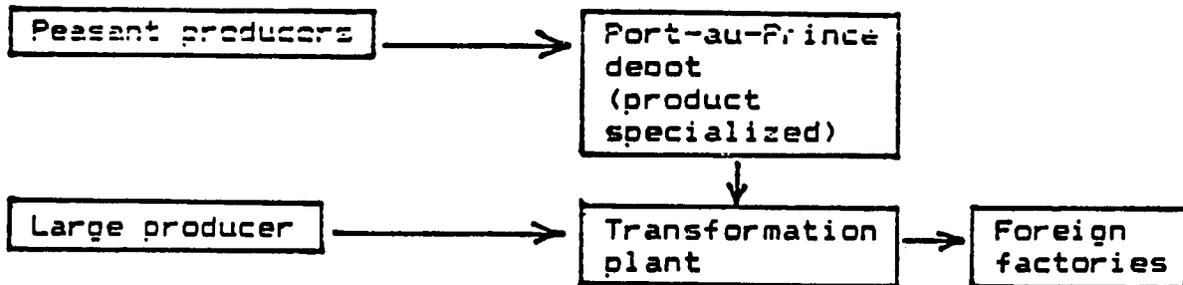
FIGURE VII-3

MARKETING CHANNELS FOR EXPORT CROPS

Model 1: Marketing involving minimal local transformation
(example: mangoes)



Model 2: Marketing involving local transformation
(example: limes)



titude of individuals in a variety of roles. The abundance of cheap labor and entrepreneurial individuals, and the pronounced decentralization of the system results in a superficial impression of great disorganization in the eyes of the casual observer. In fact, there is a high level of organization and integration in the system and all attempts to introduce significant changes by government interventions have so far failed quite miserably.

The markets of Haiti have never all been counted and put on a map. One study documented an estimated 70% of all markets (LaGra, Fanfan and Wesner, 1975); it counted 426 "semi-rural" markets, 59 regional markets and 34 urban markets. All of these markets handle a wide variety of products but there is some specialization in response to regional production characteristics. For example, there are the cattle markets of Chantal and Leogane, the plantain market of Arcahaie and the mango market of Gros Morne. The number of intermediaries buying and selling on these markets is not known; the government's system of registration and taxation has always been haphazard and incomplete, and licenses are required only of the madam sara.

There can be no doubt, however, that marketwomen constitute the second largest occupational category in Haiti, right after farmers. Moral (1959) estimated them to be around 50,000 in the 1950s and Port-au-Prince alone had close to 20,000 in 1973 (Locher, 1973). Most of the intermediaries operate with very little capital, in many cases not exceeding \$10, but some of the madam sara have many thousands of dollars of capital and earn good incomes. Most of the products of Haitian agriculture are not marketed by the producer (male or female). Even if a man's crops are marketed by his wife, her business is independent of her husband's, and she buys the crops from him.

Urban markets have been studied only in the case of Port-au-Prince. This city has one enormous central market (Croix-des-Bossales) which serves both wholesale and retail functions; three secondary markets (Vallieres, Salomon and Cinquieme Avenue); and, on average, one neighborhood market per 25,000 inhabitants. Most of the markets are simply street markets, with between 40 and several hundred sellers; very few markets have even a minimum amount of accommodation and services to offer, such as roofs, stalls and night-time supervision. In terms of density of sellers, quality and variation of produce and services, the Port-au-Prince markets are faithful reflections of the socio-economic status of their neighborhoods. Price variations have rarely been studied.

The depots surrounding and partially penetrating the wholesale marketing area play a significant role only in the case of the capital city. No other city has a significant depot area and even in Port-au-Prince, secondary markets have no depots. Most

of the produce arriving in Port-au-Prince by truck is distributed and stored in a relatively small area comprising many dozens of depots: the 1973 study counted 145 of them. The chief function of the depot is storage, but bulkbreaking and transformation are also important. Depots are a focal point for madam sara, offering them sleeping facilities (on top of their bags) and social contact in addition to opportunities for storage and economic exchange. In most cases, the women pay not for volume stored or time of storage, but a fixed fee each time they access one of their bags. This encourages them to keep the largest possible volumes out on the streets where the potential for spoilage is much greater than inside the depot. Some depots appear to permanently specialize in only one or two products. Such is the case with some grains--the depot owner may have an electric corn mill--and with coffee and limes, the bulk of which are destined for export. Pratik relationships, credit, and mutual trust are critical for both depot owners and their clients, the madam sara. Since a madam sara can usually only maintain regular ongoing relations and pratik with producers in a single region of the country, the depot owner and all his clients usually originate from the same region and do business only within that one region. Hence, the appearance of product specialization in depots; however, this is, more accurately an expression of the harvest time for a given product in a given region.

Transportation from farm to rural markets usually takes place on donkeys and mules. From there to the city, transportation is by truck. In 1973 it was estimated that a fleet of some 300 trucks made 750 trips per week to Port-au-Prince, carrying, on average, 840 madam sara per day with their merchandise. Since then, the population of Port-au-Prince has more than doubled and the agricultural produce carried to the city has certainly increased correspondingly. There is still no wholesale market as such (a World Bank project to that end was aborted in 1986²⁸), nor is there a clearly defined arrival area for trucks coming in. However, the expansion of the Croix-des-Bossales market, the completion of a generously-planned boulevard paralleling it and the general congestion of the downtown area have led to a much wider spread of truck stops and depot areas.

Other formal retail outlets such as the hundreds of small stores (boutiques) and the approximately two dozen supermarkets also play a role in the distribution of agricultural products in the capital city. However, their specialization and volumes have never been researched. Nor do we know much about the numbers

28. The World Bank cancelled the project because the land that was to be used for the proposed sites was ostensibly occupied by others. The question of markets is currently under examination and AID cooperation would be welcome.

and/or functions of the thousands of marchande 'ti panier' — those girls and women carrying their wares up and down the streets of every Haitian city and selling directly to consumer households and institutional clients.

3. Efficiency

The fact that the internal market system is efficient in distributing produce, integrating regions of production and consumption, performing a variety of functions necessary for both producers and consumers and adapting to changes in the Haitian ecology, economy and demography is beyond any question. The wholesale/retail comparison of prices as well as the comparison of production costs on the farm and of the consumer price in rural and urban areas, show that marketing channels are reasonably efficient. Where researchers have calculated the margins of intermediaries, they have usually come to the conclusion that they are low in absolute terms, but especially low in terms of the operating risk of marketwomen. On a different level, however, the system is far from efficient. The cost of transportation is still very high, the absence of grading and adequate packaging increases post-harvest losses, and there appears to be no incentive for any of the intermediaries—with the exception of truck owners who are also mostly successful market women—to modernize the system. There is no pest control, refrigeration, formal credit, or quality control, and an almost total absence of even minimal standards of hygiene. Relative to other food crops, food grains are easy to transport and store, suffering least from the inadequacies of the system once off the farm. For most other products, spoilage in marketing is high, although not entirely out of range compared to losses occurring on the farm.

4. Recent Adaptations

Some recent adaptations of the system deserve to be mentioned. In the ten years since the completion of the last solid empirical studies of the internal market system, the Haitian road system has been improved enormously by the completion of roads to the North, the South, and now even Jeremie. More vehicles can make significantly more trips per week and produce spends much less time in transport, once it has reached the new feeder roads leading to the major arteries. Both transportation costs and spoilage have thus been reduced. Another change is the rapid growth of population and institutions in the capital city. This has facilitated the use of larger trucks and a decrease in the ratio of human weight to produce. In the 1950s it was estimated that human weight frequently exceeded the weight of produce being transported over Haitian roads because the conditions of transport, security and credit made it necessary for madam sara to make frequent trips with relatively small loads. In 1973 it was estimated that the weight of produce must have, on average, exceeded the human weight by a factor of three. Today impres-

sionistic evidence suggests that this factor has risen closer to six.

Without any direct government intervention or subsidy, Haiti's internal market system has been able to work out some of its previous inefficiencies. But the system is still very far from the point where the introduction of refrigerated containers would be feasible and a "modern" system could emerge. However, techniques employed elsewhere could be introduced to Haiti, e.g., adaptation of traditional containers to withstand motor transport, or low-cost vehicle body adaptations to allow air-flow across the produce via moist material. The farmer situated far from the market would then be at less of a disadvantage vis-a-vis the farmer whose produce has less distance to travel.

Recommendation:

That the post-harvest technology employed in Haiti should be the subject of a study, with attention paid to the cost/benefit (including employment effects) of any suggestions made. The study should include an examination of the curriculum for the course in post-harvest technology to be offered by the Faculty of Agriculture and Veterinary Medicine. Assistance to strengthen this course, if necessary, should be provided. The person engaged to undertake this study should have practical marketing experience in other Caribbean islands.

Since technical assistance on cereals storage is already being financed under the assistance program to the Agricultural Producer's Association, the most obvious first commodities for study would appear to be meat, fruit and vegetables.

C. Marketing Channels for Major Export Crops

Traditionally, in order of dollar value of exports, the most important Haitian agricultural export crops have been: coffee, sugar, cocoa, essential oils (vetiver and lime) and sisal (see Table 19 in Chapter I).

1. Coffee

Coffee continues to be the major agricultural export, but it too has experienced a decline in recent decades. There has been a considerable debate over the role of monopolies in coffee marketing, with Girault (1981) arguing that market imperfections constituted a serious disincentive to coffee growers while Delatour, Lundahl and others have taken the opposite position (Capital Consult, 1983; Lundahl, 1983). There has also been debate over the role played by export taxes as disincentives. The coffee tax has been reduced from 26% in 1984 to 19.5% and is now in the process of being eliminated completely, but it remains to be seen how much this will stimulate production (see

Seguino, 1985, 1987).

The major disincentive for coffee production at this point appears to be neither the presence of monopsonies among exporters nor the tax. A look at "agricultural prices deflated by consumer price index" over the 1978 to 1983 period shows that while prices for rice and beans remained stable and corn prices have increased, coffee prices declined steeply over the five year period (Seguino, 1985: 4, see also Tables 16, 17 & 18, Chapter I). At the farm level, coffee has thus been losing out in the competition with food grains and other crops. Fluctuations in the volume of exports are not only related to export prices and marketing characteristics but also to local market demands for domestic food crops. The rapid population increases, urbanization and the concomitant increases in demand of foodstuffs have led to predictions for further declines in export crop production (The Futures Group, n.d.).

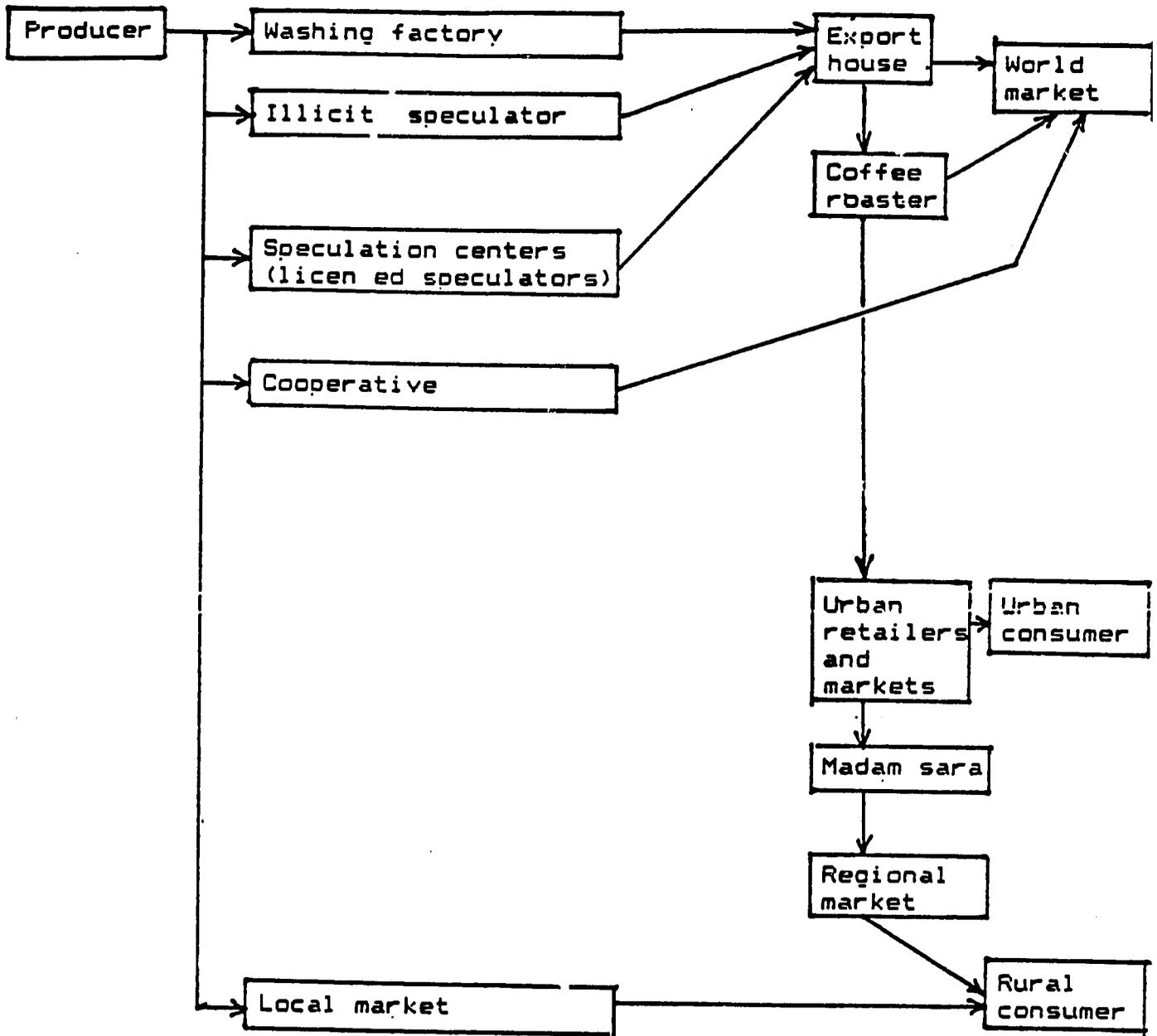
An entirely new element has been introduced with the collapse of the Duvalier regime in 1986. The limitation of food grain imports up to that time had constituted a protection of local grain prices from world market competition--a de facto subsidy for locally produced grains. With the opening of the borders to massive contraband imports, consumer prices have been cut in half and sometimes even more. One marmite²⁹ of the best locally produced rice which used to sell for 18 gourdes is now going for 7 gourdes on the urban retail market. This might be seen as a stimulant for increased coffee production. However, within the risk structure governing peasant production, it is not at all clear whether the newly re-established ratio of coffee to grain prices will lead to an expansion of coffee production. Planting coffee trees means foregoing income from other crops for several years before coffee earnings become substantial. A lack of savings may well prevent most farmers from reverting to coffee now.

In Haiti, coffee is basically a crop grown by peasants with small holdings. With the exception of one large producer in Thiotte, there are hardly any plantations exceeding 10 hectares. It has been estimated that some 180,000-384,000 farmers produce coffee and that very few of them have coffee as their only major crop. The USAID Coffee PID prepared in 1987, suggests a figure of 200,000 growers.

The farmer principally has five choices in selling his coffee (Figure VII-4). In sequence of estimated volume handled there are:

29. A marmite is a local volume measure. For paddy rice it would contain approximately 6 pounds.

FIGURE VII-4
COFFEE MARKETING CHANNELS



- (a) Coffee can be sold on the local market for local consumption. Due to stagnation of coffee production and population increases, the share of coffee going to the local market has increased dramatically and may now be over 50%.
- (b) A small number of speculation centers are the places of operation for licensed speculators and speculator agents. Licensed speculators can be found in every village in the major coffee areas.
- (c) Illicit speculators feed into the speculation centers. Although collected without licenses and taxes, their coffee becomes part of the volume destined for export and, hence, of a stream which is to some extent measured and controlled.
- (d) A number of washing factories operate independently from speculation centers. They are most often owned by the major coffee export houses.
- (e) There are the fledgling cooperatives which take a hard stand against the major vested interests. At this time, none of them would seem to be able to hold their own should foreign donors decide to withdraw their support. AID is currently reviewing a PID for continued support to the coffee cooperatives.

The small number of exporters, mostly based in Port-au-Prince (and several of them linked by family ties) constitute one of the bottlenecks in coffee marketing. Many of the speculators and speculation agents are in fact agents of the export houses. It appears that competition among speculators is limited in several ways and price fixing seems to be widely practiced. Since peasants frequently cannot choose between speculators because their credit need ties them to only one--the speculator system has the effect of leaving producers with the smallest share of the profits made from coffee. The introduction of cooperatives has changed this to a certain degree in favor of peasant producers. There is good evidence to document that cooperative organization leads to a significantly higher pay-off from coffee for small producers--both for cooperative members and the wider community attracted by the presence of a cooperative (Seguino, 1985 & 1987).

The marketing system for coffee is the most complex among the export systems. Its particularly complex features stem from the process of transformation coffee has to undergo before export, as well as from the co-existence of internal and export marketing of coffee.

2. Sugar

Sugar has traditionally been the most important crop in Haiti. During colonial times the industrial transformation of sugar was one of the principal reasons that St. Domingue was the richest French colony by the end of the eighteenth century. Following independence, the sugar factories were destroyed and the large cane plantations were broken up. Production of sugar disappeared and Haiti imported its needs.³⁰ By the end of the nineteenth century production had resumed but exporting did not recommence until the advent of the Haitian American Sugar Company (HASCO) in the 1920's. The country has not exported any significant quantities of sugar since 1980 due to a growing domestic demand and a stagnation of output.

Today, a critical point has been reached--where the cost of sugar produced in Haiti is considerably higher than the world price--and sugar is being smuggled in at prices below the government price. Stocks of unsold sugar are building up, as are costs to the government. The total picture is not known but the Usine Sucrierie du Nord (USN), the major shareholder of which is the Banque Nationale de Credit (BNC), has 90,000 hundred pound sacks of unsold sugar from 1986 in stock and produced an additional 148,916 sacks in the 1987 campaign. The cost price of the sugar was \$22.43 and \$26.03 per 100 lb sack in the two years respectively. In addition the cost of warehousing is figured at \$300 per month, security staff at \$3640 per month and interest charges are 14% per annum for the 1986 production.

The position can be little different for the other refineries. For the farmers the implications are serious since Haitian sugar refineries rely principally on small farmers to supply them. In the case of the USN, the total number of farmers was unknown but the area of cane was estimated to be on the order of 4,000 ha and the area of individual holdings was on the order of 25 carreaux (32.25 hectares) according to the personnel of the USN. Delatour, in 1983, reported some 3,500 farmers to be supplying the Dessalines mill in Les Cayes.

The implications for the small farmers should the sugar refineries cease operations, (as it seems they inevitably must), are very serious. The value of cane sold to the mills at current price of \$13 per ton gives the farmer a net of about \$10. Delatour (1983) noted that only HASCO paid transport costs from the buying stations to the factory. Delatour calculated that the farmgate price was \$8.92 in Les Cayes, and no more than \$10.40 to \$11.00 in the north. Using the average cane ground by the factories over the 1970 to 1982 period of 746,000 tons, farmer losses are estimated at \$7,460,000. They will not lose

30. But probably only to a limited extent. The local "raw sugar", rapadou seems to have met the major share of the demand during the 19th century. See Chapter III, Section A.5.a.

their entire market, since a proportion of the sugar crop finds an outlet through the clairin factories. Delatour reported clairin demand to account for some 60% of the total cane output, but the removal of the guaranteed price of \$13.00 per ton of cane for sugar production (of whatever quality) at the refineries is likely to reduce the price paid for cane for clairin production also. The price of cane for clairin production is reported by the World Bank to be \$7.00 per ton. It is interesting to speculate whether a flood of cheap clairin will be released onto the domestic market.

3. Sisal

Roe reported (1978) that the export of raw sisal from Haiti began in 1920 with the establishment of the Crooks and Dauphin plantation companies. Production was stimulated by World War II and the Korean War. Sisal production peaked at about 40,000 tons in 1958, declined during the 60's, and dropped to 10,000 tons by 1975. Roe quotes Fatton as estimating the area of sisal at 16,850 hectares in 1975, with six plantations accounting for 7920 hectares, and of this the Dauphin estate had 6,000 hectares. The balance of the area was made up of small producers.

Exports have declined from 12,000 tons in 1974 to about 3,000 tons currently. The World Bank reports that the domestic market consumed 67% of the sisal sold from 1970/71 to 1979/80. Exports of raw sisal have gone increasingly to the Dominican Republic and Puerto Rico, rather than to the USA which was Haiti's major customer. The fact that nowadays countries are turning more and more to processing their own production puts Haitian raw exports at risk. There has, however been an increase in the export of finished products and handicrafts.

There appears to be a market for sisal albeit not on the scale of the past as the domestic trading network is in place and the crop grows on inferior lands. The comparative advantage for its production probably lies with the small farmer now that the large-scale market has been taken over by synthetics.

4. Cocoa

Like coffee, cocoa is grown on small plantations estimated in the Le Borne area as 0.75 hectares, in Port Margot as 0.48 hectares, and in northern Haiti at 1.46 hectares.

Cocoa marketing has traditionally been done through a very small number of exporters who used the speculator network as their collection agents. A new element was introduced into the market with the Mennonite Economic Development Associates (MEDA) who began a cocoa marketing center in Grande Riviere du Nord with the help of funding from C.I.D.A. (Canadian) in 1983. In 1984, A.I.D. gave a two year grant for an additional six centers. The

centers are run along the lines of a cooperative, with membership open to anyone, irrespective of the size of their cocoa holdings. A 1985 report indicates that the democratic control of the cooperatives is not well developed yet, being characterized by office-bearers who are teachers, businessmen, notaries, etc. On the other hand, it could be argued that it is normal in any society that associations will be dominated by their more educated and articulate members. However, the existence of the cooperatives and the fact that they buy for cash has stopped the local speculators from buying with promissory notes instead of cash. An extension service is providing technical advice to members. Of interest is the participation of speculators as members of the cooperatives and the judgment that they have contributed to the success of the cooperatives with their business knowledge. Their cooperation in making a success of the organizations, rather than competing with them, bears out what Roe said in 1978 with regard to the desirability of the coffee cooperative movement working in cooperation with the exporters rather than in competition.

5. Essential Oils

Essential oil exports have declined of late years from a high in the late 1970's. The main essential oils produced for export in Haiti are vetiver, lime and amyris. According to Delatour (Delatour, 1983) essential oils production and export are relatively recent. Exports amounted to \$1,431 for 555 kg in 1932-33, rose to \$615,600 on 84 tons in 1950, reached 394.4 MT in 1976, worth over \$8 million, before declining to 215 tons for \$5.1 million in 1982. Apparently in earlier years Haiti exported petit grain, neroli, and sweet basil, but currently it only exports lime oil, vetiver oil, amyris, and a small quantity of bitter orange. According to Delatour, Haiti is the only producer of amyris, the largest producer of vetiver, and the second largest producer of lime. Delatour claimed that the major factor in the decline has been the fall in price, but that there has also been some reduction in production. The American market for essential oils has contracted, and Haiti has found itself in competition with China and Indonesia. The former supplied at prices well below those of Haiti, and the Indonesians appear to have had a targeted marketing strategy which sold to the American market at prices below those for other buyers. While Haitian essential oils are considered to be of higher quality they nevertheless lost ground. Delatour criticized the pricing policies of the Office de Commercialization des Essences Aromatiques d'Haiti (OCEAH), the sole seller facing one major buyer in the US, in attempting to maintain high prices in the face of a weakening demand and price cutting competitors. Contrary to the view of the 1982 Food and Agricultural Sector Analysis team, Delatour did not consider that the tax structure had had a disincentive effect, on the basis that a reduction in tax levels had not brought corresponding increases in produc-

tion. Delatour defended the need for a body to handle marketing in the face of one major buyer. It appears, however, that the processors have no voice in the operational decisions of the marketing board. This, and the capability of the board to monitor international trends, as Delatour suggested, would appear desirable.

Prices paid to the farmer for vetiver roots were put at 5 cents per kilogram and factory prices were about 8 cents in a report by the FAO in 1971 while Delatour puts the factory price at 13 cents per kilogram in 1983 which, if the same marketing ratio remained, would put farmgate prices at 8 cents per kilogram. Thus, on a yield of 1.5 tons per hectare gross output is some \$120 per hectare.

According to Delatour, lime oil production began in 1938 with commercial export beginning around 1941-42 with 2,396 kilograms shipped for \$26,467. Oil is extracted by steam distillation of lime juice that has been obtained by crushing and grinding fresh fruits. Lime oil exports have been somewhat unstable over the years, with a peak in 1974 of 139,299 kilograms and a dip to only 47,374 in 1981 (Table 59).

Prices paid by the processors were estimated at 3.57 cents per kilogram in 1970, and 5 at cents in 1982.³¹ According to Delatour, this constituted 85% of the processor's cost of producing oil. One reason for this is that the energy costs are much lower than for vetiver. Processing time (combustion time) is only 6 hours for lime as opposed to 36 for vetiver.

If the same marketing ratio pertains to limes as to vetiver, then the farmgate price was about 3 cents, a gross return of \$600 per hectare.

Exports of amyris oil averaged 21,688 kg from 1950 to 1954, rising to an average of 32,341 kg between 1955 and 1959, with exports recording an increase of 69% for the 1960-1964 period and another 72% during the 1965-1969 period over the previous period (Delatour, 1983). This has been followed by a continuous decline.

It seems that the producers of the oil in Haiti control output of the product to maintain prices at a high level, something they are able to do as Haiti is the sole producer of the product. In the 1950-54 period, price was \$2.45 per kg, dropping to \$1.90 in 1955-59, to \$1.83 in 1960-64 and to \$1.71 in 1965-69. Prices rose rapidly after this to \$9.15 per kg in 1975-79, and as high as \$15.90 in 1982.

31. \$0.50 and \$0.70 per 14 kg tin in 1970 and 1982, respectively.

TABLE 59

U.S. ASSISTANCE IN HAITI, MAY 1987

AID Budget: 1987 - \$100 million
 1986 - \$ 79 million (including \$30 million in emergency aid
 committed after February 7, 1986)
 1985 - \$ 53 million

Donated food to be distributed by voluntary agencies:
 (PL480 Title II) = 31,000 tons (\$7 million)

Number of people who receive food: approx. 500,000
 (375,000 school children)

Number of voluntary agencies receiving U.S. Govt. support: 400

Trees planted per year under AID-funded projects: 7 million
 Survival rate: 50+%

Trees planted to date under AID-funded projects: 26 million

Number of pigs distributed to date by AID-funded project: 27,000
 Number of pigs to be in peasant's hands by Sept. 1987: approx. 100,000

Number of child deaths from diarrhea prevented in 1986 by
 AID-funded health projects: 6,000

Number of jobs created in assembly sector industry in 1986 under
 AID-funded projects:
 2,000 - 3,000 (Each job supports on the average 5 people.)

Number of people sent oversea for AID-funded training in 1984: 92
 1985: 105
 1986: 110

Number of schools built under AID-funded project in 1984: 5
 1985: 11
 1986: 10

Number of kilometers AID-funded roads built in 1985: 39
 1986: 98
 (projected) 1987: 153

Number of kilometers AID-funded irrigation canals built in 1985: 21
 1986: 17
 (projected) 1987: 24

Number of hectares of land irrigated under AID-funded projects:
 approximately 5,000

Number of Peace Corps volunteers: 24 in Agriculture
 13 in Health
 8 in Education

Bitter orange is apparently a very small specialized export product controlled by two plants. Delatour reports that one plant, Marnier L'Apostole, is a wholly owned subsidiary of the buyer and the fruit is grown on its own small plantation. In the second case the Haitian producer, Guacimal, has a long-term contract with Cointreau and grows its own supplies on a 100 hectare plantation.

D. Marketing for Domestic Consumption

Coffee marketing is a process of concentration; coffee has to reach its foreign destination through a very thin funnel — the export houses. Grains and beans (Figures VII-5 & 6) start from an even larger base of producers than coffee but are never concentrated on their way to the consumer. Competition in the internal market system is fierce and general. The impact of demand fluctuations tends to reach producers very quickly and the margins of intermediaries in the final retail price are much smaller than in the case of export crops. Other striking differences between the two systems are that the internal market system is dominated by women, is undercapitalized at every level and is inefficient in preventing losses due to spoilage while the export system is run by men, adequately capitalized and virtually free of spoilage in transport or storage.

Neither the volumes nor the marketing channels of contraband grains are really known at this point. Much of it ends up in the depot area and on the central market of Port-au-Prince, but significant quantities appear to go directly from ports of arrival (e.g., Petit-Goave, Gonaives and Port-de-Paix) to inland regional markets. Some institutional clients, shop owners and even wealthy households appear to find it worth their trouble to pick up contraband grains directly at the port of arrival, but this cannot possibly account for a very large proportion. Overall, the internal market system has adjusted smoothly to this new situation. However, there is some evidence that it is not the traditional female intermediaries who are handling the contraband grain, so that income loss per rural family may be doubled--the producer doesn't sell maize and the marketer doesn't make a margin on maize or contraband grain.

The marketing of meat in Haiti is in some ways similar to the marketing of coffee, in that there are two subsystems operating: one leading to a modern meat packing plant (the Haitian American Meat Packing Company, HAMPCO) and from there to supermarkets, institutional outlets and export; the other being the same internal market system as described above. In terms of volumes, the traditional system handles vastly more than the modern one, but meat quantities are hard to estimate.

Meat products form a regular part of the diet of many Haitians but the quantities consumed on average are minuscule. Nutrition studies generally estimate that only about 70% of the population's protein requirements are actually being met. Several recent observers have

FIGURE VII-5

FOOD GRAIN MARKETING CHANNELS

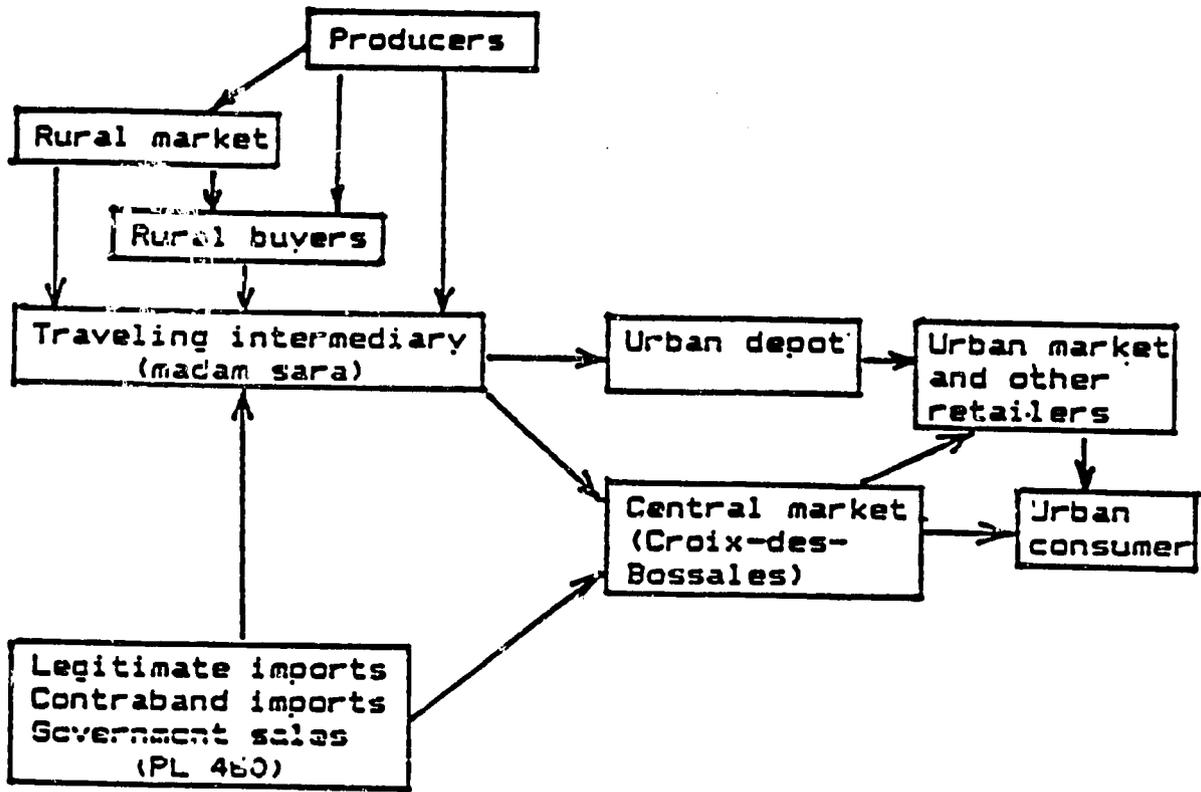
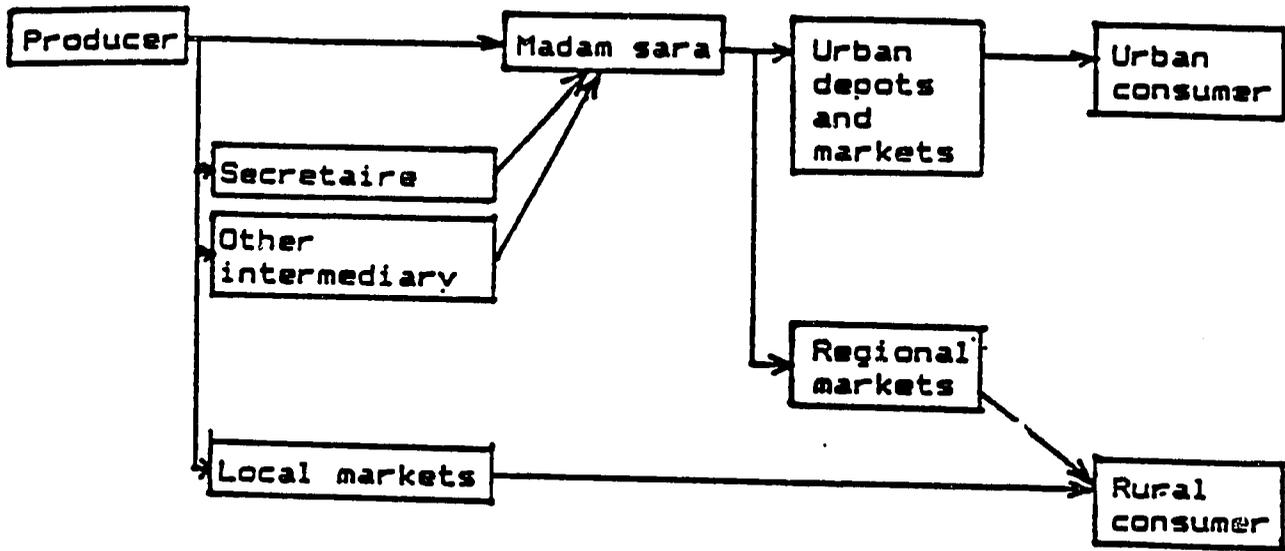


FIGURE VII-6
BEAN MARKETING CHANNELS



pointed out that meat production is among the least developed sectors of Haitian agriculture. Animals forage for available feed, often restrained by ropes attached to trees and stakes, thereby limiting their grazing area. Malnutrition in animals is widespread. However, the picture is not universally bleak. Animals which have survived under Haitian conditions of breeding and raising, have evolved over time into disease resistant strains. One specialist stated recently that changes in foraging patterns and nutrition alone could significantly increase meat production in Haiti, without any introduction of superior foreign breeds (Treadwell, 1986).

African swine fever decimated the pig population in the early 1980s, leading to an eradication campaign financed by USDA, Canada and Mexico. The campaign completely eliminated the traditional Haitian pig (Cochon planche) and then introduced new pigs, mainly from the U.S. (Cochon grime). The new breed has much potential but it must be realized that achievement of this potential requires knowledge of techniques for care and feeding which Haitian farmers are not yet familiar with. Some of these new pigs have now started arriving in the marketing channel and evidence so far suggests that pork will continue to be marketed in the traditional way.

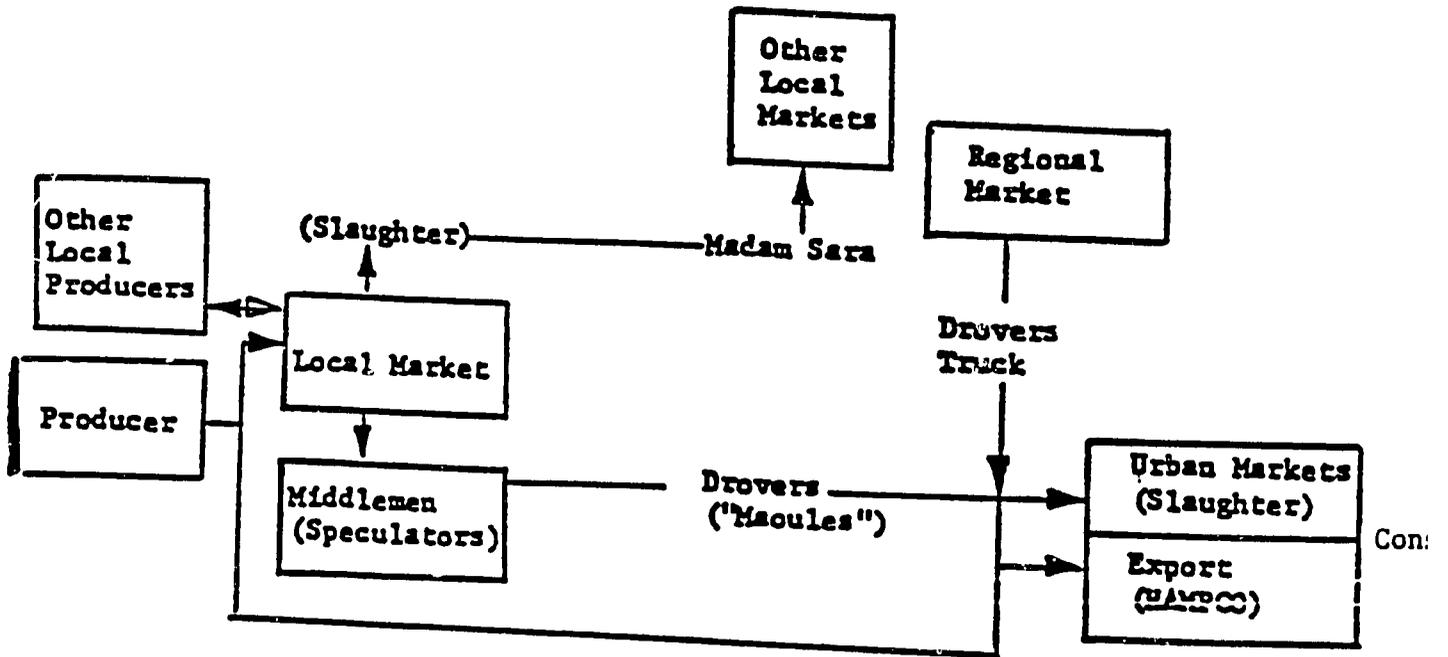
Figures on animal holdings are among the least reliable of any figures in the census and similar large scale household surveys. Farmers' reluctance to disclose their holdings leads to serious underestimates of the animal population. The best estimates at this time are given in the Livestock section of this report.

As is evident from Figure VII-7, farmers generally select one of the following alternatives for the marketing of animal products:

1. Sale of the live animal on the local market, assuring a quick return in cash and a low level of risk;
2. Slaughter at the farmer's home and sale of the meat there. Said to give a slightly higher profit (after remuneration of the ambulant butcher), this leaves the farmer with the risk of having to sell meat in large quantity fast, since there is no cold storage anywhere in rural Haiti;
3. Sale of animals to middlemen who accumulate larger quantities and arrange for trucking to the city; or
4. Arrangement for transport to and sale in the urban market by farmer himself.

For the latter two alternatives, drovers have traditionally been used to walk cattle over long distances to the urban market. Weight losses of up to one third for beef have been reported, for example, in the course of the 5 day walk from Les Cayes to Port-au-Prince. The recent improvement of the Haitian road system has changed this drastically; it has become rare to see large numbers of animals being walked to the

FIGURE VII-7
LIVESTOCK MARKETING CHANNELS



Source: Roe, 1978: 37.

capital city. Instead, it is now commonplace for urban buyers to arrange for transport by truck. Approximately 300 heads of cattle are estimated to be loaded onto trucks every week at the Chantal cattle market alone.

Meat is expensive and there seems to be very little wastage of meat products in the marketing process. However, there is a serious degradation of meat quality in the absence of refrigeration. When animals are slaughtered far from urban markets, only a small quantity of the meat is usually sold locally. The rest is bought by madam sara and transported on the usual trucks to the city where it will again spend many hours or even days in the retail market, exposed to sun, flies and other inappropriate conditions. There is no official grading practice for meat products, but informal grading does take place among retailers and madam sara, with the higher class markets and super-markets in the cities inevitably ending up with a better quality of meat.

E. Problem Areas in Marketing

Given the description provided above, we can summarize the key features of marketing in Haiti in the following way:

1. Marketing of export crops is relatively highly capitalized, has been improved in response to the needs and initiatives of exporters, and is organized in such a way that there are serious bottlenecks only in Port-au-Prince. These bottlenecks have caused oligopsonistic competition among exporters which resulted in lower returns for farmers. On the other hand, the bottlenecks have provided the government with the opportunity to collect taxes and, potentially at least, to render services. Also, bottleneaking implies a process of concentration which can lead to significant economies of scale which then in turn could be translated into overall increased market performance.
2. Given the existing marketing conditions, the internal market system allocates resources in the best manner possible. However, these resources are insufficient to induce improvement of the quality of the produce, or to handle greater quantities more efficiently. Any expansion in production always seems to lead to an increase in the marketing activities of increasing numbers of intermediaries, along with the negative aspects that this increased activity implies. Some of these negative aspects include: higher densities of retailers in congested areas of the cities; poorer sanitation and health conditions; more rapid deterioration of produce offered for sale or stored in depots; and an even deeper cleavage between the modernizing marketing system for export and the traditional internal market system.
3. One of the most important aspects of the internal market system is the integration of wholesale, retail, storage and credit functions. This integrated system has been developing over the

past 250 years. Attempts to change it have been futile, whether they concerned weights and measures, hygienic conditions, the location of retailers and wholesalers, the location and regulation of truckstops, the standardization of packaging or anything else. Practical attempts to improve the system, on the other hand, have frequently been successful. Where markets have been equipped with roofs, walls, stalls, night-time supervision, running water and the like, such facilities have actually been put to good use. Where improved slaughtering facilities have been installed in rural markets, they do not go unused despite the fees imposed for their use. The improvement of the major road from Les Cayes through Port-au-Prince to Cap Haitien has changed marketing methods--for example the trucking of cattle--but many areas are not served by good all weather roads. Where rural feeder roads have been constructed, transport costs have been reduced and spoilage has been brought down. It appears quite likely that further improvements can be achieved as long as modification of the existing system is done with the intention of providing services rather than imposing taxes and controls.

4. The most striking feature of the internal market system is probably the abundance of and intense competition between intermediaries. Since there is no lack of cheap labor and entrepreneurial spirit in Haiti, any attempts to limit the number of intermediaries in the name of modernization, be it by licensing or by directly undercutting their volumes and margins, are likely to be counterproductive. Many parts of the Caribbean have seen the creation, subsidized maintenance and inevitable demise of "Agricultural Marketing Corporations" and the like. No public servants have ever worked as hard and been as devoted and cunning as market women. The marketing system will be improved only if the contribution of these women is fully sought and used.

F. Market Development

A most urgent need in Haitian agriculture is the development of production systems to replace those on lands which will come out of sugar cane, and to provide more profitable crops than corn, and (especially) rice. This is of particular importance now that these crops are facing world market prices under the current laissez-faire attitude to contraband and the removal of import restrictions. The best hope for the farming community would appear to be the development of rural and urban-based agro-industry. This will inject cash into the rural economy and provide rural and urban jobs. This view coincides with that of the 1982 Food and Agricultural Sector Strategy which stated, "Dynamic growth of private enterprise--both agricultural and industrial--is fundamental to the accomplishment of the objectives envisioned by the strategy team: sustained and sustainable increases in the productivity and incomes of the Haitian peasants and urban poor leading to food and agricultural self-reliance and adequate levels of nutrition."

The projects in the agriculture and rural development portfolio have concentrated on improving agricultural production, mainly through erosion control and irrigation rehabilitation projects. Scant attention has been paid to the existence or development of markets for the increased or diversified production. Project Papers talk of the encouragement of citrus production, for example, without explaining where this citrus is going to be sold and thus, what incentive there is for the farmer to follow the recommendations.

G. Marketing Regulation and Support

1. Licensing of Markets and Marketing Operators

Due to the difficulties in travelling at the end of the mission in Haiti (demonstrations, road blockages, etc.) the team was unable to adequately research the licensing of markets and market operators. We know that persons selling and buying in the markets pay taxes to the government. For example, market women pay a fixed daily tax for operating in the market while cattle buyers pay a tax by the head. Records of persons operating in the market are, therefore, kept. However, we do not know if there are any physical or financial restrictions to entering the market nor do we know if there are licensing criteria that must be maintained in order to retain positions in the market.

2. Weights and Measures Control

There is no control over weights and measures for domestic marketing in Haiti. In fact most goods appear to be sold by count or volume. Duplan, in 1975, conducted a survey of weight equivalents of units of measurement and listed ninety-two products. Roe (1978) suggested that the effects of standardization on market efficiency would be slight, given the intensity of competition in the main domestic products. Given the low opportunity cost of labor, the value of the additional time required in a transaction to determine volume is probably small.

If one assumes, however, that improved road systems and communications would involve less direct-contact sales and more sales on description, then a standardized system has some merit. A non-standardized system also makes market monitoring and reporting, and data collection more difficult.

For products marketed for export, internationally recognized measures are used.

Recommendation:

That the desirability of introducing control of weights and measures for a wider range of products be examined.

3. Grades and Standards

The argument for grades and standards is much the same as for weights and measures. In the domestic market, buyer and seller face each other and information about the quality of produce needed to satisfy a particular market is undoubtedly passed back to the producer. A visit to the markets or roadside stalls confirms that, as in all societies, the market responds to the level of quality demanded by a particular clientele. Fruit and vegetables in Petionville bear absolutely no resemblance to those offered in Leogane. However, if the supply lines become longer and producers were selling on description then the need for some standard description becomes necessary. In the domestic market that necessity appears a long way away, but for export products this is not the case and any proposed export market venture should be assured of quality control, either by the government or by a self-regulating association of exporters. Sales abroad depend very heavily on quality and it is tempting, and ruinous for the trade, for one rogue exporter to take advantage of a strong demand, dispatch inferior produce, and spoil a country's reputation for quality.

Roe pointed out that the lack of grades and standards in the case of cotton, sugar and perhaps coffee appeared to be most severe. It seems that the CCH has in mind the sale of "organically grown" coffee. This seems like a good idea but it might be an advantage to market in conjunction with the private exporters, rather than risk that someone might spoil the market at a later stage.

4. Marketing Extension

This appears to be nonexistent in Haiti. Losses of foodstuffs in the marketing chain are reported to be large. The condition, particularly of fruit and vegetables offered for sale, would appear to confirm this. As in all countries, traditional packaging has developed based on locally available materials, and these systems are often adapted over time as new materials become available. However, some part of the waste could probably be avoided by the introduction of low-cost techniques from elsewhere. The introduction of a post-harvest technology option into the agricultural degree course at the Agriculture Faculty is mentioned elsewhere in this report. If practical assistance could be offered as well as teaching reinforcement, this could serve as a contribution to the reduction of losses.

Recommendation:

An individual who has solid experience with marketing in the Caribbean islands should be engaged to study this aspect of the marketing function.

Storage and transport of fruit and vegetables are also areas which appear to require study.

5. Market Information

Haiti is not a large country so there is probably a well developed informal information network already in place. As the city of Port-au-Prince becomes larger, the farmers supplying its markets will dispatch produce from the source of market information. However, the government needs good reliable market intelligence and consideration should be given to the possibility of disseminating such information for the benefit of all the operators in the trade, from producer to retailer. Seguino (1987) reports a good reception of broadcast coffee prices. The impact of making knowledge about a market more open is difficult to measure, but improved knowledge clearly makes for more rational decision making.

Recommendation:

That the current commodity price collection systems be examined to determine their effectiveness and appropriateness; and that the possibility of broadcasting a wider range of price information be determined. AID should consider making funds available for both activities.

6. Domestic Market Premises

The condition of market premises appears to vary. The timeframe of this study did not permit more than a cursory visit to a few markets, but as stated in the discussion on domestic marketing, such improvements as have been provided in some markets have been put to good use.

Cap Haitien and St. Raphael benefited from renovation and covering of their markets under a project. The state of markets such as Chantal, however, can hardly be described as good, with a large area in the middle resembling a quagmire and most of the produce exposed in the full sun. An open irrigation ditch runs through the center of the market thereby offering water for washing, etc., but no other facilities for human hygiene existed. Les Cayes also has market premises which are difficult to clean and where there was little evidence of storage facilities.

In Port-au-Prince, the marketing of domestic produce appears to be chaotic and unsanitary in the extreme. The large market which used to be alongside the road at Croix-des-Bossales now spills halfway across this major route, beside a stormdrain full of rotting garbage. The marketing premises, the sidewalk sales pitches, and the roads adjacent to the Iron Market are equally congested and unappealing. Apparently even the merchants who

have stands inside some of the markets are obliged to take stands outside as well in order to compete with the outside sellers. Clearly this is not a state of affairs which should be allowed to continue, either from the point of view of health, marketing efficiency, or of traffic flow, but a minimalist approach must be taken. As suggested earlier, no grandiose out-of-town market development should be contemplated, but clearly, a domestic market strategy which matches the growth of the city should be initiated as soon as possible.

Recommendation:

That an inventory of domestic market and storage premises, both urban and rural, be prepared and funding made available for their upgrading where appropriate. Any proposals should respect existing trading networks and practices. This should be coordinated with the World Bank particularly since they have studies in trade.

7. Government Animal and Plant Health Regulation

With the swine repopulation program, regulations have been introduced regarding the importation of pigs and pig veterinary products. The IDB and the GOH are currently preparing a follow-on project which will provide for a veterinary health service which will include port controls, veterinary laboratory (financed by A.I.D.), and slaughterhouses. Initially this service will deal with swine but should lay the foundation for disease control in other livestock. Haiti used to export meat but it is understood that this has now ceased in the face of disease control regulations by the importers. If Haiti can control disease in its other livestock, the nutritional level of the population should rise; effective disease control mechanisms might also result in the reopening of the export markets.

Phytosanitary controls are being developed with Title III funding. There are now five inspection points, three at Port-au-Prince, one at Cap Haitien and one at Port-de-Paix. Laboratory construction is scheduled. In addition, quarantine facilities and an import permit system are being developed, as are new laws regarding the importation of pesticides. These should be coordinated with new USDA protocols.

At farm level, pest control services are admittedly weak due to lack of resources, although a rodent control program is being funded using Title III funds.

CHAPTER VIII

USAID

A. Recent Evolution of the A.I.D. Agricultural Strategy in Haiti

1. The FY 1984 CDSS

The most recent Country Development Strategy Statement (CDSS) prepared for Haiti is that for FY 1984, written in 1982. Agricultural strategy assessments carried out in 1978 and 1982 provided the information and orientation toward the rural economy and agriculture presented in that CDSS. The document outlines the major features of the Haitian economy and polity to which it is responding as follows:

- a. Haiti is resource-poor and suffered from serious regression during 1957-71 under Duvalierisme. On the other hand, substantial progress was made in terms of infrastructural and industrial development from about 1973, warranting the return of A.I.D. to Haiti. Following in the wake of a series of adversities, including poor fiscal policy and management, by 1981 the GOH seemed willing to undertake serious reforms. There remained, however, a sense of distrust between the international donor community and the GOH.
- b. The country was steadily moving toward urbanization. Job creation was envisioned as the result of a dynamic manufacturing and commercial services sector, the former benefiting from the Caribbean Basin Initiative (CBI). Transition from a peasant to a diversified economy would create risk especially for the rural sector, which still accounted for over 70% of the population.
- c. For agriculture, revitalization was necessary. Erosion control was a key emphasis, as was tree crop production on the hillsides, and a concomitant reduction in food crop cultivation on these fragile lands. This was seen to imply a more open economy based on exports of manufactured goods, and processed agricultural products, as well as increased imports of cereals and consumer products. This implied closer ties to the U.S. economy.
- d. The development strategy to be pursued by A.I.D. was seen as one oriented toward improving industrial infrastructure and services, as well as a comprehensive restructuring of the rural and agricultural sector. Specifically, natural resource management and conservation were to be central to the strategy, including taking marginal lands out of cultivation. Crop selection for the remaining arable lands was to be made on the basis of comparative advantage

through improved small-farmer technologies, irrigation systems, credit, extension systems and related inputs. Crops to be emphasized were those which would provide commodities that could be processed in Haiti through labor-intensive agro-industries, primarily oriented toward external markets; agricultural products for local consumption and export were also targeted.

Given the then-new policy of the GOH stressing decentralization and regionalization, A.I.D. was going to concentrate its efforts in the southern peninsula, with a secondary regionalized effort in the Northwest. This would be in addition to some national programs in health and human resources development, and in private sector development.

2. The FY 1986-FY 1987 Action Plan

This document again stresses declining per capita productivity and income of the rural population as well as the rapid deterioration of the natural resource base. The threat posed by hillside erosion in terms of siltation on the plains, and the deleterious results for irrigation systems, allowed the Mission to justify a "dual agricultural strategy", based on assistance to preserve the fragile hillside lands while at the same time, assisting agricultural production on the plains. Again, the regional focus was in the south, in the Les Cayes/Cavaillon area, and also on other watersheds with relatively high production potential. Successful interventions developed in the Southwest would be replicated in other areas. Intrinsic to the strategy was the creation and involvement of base-level organizations, primarily through assistance to PVOs. The quantifiable objective was that by the year 2000, production patterns on 290,000 hectares of hillside land would have been changed, reducing erosion significantly. Further, 12,000 hectares of plains land would be provided with improved water delivery systems, resulting in expanded production. Water-user associations would be formed to provide for maintenance of newly-rehabilitated irrigation systems.

This approach toward the rural sector, which came to be called "the Hillside Strategy" was to be implemented in the context of an overall Mission strategy stressing private sector development and employment generation. It would eventually include the development of agro-industries, especially in those regions of the country where A.I.D. would be focusing its assistance for resource conservation.

The key assumptions of the Hillside Strategy have recently been restated in an internal A.I.D. document (n.d.) as follows:

- a. Over four million people located on Haiti's hillsides still have a potential for improving their economic and

social well being. The cities cannot absorb these people and Miami or New York are not viable options. Haiti's long-term stability will depend on the future of its peasantry.

- b. The magnitude of the agricultural development problem in Haiti requires a focus. That focus, however, must be on what constitutes the majority of Haitian agriculture, i.e., hillside farming.

The constraints to be addressed through the application of this strategy are then summarized:

- a. The problem of soil erosion and the need to conserve the ability to produce in the years to come;
- b. Low technology in terms of quantities of improved/modern inputs--fertilizer, improved seeds, mechanical power and other modern inputs;
- c. A weak institutional base both in the public and private sectors, including NGOs; and
- d. Lack of knowledge and experience on how to deal with the complex Haitian agricultural systems.

Addressing these constraints will help attain the strategy's objectives, which are:

- o to increase farm income through changes in production patterns;
- o to reduce rural-to-urban migration; and
- o to support a majority of Haiti's agricultural production units, which are located on the hillsides.

In attempting to convince other donors that this is the strategy that should be followed across the board, coupled with requisite policy reforms, A.I.D. also stressed that it was a natural resource conservation-led strategy, which was somewhat unique. In terms of internal A.I.D. policy, the Mission's hillside strategy, combined with the private sector initiatives, tended to meet three of the four A.I.D. "pillars"--institutional development, private sector emphasis, agricultural development, and policy dialogue.

3. The FY 1987 - FY 1988 Action Plan

This document reiterated the orientation of the agricultural portfolio toward hillside agriculture. Policy dialogue was proposed that would complement this strategy and other com-

ponents of Mission assistance. Six actions were identified, some of which had also been included in the PL 480 Title III Agreement signed in May 1985. Those included in the Action Plan were:

- a. Coffee export tax reduction;
- b. Privatization of state lands;
- c. Enforcement of renewable natural resource laws;
- d. Establishment of inducements for owners and users of hillside lands to employ sound conservation measures;
- e. Reform of water user-related legislation; and
- f. Increasing GOH investment in agriculture.

The Plan indicates that the GOH and other donors have recognized the importance of the hillside strategy, and that progress on A.I.D.'s part in implementing the strategy is good. It noted that suitable farming practices were being developed using grass and Leucaena terraces, as well as the swine repopulation scheme, and progress was being made in setting up an agricultural data collection system.

Institutional change was also said to be progressing, links being established between the Faculty of Agronomy and Veterinary Medicine (FAMV) and the international research centers. BCA had substantially reduced its losses, and was expected to move into a profit position before the end of FY 1987. Small-farmer groups had been established (groupements) and were increasing in numbers, and this was predicted to assist in raising small-farmer incomes.

Policy dialogue was moving along patchily. Plusses included a reduction in the coffee export tax and slow progress on water-users associations. The GOH had agreed to create a Hillside Agriculture Secretariat and other donors had expressed interest in supporting hillside agriculture. A contract had been negotiated to establish a national resource inventory, but the idea of an erosion fine had been postponed.

In the private sector, progress was reported on the adoption and implementation of improved customs procedures, resulting in reduced processing time and increased revenues. However, the creation of a new agricultural investment code and an investment and export promotion program had made no headway.

Investment credit institutions had, however, gone well. There had been a reorganization of the HDF, a consolidation of the DFC's management and medium-term strategy, and the establishment of the Haitian Mortgage Bank (BCI). Through these credit institutions about 3,600 jobs had been created in companies borrowing from them, and more were expected.

There was also progress in assisting non-traditional exports

such a rural handicrafts and winter vegetables, but perhaps more important was the creation of the Agricultural Producers Association (AAA), to provide a forum for development in this field. Support to the Management and Productivity Center and an Export and Investment Promotion Entity was hung up by delays in USAID/W approval.

4. Revised FY 1987 - FY 1988 Action Plan

A supplement to the 1987/88 Action Plan was prepared in response to the changed circumstances brought about by the end of the Duvalier regime. Table 59 summarizes the AID program as of May 1987. A 1963 report had speculated that the end of the Duvalier era would be marked by civil disorder, an empty GOH treasury and conditions of financial and economic chaos. This proved to be the case. It was proposed, therefore, that the United States, working with other donors, should:

- a. Issue a statement of intent to assist Haiti;
- b. Place pressure on the new government to remove the oppressive measures of the Duvalier regime;
- c. Urge the GOH to give immediate attention to the formulation of a reform, and a long-delayed development program;
- d. Provide short-term balance of payments support...to carry on an essential, mutually-agreed public works program and a PL 480 food relief program.

Funding of \$20 million additional ESF and \$10 million PL 480 Title III assistance was requested.

The policy reforms proposed, among others, were that the GOH would replace import restrictions with tariffs for all products produced by parastatals, including the flour mill, cotton gin, sugar refineries and cement plant, thus forcing pricing policies to be more consistent with international prices. In addition, all government subsidies were to be removed from parastatals, including preferential access to foreign exchange and credit. All taxes, tariffs and quantitative restrictions were to be removed from agricultural inputs, and private sector access to agricultural inputs was to be ensured.

5. The FY 1988 - FY 1989 Action Plan

This Action Plan stressed the need to continue with the existing funding levels in the ongoing programs in order to maintain their objectives which, in the case of virtually every project in the rural development sector, were geared toward raising farm income. Similarly, in the private sector portfolio, the intermediate credit institution projects were designed to create jobs and develop industrial enterprises.

Thus the A.I.D. program was broadened and increased considerably

TABLE 59

EXPORTS OF ESSENTIAL OILS 1945 - 1982
HAITI

YEAR	VETIVER			LIME			AMYRIS			TOTAL OILS		
	VOLUME (KG)	VALUE (\$)	PRICE/KG									
1945 :	4,000	\$93,200	\$23.30	10,000	\$107,200	\$10.72	10,000	\$56,800	\$5.68	24,000	\$257,200	\$10.72
1950 :	17,545	\$339,986	\$19.38	8,944	\$78,834	\$8.81	34,986	\$115,225	\$3.29	51,475	\$534,045	\$8.69
1951 :	20,683	\$672,240	\$32.50	8,346	\$95,035	\$11.39	12,322	\$35,272	\$2.86	41,351	\$802,547	\$19.41
1952 :	20,387	\$602,892	\$29.57	12,670	\$156,190	\$12.33	10,208	\$20,454	\$2.00	43,265	\$779,536	\$18.02
1953 :	9,670	\$263,576	\$27.26	15,347	\$172,069	\$11.21	24,770	\$54,006	\$2.21	49,787	\$490,451	\$9.85
1954 :	27,336	\$544,965	\$19.94	16,888	\$126,428	\$7.49	26,056	\$43,922	\$1.92	70,280	\$721,375	\$10.26
1955 :	53,422	\$845,051	\$15.82	12,396	\$63,526	\$5.12	34,308	\$60,199	\$1.99	100,126	\$976,776	\$9.76
1956 :	41,700									41,700		
1957 :	27,076	\$419,397	\$15.49	7,463	\$51,900	\$6.95	45,697	\$80,734	\$1.77	80,236	\$552,031	\$6.88
1958 :	31,200	\$507,600	\$16.25	13,200	\$125,000	\$9.47	25,200	\$45,000	\$1.79	69,600	\$677,000	\$9.73
1959 :	31,750	\$482,163	\$15.19	49,228	\$155,081	\$3.15	24,160	\$50,410	\$2.09	105,138	\$687,662	\$6.54
1960 :	56,469	\$971,960	\$17.21	21,657	\$184,554	\$8.52	27,207	\$60,895	\$2.23	105,413	\$1,217,409	\$11.55
1961 :	57,998	\$1,048,176	\$18.07	31,415	\$256,180	\$8.15	76,066	\$169,664	\$2.23	165,479	\$1,474,920	\$8.91
1962 :	68,027	\$1,063,725	\$15.46	33,499	\$297,960	\$8.89	84,517	\$152,822	\$1.81	186,043	\$1,514,507	\$8.11
1963 :	54,434	\$750,245	\$13.78	26,764	\$254,819	\$9.52	33,331	\$54,784	\$1.64	114,529	\$1,059,848	\$9.25
1964 :	42,813	\$603,227	\$14.09	18,810	\$173,859	\$9.24	52,564	\$67,562	\$1.29	114,187	\$844,648	\$7.40
1965 :	67,507	\$851,857	\$12.62	32,399	\$264,848	\$8.17	66,512	\$90,756	\$1.48	166,418	\$1,215,461	\$7.30
1966 :	62,736	\$1,154,999	\$18.41	40,310	\$513,496	\$12.74	135,953	\$334,629	\$2.46	238,999	\$2,003,124	\$8.38
1967 :	109,156	\$1,656,035	\$15.17	74,679	\$887,901	\$11.89	103,834	\$170,090	\$1.64	287,669	\$2,714,026	\$9.43
1968 :	104,986	\$1,736,137	\$16.54	79,861	\$882,096	\$11.05	84,773	\$126,038	\$1.49	269,620	\$2,744,271	\$10.18
1969 :	150,466	\$2,103,093	\$13.98	72,723	\$849,039	\$11.67	81,635	\$123,045	\$1.51	304,824	\$3,075,177	\$10.09
1970 :	78,599	\$1,487,767	\$18.93	71,159	\$1,075,677	\$15.12	55,756	\$91,040	\$1.63	205,514	\$2,654,404	\$12.92
1971 :	93,062	\$1,642,837	\$17.65	121,870	\$1,261,311	\$10.35	82,490	\$179,669	\$2.18	297,422	\$3,083,817	\$10.37
1972 :	99,146	\$2,053,520	\$20.71	79,041	\$604,298	\$7.65	127,889	\$612,092	\$4.79	306,076	\$3,269,916	\$10.68
1973 :	130,084	\$2,397,861	\$18.43	92,695	\$847,251	\$9.14	106,750	\$410,100	\$3.92	329,529	\$3,663,212	\$11.12
1974 :	135,579	\$3,318,615	\$24.48	139,299	\$2,295,078	\$16.48	114,677	\$860,928	\$7.51	389,555	\$6,474,621	\$16.62
1975 :	94,221	\$3,564,500	\$37.83	64,860	\$731,451	\$11.28	45,685	\$354,401	\$7.76	204,766	\$4,650,432	\$22.71
1976 :	149,225	\$6,434,504	\$43.12	105,469	\$1,190,743	\$11.29	71,079	\$560,071	\$7.88	325,773	\$8,185,318	\$25.13
1977 :	96,183	\$4,435,528	\$46.12	77,600	\$1,135,321	\$14.62	76,071	\$613,739	\$8.07	249,934	\$6,184,588	\$24.74
1978 :	135,833	\$7,611,993	\$56.04	77,282	\$1,099,027	\$14.22	85,694	\$831,000	\$9.71	290,009	\$9,542,028	\$31.94
1979 :	82,537	\$4,646,514	\$56.30	81,000	\$1,280,314	\$15.89	103,786	\$1,287,907	\$12.41	267,403	\$7,222,735	\$27.01
1980 :	65,150	\$2,739,066	\$42.04	100,948	\$1,654,513	\$16.39	62,733	\$770,396	\$12.28	220,839	\$5,163,975	\$22.57
1981 :	67,906	\$2,137,066	\$31.48	47,374	\$1,081,440	\$22.83	62,931	\$944,868	\$15.01	178,211	\$4,164,174	\$23.37
1982 :	83,609	\$2,788,644	\$33.35	80,911	\$1,451,963	\$17.95	40,325	\$641,550	\$15.91	204,845	\$4,882,177	\$23.83

to attempt to take advantage of what the 1988-89 Action Plan described as a short "window of opportunity" for establishing the framework for economic development. The strategy elaborated in the previous Action Plan and its supplement was essentially to continue in effect. It was anticipated that the public/private split of the portfolio would be examined, but it was too early to forecast major shifts; that new areas would be explored, such as energy and the administration of justice.

The duality of purpose and intent in the rural development portfolio in its attempt to assist both hillside and plains farmers was acknowledged. The unification of A.I.D. assistance was perceived as its overall commitment to public policy dialogue, technological development and expansion, basic infrastructure development and management, and local participation through organizational development at the community level (e.g., coffee marketing cooperatives and local water-users associations).

New projects proposed for agricultural development included a \$9 million Coffee Cooperative Development Project for FY '88 and a \$10 million Hillside Farming Outreach Project for FY '89.

The former project is aimed at strengthening the farmer coffee cooperative movement which, from the marketing standpoint, should allow the farmer's voice to be heard in the tight-knit group of coffee exporters who have been suspected of oligopsonistic practices. The improvement of coffee production techniques is also proposed. The Action Plan review committee approved the Coffee Cooperative Development Project. A.I.D. has been indirectly involved in support of export crop promotion and cooperative development as far back as the 1950s. From 1974 onwards, through the Small Farmer Production Project and later the Small Farmer Marketing Project, assistance has been given for the creation of a network of cooperatives, cooperative development training activities and loan funds for coffee purchases.

The Hillside Outreach Project did not receive approval in the Action Plan review pending the results of this sector analysis, availability of funds in the ARDN account and the priorities of the new GOH. Possible reconsideration will await further reviews. This project proposed the organization of peasants for the adoption of soil-conserving, income generating technologies on the hillsides of the upper Artibonite Valley and the north-west slope (from Trois-Rivieres to Jean Rabel).

In the OPED portfolio, the project proposed and approved at the Action Plan review which will most benefit agriculture was the Management and Productivity Center Amendment. This project has as its purpose the establishment of a private-sector Haitian institution capable of upgrading the management skills of business owners, managers and micro-business entrepreneurs.

6. Private Voluntary Organizations (PVOs)

For some years, a key characteristic of development in Haiti has been the role played by expatriate and indigenous private voluntary (non-governmental) organizations. U.S.-based PVOs began to work extensively in Haiti after Hurricane Hannah in 1954. As the United States Overseas Mission (USOM) program began to be more heavily focused on working toward development at the base level, community development approaches were taken up with a commensurate increase in funding through non-governmental routes. With the growth in numbers of expatriate and indigenous PVOs working in Haiti, and the related magnitude of resources which they themselves provide or which are funneled through them by bilateral donor agencies, their role, independence, development performance and political impact have increasingly come to be highlighted in general discussions of development, and institutional development in particular.

A key fact which is used as an example of the vast reliance on PVOs--and their exaggeratedly independent stance--by those who prefer a more public-sector focused development strategy is that no one knows exactly how many PVOs are operating in Haiti. This is in part because some refuse to register either with consortia or national agencies in their countries of origin, and in part because they refuse to register or find themselves unable to register with the Ministry of Plan (now CPNAP) which has this responsibility on behalf of the GOH. Current estimates, however, are that there are 400 or more PVOs operating in Haiti. A recent fact sheet from USAID/Haiti indicates that A.I.D. is supporting 400 PVOs (May, 1987). A 1984 USAID listing cited by Smucker indicates that there are 127 PVOs but also indicates that this is an incomplete listing (Smucker, 1986, p. 100). A frequently-cited C.I.D.A. study mentions that there are between 250 and 400 PVOs active in Haiti (ACDI-CIDA, 1982). Another estimate concerns the religious PVOs alone--Anglade estimates that there are 30 Catholic orders, 100 Protestant denominations and missions, and a 5,000 member clergy (cited in Smucker, 1986).

The volume of funds going into Haiti--and Haitian development--through NGOs was estimated by the UN in 1983 as \$24.2 million out of a total of \$181 million of assistance. English (cited in Smucker, 1986), estimates that the 400 PVOs are spending \$40 million a year. Most PL 480 Title II assistance has been channeled through PVOs. Relief assistance was channeled through PVOs from the early days, and continues to be disseminated through PVOs, including Food for Work programs.

A.I.D. presently tends to "wholesale" funding through several of the larger U.S.-based PVOs--CARE and CRS, for example--which in turn retail Title II commodities to smaller and indigenous PVOs. While this PVO-related approach to development has been charac-

teristic of American bilateral assistance for almost thirty years, the magnitudes have changed, as have the proportions. The shift has meant that not only "humanitarian" assistance, but a considerable proportion of the "regular" development assistance program funds are now being used to fund projects that are implemented through non-governmental routes rather than through the organizational structures of the GOH. A key example in this area is the Agroforestry Outreach Project, which is operated through grants to U.S. PVOs--PDAF and CARE--which then work through other, local PVOs for implementation of the various project components.

The proportion of funding passing through the private voluntary and the private for-profit sector corresponds to the shift in A.I.D.'s policy toward private sector initiatives. However, it also corresponded to a specific and growing concern on the part of A.I.D. and other bilateral donors as to whether working through the GOH would have developmental results. This remained a concern despite the creation, as noted below, of a variety of local-level "governmental" structures--alleged to be participatory--by the Duvalier regimes. It was bolstered by the unwillingness of succeeding Haitian administrations to engage in even the most superficial elements of administrative reform (see Brinkerhoff, 1981, 1987), and by the poor fiscal management performance of almost every ministry or GOH agency with which A.I.D. had tried to work.

Despite these factors militating in favor of a non-governmental approach to development on the part of A.I.D. and other donors, implementation of the approach has involved reluctance, reservations, and has caused considerable reaction on the part of the GOH. Even some who recognize that the PVOs have probably performed better overall in delivering benefits to the poor are prone to see this approach as neocolonialist; the phenomenon has been described as the privatization of foreign assistance to Haiti (Smucker, loc. cit.; Delatour et al, inter alia).

Not only does this approach keep resources out of the control of the GOH, it also takes them largely out of the control of the bilateral donor. A.I.D. relies on evaluations and financial audits to assess how the PVOs are managing funds; in some cases more latitude may be given in terms of A.I.D. supervision than is given to for-profit contractors. Wholesaling resources through large PVOs and consortia of PVOs allows a donor such as A.I.D. to externalize the significant management burden of dealing with a very large number of projects. The result is that each PVO deals with a very small number of people and a commensurately low level of resources. In a sense, it may reduce overall direct quality control, but it also obviates the need for micro-management that would make the present level of funding impossible to manage otherwise.

The exception to this generalization is, of course, the kind of program assistance that is being provided under the ESF budget support portion of the A.I.D. program, or under PL 480 where local currency generations are jointly programmed, but where the GOH has the benefit of the majority of the funds thus generated. It is with PL 480 Title III funds, for example, that USAID/Haiti continues to fund the activities of the MARNDR, while at the same time funding such NGO projects as the Agroforestry Outreach Project.

In addition, the GOH has, theoretically, the ability to exercise some monitoring and control over the activities of the PVOs through the requirement that they register with the Commissariat a la Promotion National et l'Administration Publique. The latter, under the predecessor administration, was unable to enforce this requirement, and according to many is still unable to do so, although greater efforts are being made. The PVOs, on the other hand, apparently claim that where they have been willing to register, the bureaucratic requirements and delays on the part of the GOH are such that they are unable to do so.

With regard to the agricultural sector per se, it is interesting to note that the GOH is alleged to take credit willingly for the progress made through the Agroforestry project, for example, while at the same time it regrets that these funds are not being routed through the public sector. The 1986 evaluation makes some positive points about the reality of collaboration with MARNDR under the project:

In spite of some earlier problems reported in this area, the project, and each of its components, currently enjoy cordial and productive working relationships with MARNDR and its representatives. Informal collaboration with the Direction of Natural Resources and the World Bank/MARNDR National Forestry Project has been particularly fruitful on both sides.

In more concrete terms, MARNDR has availed itself of services provided by the AOP, including ODH's nursery [Operation Double Harvest] production system, which sells a good portion of its annual seedling output to the Ministry; and PADF's procurement system, which has on occasion assisted the Ministry in obtaining nursery materials and supplies. MARNDR field personnel have also been assisted by PADF's regional outreach programs.

Information and feedback are mutually solicited and shared freely on an informal basis, through the Coordinator's office and directly with the individual grantees, at all levels of the staff. The flow of information from the project to MARNDR should probably be made somewhat more routine. The evaluation team found no compelling reason

for the AOP to pursue a more formal, institutionalized relationship with MARNDR at this time (USAID/Haiti, 1986, pp. 100-101).

While all of this is positive, this project also represents one in which the evaluation recommendations include the hiring of more technical extension staff. Ultimately, such staff, if they are Haitian, will add to the numbers working not for MARNDR--whether at the center or at the periphery--but rather for the NGO and profit-making private sector. As is discussed further below, this "raiding" of the public sector for qualified technicians who are in short supply is seen by committed technicians presently in the GOH as ultimately counter-productive. Since salaries outside the public service are substantially higher, it is usually the brighter, more ambitious cadres who gravitate away from public sector positions, especially since there is no guaranteed career path for them there. Nonetheless, the tendency of donors to create or to work through NGOs and autonomous organizations which, in turn, hire away the best technical talent, per force places the government in a weakened position to engage in the reforms which are being asked of it.

It should also be realized that the career alternatives for skilled technical personnel are frequently located outside of Haiti. If one were to curtail the "brain drain" from the GOH to PVOs, one would most likely stimulate the brain drain from Haiti to Canada, the U.S. and international organizations. This would depend, however, on how such a curtailment was instituted. If attractive conditions were created socially and professionally for the civil service, with job descriptions and career paths, this might not be so. To some extent, it has remained a "chicken-and-egg" question ever since the issue of administrative reform has been under discussion.

It seems clear that A.I.D. will continue to rely on the effectiveness of PVO outreach activities so long as this effectiveness is demonstrably better than that of GOH agencies, and so long as the GOH allows it. However, there are probably compromises that can be made which would allow the GOH a more active say in what is being done, provide it with the funding to carry out the functions for which it has a comparative advantage, and at the same time ensure that benefits continue to flow to beneficiaries. While it may be true, as Murray asserts, that "those who have argued against this mode almost invariably resort to philosophical arguments[,] one rarely hears arguments as to the superior efficiency of the Haitian public sector in managing development projects; what one hears are philosophical statements about its sovereign rights and the like," there are functions which the state will ultimately continue to insist on performing, and it is unlikely that the present situation will be allowed to continue unchanged.

Recommendation:

Convincing efforts at administrative reform—not just good intentions expressed by a new GOH—should be a precondition for increased A.I.D. funding through public sector institutions.

Where appropriate, A.I.D. should assist the Commissariat a la Promotion National et L'Administration Publique to develop an effective system for registering and monitoring PVO activities. Such a system should provide the GOH with appropriate information about what these PVOs are doing, but should not be so cumbersome that it adds substantially to GOH recurrent costs or to the overhead portion of PVO-sponsored activities.

The study proposed by OPVD on the comparative cost-effectiveness of working through the public and private sectors in Haiti should be implemented using a careful data collection and analysis approach and representative case studies. Decisions about relative levels of funding to each sector should be based on its conclusions to the extent politically feasible.

Funding should be allocated by A.I.D. for support to PVO consortia that can interact effectively with the relevant GOH agencies to facilitate project planning, implementation and evaluation, as well as sectoral planning and development.

B. PL 480, Title II and Title III

1. Title II

Under the PL 480 Title II emergency humanitarian aid program, USAID/Haiti provides for the direct feeding of nutritionally vulnerable groups. There are over 600,000 recipients, and 500,000 children are fed daily through school feeding programs. The majority of these activities are implemented through PVOs. However, some support to the agricultural sector is also provided, through the GOH and through PVOs. Under Phase 1 of the Title II emergency program, \$8,774,046 in local currency sales proceeds (LC) assistance was provided. For irrigation two schemes were rehabilitated out of three originally envisioned after further studies on them were commissioned. Studies were funded for the rehabilitation of an additional 57 schemes. One watershed management project for Cap Haitien was also financed. Funding for these activities totaled \$411,498 (see Table 60).

Under Phase 2, despite considerable dissatisfaction with the progress of the activities managed by the Ministry of Agriculture in Phase 1, funding was provided for the rehabilitation of the 57 schemes, and for the d'Avezac Irrigation system rehabilitation. The latter is to be carried out by the UN Disaster Relief Office. The other work is contracted out to the private sector by MARNDR. These activities totaled \$1,250,000

TABLE 60

TITLE II EMERGENCY RELIEF PROGRAM
PHASE I.

Projets/Activites	Nom de Compte	Allocations	Transferts	97/99 %	Saldo Budget	99/99 %	Depeuse Justifiee	97/99 %	Montants Justifies	97/99 %
1 REHABILITATION VOIEUR TPTC	AC-310-PE	\$21,055,000.00	\$27,932,762.00	118	(\$7,877,762.00)	-10	\$22,615,266.55	81	\$5,319,408.40	10
2 APPUI AU CAS	004 DUC	\$1,242,365.00	\$170,000.00	14.5	\$271,365.00	22.0	\$63,400.00	50	\$17,100.00	1
3 APPUI AU SCS	011010-01 SUP	\$750,475.00	\$517,229.00	69.0	\$233,246.00	31.2	\$267,229.00	35	\$150,000.00	20
4 APPUI AU ADRA	7602 DUC	\$1,191,010.00	\$1,016,110.00	85.3	\$174,900.00	14.7	\$70,000.00	59	\$230,000.00	20
5 APPUI AU CAS	0128 DUC	\$1,226,900.00	\$600,000.00	49.0	\$626,900.00	51.1	\$460,000.00	37.5	\$230,000.00	20
6 APPUI A L'INITIATIVE SECTEUR PRIVÉ	000-5337-007 CB	\$750,000.00	\$505,200.20	67.4	\$244,800.00	32.6	\$510,000.00	68.0	\$75,000.00	10.0
7 CONSTRUCTION D'EMPLAIS, OUV (DATA)	212015 DUC	\$1,660,700.00	\$1,104,500.00	66.5	\$556,200.00	33.5	\$710,500.00	42.8	\$100,000.00	12.5
8 IRRIGATION MATRYE	AC-230-PE	\$100,000.00	\$100,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
9 IRRIGATION SA-01PTISTE	AC-230-PE	\$100,000.00	\$100,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
10 IRRIGATION CARRIPIVU ABORÉ A PAIZ	AC-230-PE	\$100,000.00	\$100,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
11 FINALISATION DES TRAVERS D'IRRIGATION	AC-230-PE	\$100,000.00	\$100,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
12 DISTRIBUTION DE LA LUTTE ANTI-VECTOIRIELLE	013 0	\$1,235,000.00	\$800,500.00	64.9	\$434,500.00	35.1	\$227,400.00	18.4	\$276,000.00	22
13 ALPHABETISATION (ENCLINE CATHOLIQUE)		\$1,000,000.00	\$1,500,000.00	150	\$0.00	0	\$0.00	0	\$0.00	0
14 ALPHABETISATION (OUPP)	AC-240-PE	\$1,000,000.00	\$1,000,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
15 ALPHABETISATION (ENCLINE PROTESTANTE)	100-5792-0	\$750,000.00	\$250,000.00	33.3	\$500,000.00	66.7	\$100,000.00	13.3	\$150,000.00	20
16 AMPLIFICATION BASSIN VERSEAU CAP HAITIEN	01-0175 DUC	\$100,000.00	\$100,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
17 CLOTURE PARC SPORTIF COMPLEXE	AC-229-PE	\$200,000.00	\$200,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
18 APPUI A REHABILITATION DU PORT DE TORONCE	AC-216-PE	\$500,000.00	\$500,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
19 APPUI A REHABILITATION DE 0 SYSTEMES D'EAU POTABLE	703 0 000	\$150,000.00	\$200,000.00	133.3	\$0.00	0	\$0.00	0	\$0.00	0
20 INFORMATION SUR PROGRAMME PL 020/TITRE II		\$10,000.00	\$10,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
21 GESTION DU PROGRAMME D'VEGUE	AC-313-PE	\$750,000.00	\$750,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
22 TRAVRS DE REHABILITATION DE 57 SYSTEMES D'IRRIGATION	AC-313-PE	\$1,000,000.00	\$1,000,000.00	100	\$0.00	0	\$0.00	0	\$0.00	0
23 APPUI A LA RESTAURATION DE MONUMENTS HISTORIQUES	AC-213-PE	\$600,000.00	\$550,000.00	91.7	\$50,000.00	8.3	\$400,000.00	66.7	\$100,000.00	16.7
24 APPUI AU CENTRE NATIONAL ANABE	1000-00100	\$100,000.00	\$20,000.00	20	\$80,000.00	80	\$20,000.00	20	\$0.00	0
TOTAL		\$43,010,230.00	\$41,150,262.90	95.7	\$1,860,000.00	4.3	\$20,570,220.00	47.8	\$11,370,420.00	26.5

out of a budget of \$6,999,000 (see Table 61). While some further funding of another irrigation scheme had been considered, an assessment carried out by USAID/OPVD uncovered too many economic and sociological deficiencies in the design to warrant funding (Thomazeau).

In general, the feeling of concerned A.I.D. staff in OPVD has been one of great discouragement given the results of working through MARNDR on these schemes. When discussing possibilities for institutionalizing the A.I.D.-funded interventions through NGOs, they are much more positive about the possibilities of working through HAVA, a relatively new association of PVOs, to which A.I.D. provides funding for administration and program activities. Other donors fund the activities of the PVOs that make up the association. HAVA has developed a series of sectoral committees, including one for agriculture, to develop plans for HAVA members' activities in the respective sectors. Funding is being sought for the projects that make up these plans. Apparently, a number of the Agronomes from MARNDR have participated in meetings with HAVA, and are actively helping them to improve the technical quality of their proposals. This is noteworthy given the generally negative structural opposition between MARNDR--and other GOH ministries--and the PVO community.

2. Title I/III

For ten years, Haiti participated in a PL 480 Title I program, under which it purchased, on a concessional basis, surplus U.S. agricultural commodities, primarily edible oils and wheat. Under a new PL 480 Title III program, begun in May 1985, by pursuing a series of mutually-agreed upon policy reform measures, the GOH continues to purchase commodities at concessional rates, but at the same time receives debt forgiveness for a proportion of the debt it incurred under Title I. As under Title I, local currency sales proceeds (LC) generated when the GOH sells these commodities in Haiti, are jointly programmed by the GOH and A.I.D.. Whereas such joint programming was optional under Title I, it is required under Title III. The program is run through an interministerial Executive Committee, and implemented through a variety of ministries and PVOs. Management and oversight are delegated by the Executive Committee to the PL 480 Title III Management Office, which is attached to the Commissariat a la Promotion Nationale et l'Administration Publique.

The LC from Title I and Title III is programmed against a series of project activities, providing the counterpart funds required for regular A.I.D.-funded projects, as well as funding for other programs and projects implemented by PVOs and GOH agencies. The total amount of LC generated from July 1985 to March 1987 was approximately \$36 million in Gourdes, which is more than was anticipated. The program in terms of dollar value of commodities purchased runs at \$15 million a year.

TABLE 61

TITLE II EMERGENCY RELIEF PROGRAM PHASE 2

<u>Activity</u>	<u>Funding</u> (G.000)	<u>Activite</u>	<u>Financement</u> (G.000)
1. <u>PVO Title II Enrichment:</u>	<u>2,355</u>	1. <u>Appui Progr. Titre II-ONG</u>	<u>2,355</u>
ADRA	(550)	ADRA	(550)
CARE	(1,305)	CARE	(1,305)
CRS	(500)	CRS	(500)
2. <u>Urban/Rural Infrastructure and Rehabilitation:</u>	<u>17,750</u>	2. <u>Infrastr. et Rehab. Urb./Rurales</u>	<u>17,750</u>
TPTC (at least 42 locations)	(14,250)	TPTC (aumoins 42 sites)	(14,250)
IDB counterpart, Ind Park	(3,000)	Farc Industriel, BID	(3,000)
IDB counterpart, Road Rehab.	(500)	Rehab. de Routes, BID	(500)
3. <u>PVO Employment Generation:</u>	<u>5,395</u>	3. <u>Gener. Emplois ONG</u>	<u>5,395</u>
Literach Program	(1,500)	Progr. d'Alphabetisation	(1,500)
Special Dev. Activities	(1,895)	Activ. Speciales de Dev.	(1,895)
Macaya Park Extension	(750)	Ext. du Parc Macaya	(750)
Human Resources Dev. Ctr.	(500)	Centre Dev. Res. Humaines	(500)
Management Productivity Ctr.	(500)	Centre de Prod. de Gestion	(500)
Afe Neg Combite	(500)	Afe Neg Combite	(500)
4. <u>Irrig. and Soil Conservation:</u>	<u>(6,250)</u>	4. <u>Irrig. et Conserv. Sols</u>	<u>(6,250)</u>
Small Irrigation Systems X	(3,750)	Petit Systeme d'Irrig	(3,750)
Avezac Irrigation Rehab.	(2,500)	Rehab. d'Irrig.-Avezac	(2,500)
5. <u>Rehab/Paving 1.5 km Road</u>	<u>911</u>	5. <u>Rehab/Pavage 1.5 km Route</u>	<u>911</u>
<u>Pet. Riv. de l'Artibonite</u>		<u>Pet. Riv. de l'Artibonite</u>	
6. <u>Riviere Pendu Bridge</u>	<u>1,500</u>	6. <u>Pont de la Riviere Pendu</u>	<u>1,500</u>
7. <u>3 Culverts, St. Marc</u>	<u>75</u>	7. <u>3 Ponceaux, St. Marc</u>	<u>75</u>
8. <u>Completion of Place Publique</u>	<u>109</u>	8. <u>Achevement de Place Pub.</u>	<u>109</u>
<u>Grande-Riviere du Nord</u>		<u>Grande-Riviere du Nord</u>	
9. <u>Program Management</u>	<u>650</u>	9. <u>Gestion du Programme</u>	<u>650</u>
Total:	34,995	Total:	34,995

In agriculture, for the agreement period, 12 projects have been identified for Title III LC funding, although nine were originally budgeted. The Title III Agreement was just amended in June, so that it will be extended for another year. A.I.D.'s logic was to postpone preparation of a new program in light of the interim nature of the present government, and the likelihood that the elected government may have differing priorities and might wish to distance itself from commitments made by the CNG.

The 1986 Performance Evaluation Report for the period from October 1985 - September 1986 found that a considerable amount of progress had been made in implementing the agreed policy reforms. Some had been put in place in advance of signature of the agreement, as a sign of good faith on the part of the government in 1985. Others have been implemented on schedule, while still others are lagging for various reasons. Performance was considered to be so good, however, that the debt-forgiveness mechanism of Title III has been activated. Table 62 shows the budget for Title III local currency funding in agriculture, while Table 63 shows implementation progress as of October 1986. Finally, Table 64, adapted from Brinkerhoff and Grandpierre (1987), gives a rough assessment of progress on policy provisions (formally called Self-Help Measures, SHMs).

As may be seen from these Tables, while policy reform progress has indeed been remarkably good given the political situation that prevailed during the implementation period, those policy measures that were either the most difficult to implement and/or which required the most active pursuit on the part of the GOH are those which have received the least attention. Included among these are the provisions for decentralization and for the revision of the law relating to water user associations in the part of the agreement relating to the agricultural sector. It is not clear to what extent the CNG or, indeed, the prospective elected government will have the political will to carry out these two provisions.

On the positive side, at the time this report was being prepared, a colloquium was about to be held, sponsored by the Title III Executive Committee, to discuss decentralization in general, and to lay the ground rules for its achievement in whatever sector may come to be concerned. Similarly, the new Constitution of March 1987 specifically espouses decentralization as underlying the structure of government, and assigns a role in the planning process to Departmental Councils. Further, it states that an Interdepartmental Council, "jointly with the executive, studies and plans all the decentralizations and development projects of the country from the social, economical [sic], commercial, agricultural and industrial point of view. Decentralization must be accompanied by the deconcentration of public services with a delegation of power and industrial decom-

TABLE 62

Budget for PL-480 Title III Counterpart Funds

	FY86	FY87	FY88	Total
(in US Dollars, Millions)				
<u>Agriculture</u>				
Farming Systems Research/Extension	.50	.50	.50	1.50
Strengthening Rural Credit Services	1.50	1.50	1.50	4.50
Irrigation and Soil Conservation	1.50	2.50	3.00	7.00
Coffee/Cocoa Production	.50	.50	.70	1.70
Cereal Production Improvement	.50	.50	.50	1.50
Crop Protection	.20	.25	.30	.75
Animal Health and Husbandry	.25	.50	.50	1.25
Agricultural Studies	.15	.25	.10	.50
Local Resource Development	.30	.40	.30	1.00
	-----	-----	-----	-----
Agriculture Total	5.40	6.90	7.40	19.70
<u>Health</u>				
Targeted Community Health Outreach	2.00	2.00	2.00	6.00
Management of Malaria	1.10	1.00	1.00	3.10
Family Planning Outreach	.30	.30	.30	.90
Community Water Systems	.15	.15	.10	.40
	-----	-----	-----	-----
Health Total	3.55	3.45	3.40	10.40
<u>Transport</u>				
Secondary Roads	3.40	3.40	3.40	10.20
<u>PL-480 Title III Management</u>				
	.40	.30	.30	1.00
<u>Support to PL-480 Title II</u>				
	1.00	1.00	1.00	3.00
	-----	-----	-----	-----
Subtotal	13.75	15.05	15.50	44.30
Unprogrammed Title III funds available for Agriculture, Health, and Transport Projects*				
	3.25	1.95	1.50	6.70
	-----	-----	-----	-----
GRAND TOTAL	17.00	17.00	17.00	51.00

* As commodities' local sales prices are greater than costs, counterpart funds generated exceed FOB/FAS prices. Thus a \$15 million sales agreement generates \$17 million in counterpart funds.

SOURCE: USG/GOH, "PL-480 Title III Agreement, FY 1985 - FY 1988, Annex B." Port-au-Prince, Haiti. May 30, 1985

TABLE 63

IMPLEMENTATION PROGRESS, PL-480 TITLE III PROGRAM-FUNDED PROJECTS

Sector/Projects	Funds Absorption Rate	Actual Implementation Pd.	Progress Status
Agriculture			
Farming Systems Research/Extension	53%	8 months	B
Strengthening Rural Credit Services	100%	9 months	B
Irrigation System Improvement	24%	7 months	C
Swine Repopulation	44%	8 months	D
Watershed Management	95%	7 months	A
Coffee/Cocoa Production	92%	7 months	C
Cereal Production Improvement	89%	7 months	C
Crop Protection	71%	7 months	B
National Forest Rehabilitation	80%	7 months	B
Animal Health and Husbandry	59%	7 months	D
Upper Artibonite Valley Watershed Management	86%	9 months	A
Local Resource Development	82%	9 months	A
Health			
Targeted Community Health Outreach	42%	7 months	C
Management of Malaria	68%	12 months	B
Family Planning Outreach	16%	4 months	C
Community Water Systems	38%	9 months	C
Transport			
Secondary roads	70%	12 months	B
TPTC Training Center	56%	5 months	C

NOTES:

1. Funds Absorption Rate = Disbursements divided by Approved Budget Level
2. Actual Implementation Period = Activity Start Date through 9/30/86
3. Progress Status:
 - A = Activity implementation consistent with projected estimates.
 - B = Activity implementation very close to projected estimates.
 - C = Activity implementation behind projected estimates.
 - D = Activity implementation significantly behind projected estimates.

SOURCE: Adapted from PL-480 Title III Management Office, "Food for Development Program, Annual Evaluation Report, Fiscal year 1986." Fort-au-Prince, GOH Commissariat for National Promotion and Public Administration, November 1986.

TABLE 64

IMPLEMENTATION STATUS OF PL-480 TITLE III POLICY REFORM MEASURES

Reform Measures	Progress toward FY 1986 Benchmarks		
	Little/None	Partial	Satisfactory
<u>Macro-economic policy reforms</u>			
1. Coffee study			X
2. Flour price impact study		X	
3. Import licensing study		X	
4. Public enterprise study	X*		
5. Petroleum tax revision study			X
<u>Institutional reforms</u>			
Ministry of Agriculture			
6. Decentralization	X		
7. Water users' association legislation		X	
8. Ag. credit agency cost control			X
Ministry of Public Works			
9. Road maintenance costs assumed by Treasury			X
10. Labor-intensive road construction & maintenance			X
11. Recurrent cost coverage	X		
Ministry of Health			
12. Improved internal administration			X
13. Increase community pharmacy sale			X
14. Decentralization	X		
15. Improved collab. with NGOs	X		
16. Improved fam. planning services	X		
17. Improved resource allocation and recurrent cost control	X		

* Parastatals abolished, study cancelled.

SOURCE: Adapted from PL-480 Title III Management Office, "Food for Development Program, Annual Evaluation Report, Fiscal Year 1986", Port-au-Prince, GOH, Commissariat for National Promotion and Public Administration, November 1986; in Brinkerhoff: 1987.

partmentalization for the benefit of the Departments" (Chapter I, unofficial English translation, USIS).

In continuing the Title III program with essentially the same policy and project emphases in agriculture, the U.S. Country Team, and A.I.D. in particular, are probably taking a wise approach. It seems likely that, given a successful electoral process, A.I.D. would wish to negotiate a follow-on Title III program with the new GOH. The preparation of program documentation and attendant preliminary negotiation with the government may take over a year. Approval by A.I.D. and then by the inter-agency U.S.G. committee that is responsible for approving and providing formal negotiation instructions for such programs may take an additional six months before an agreement is signed. Therefore, it is recommended that preparatory work be undertaken by A.I.D. as soon as possible, under the auspices of the existing Title III Executive Committee on which a number of key ministries, including agriculture, are represented.

One of the accomplishments of the Title III program has been the creation of a Comite Mixte de Recherche de la Politique, which promotes joint policy research in support of the policy provisions of the Agreement. If this mechanism can continue to exist, it may be a logical resource to use in working with the new government to assess the appropriateness of this agricultural strategy to its policy agenda for the agricultural sector. This would be an option through which the former Ministry of Plan, now the Commissariat a la Promotion National et l'Administration Publique, which is still responsible for formulating the national development budget, could be involved at a working level with the Ministry of Agriculture and the Ministry of Economy and Finance in agricultural policy and strategy formulation.

This would, on a somewhat more formal basis, mirror what was done by an informal group during the protracted negotiation of the first Title III program, and especially of the policy provisions. While it is unlikely that the Ministry of Agriculture would espouse this option enthusiastically, the option would provide a relatively non-threatening, technocratic venue for interministerial collaboration in setting a policy agenda. To the extent that the sponsorship of this committee is jointly that of the GOH and the USG under the Title III umbrella, it is possible that this could serve equally as a venue for a discussion of this A.I.D. strategy document.

In fact, in mid-June 1987, the Commissaire General, acting as President of the Executive Committee, formally proposed to A.I.D. that funds from the agricultural studies budget of Title III be used for a study to "reorient" Title III, an effort to begin immediately and continue for a period of three months. The proposal is actually for the work preparatory to the development of a PID for a new Title III program. The fact that

the Title III Executive Committee—representing ministries of the CNG—proposes to take this step at this time can be regarded in several ways. It may be interpreted as: an attempt to coopt the planning and policy role of a prospective elected government; as an attempt to ensure that the GOH takes the initiative in the planning process for Title III, which heretofore was taken by A.I.D.; as an example of good management taking into consideration the lengthy timeframe for approval of a new program, as well as the time it would take for a newly elected government to position itself to develop policy, or as a combination of these. A.I.D. was to decide on its response at the time this strategy document was being prepared.

Recommendation:

That preparatory work be undertaken by A.I.D. and the PL 480 Executive Committee to begin "reorientation" of the Title III policy provisions and policy reform process, in order to have something available for preliminary discussion as soon after the elections as possible. This should, however, remain preliminary so as to avoid rejection by the new government of something perceived to have been negotiated with the CNG.

That CMRP be used as a venue to begin the process of definition of the policy reform provisions that should be included in the proposed second Title III Agreement; CMRP should also be used as a venue to discuss the project and program implications for local currency funding under Title III of the elements of this strategy.

CHAPTER IX
STRATEGIC ORIENTATIONS

A. Strategic Focus

The background to this assessment is one of political change following the fall of the Duvalier regime, and control by an interim government in anticipation of democratic elections in the fall. In the Mission's view, this provides a "window of opportunity" and U.S. assistance levels have risen accordingly.

The possibilities for change in A.I.D.'s approach to the agricultural sector derive from changes in GOH macro-economic policy which affect all non-subsistence agricultural production, whether on the plains or on the hillsides. What we are recommending, therefore, is a gradual shift in A.I.D.'s approach toward a market-led agricultural strategy, which provides increased demand for production from both types of farms.

Such a market-led strategy, emphasizing market support and market development aspects of all of A.I.D.'s interventions in the rural sector--whether these are oriented toward hillside or plains producers--should maximize whatever production gains are likely on both the hillsides and on the plains.

At the same time, we support the premises of the "hillside strategy" as regards subsidizing production and resource conservation. We believe that none of our recommendations dilutes these premises or attempts to address these aspects of the Haitian agricultural scene. A central premise of this strategic reorientation is that the role of agriculture in the economy as a whole must be addressed, as well as the impact of other sectoral policies and activities on agriculture. We accept the Mission's present view that the "duality" in Haitian agriculture is likely to continue for some time. Yet, it seems clear to us that the combination of continued population pressure, environmental degradation and world market price impacts will force a dramatic set of changes on Haiti. Thus, an agriculture strategy--together with the rest of the Mission's development planning and programming--must begin to deal with these forces now.

B. Options for the Future

If it is accepted that both hillside and plains agriculture face changes of critical proportions, what are the other possible solutions? In our view, the solution is not simply increased production from ameliorated hillside cultivation practices and extending irrigation in the plains. The former depends on technologies which may be too risky for farmer adoption on a broad scale. The latter would depend on investments in a type of production which may soon be unable to support even those who currently practice it. Neither answer is substantially likely to keep people gainfully employed in agriculture

at a rate near to that of population growth. Instead of an overwhelming emphasis on either option, we support some continuation of what the Mission has actually been doing under DA and LC funding--that is, supporting some of both.

Since Haitian farmers respond to economic stimuli, the best basis for a strategic reorientation for agriculture is to develop the means to expose more people to developed markets. These markets may be for domestic consumption or for export. What is crucial is the development of increased and improved access to these markets through improved marketing methods, improved and additional infrastructure--including roads--and the creation or improvement of relevant institutional and information systems.

The means to do this are probably well within the grasp of A.I.D., together with other donors, since funding levels will increase, and since the kinds of improvements we are advocating are not necessarily complicated. In fact, some of the elements were discussed in the USAID's 1984 Action Plan, which proposed that the cropping emphasis should be on:

- o commodities to be processed by new or expanded labor-intensive enterprises or agro-industry (primarily for export), and
- o agricultural products for local consumption and export.

What the Action Plan did not stress--nor does the present project portfolio--is the marketing aspect of this sort of approach to production either in terms of market identification or assistance to the marketing process. It is here that we believe the comparative advantage of the Mission may now lie, along with the identification and development of systems for production of specific crops that may economically replace some sugar and rice on the plains.

The Mission's Office of Private Enterprise Development (OPED) has already commenced a program designed to help agro-industry and agricultural exports. Just begun, this is not a quick process, but it can be complemented by related projects in the agriculture portfolio that will create the backward linkages to production necessary for these agro-industries to succeed. Agro-industry has the advantage over assembly industries, for example, in that it does not depend entirely on imported raw materials, even if it is dependent in large measure on foreign markets.

What we are arguing for here is a combination of project and program interventions adding up to a market-oriented strategy which will both begin to increase purchasing power in rural and urban areas, and provide products on which that increased purchasing power can be spent. If the domestic markets in Haiti become stronger, then it is less likely that the fears of some that the country will become totally dependent on external forces and powers will be realized. In this regard, increased purchasing power may be a more viable objective

than food self-sufficiency or even food self-reliance.

Specific areas for proposed intervention, either through components added to existing projects through amendments, or through the development of new projects, are as follows:

1. Agro-Industries

In order to create employment in urban and rural areas outside Port-au-Prince, some new agro-industries should be encouraged to locate outside the capital. If agro-industries are to be encouraged to locate in the provinces, the magnet has to be strong. Since the majority of investment in infrastructure, transport and communications has been in Port-au-Prince for decades, it is easier for entrepreneurs to establish themselves there. Facilities do exist in other towns for shipping, and if it becomes clear that some version of regional development is again to be adopted by the GOH—and by donors—it is possible that resources can be committed to improving infrastructure in the regional towns.

2. Market Development

In the field of marketing development assistance, both the government and the private sector have roles to play. The project supporting PROMINEX to provide a liaison between Haitian entrepreneurs and outside market opportunities could probably be expanded to make more agricultural marketing expertise available. A.I.D.'s experience with Agro-21 in Jamaica or HIAMP in the Eastern Caribbean should be reviewed in this regard.

3. Market Information

Increased access by farmers and market intermediaries to market information is as essential as physical infrastructure. A start has been made by broadcasting coffee prices to make the market more transparent. This could be extended to include a wider range of commodities of interest to farmers and traders.

4. Post-Harvest Losses

Currently, wastage at farm level and in the marketing chain is said to be very high. This might be reduced if rational marketing decisions could be made on the basis of better market information and development and training in post harvest technologies adapted to the circumstances of Haitian producers and traders. Domestic markets are, on the whole, unsanitary and chaotic and need some infrastructural improvements as well as improved marketing practices (grading, for example, in some contexts). Standardization of weights and measures would appear to be desirable for certain products at least.

This year, for the first time, the Faculty of Agriculture is offering options to its degree students. One such option is agro-industry, which includes post-harvest technology. Every assistance should be given to the development of such courses.

5. Infrastructure

The impact of infrastructure is difficult to measure, but its improvement influences development over a very broad field, and certainly cannot be divorced from agricultural development. Impacts in terms of the widening of market opportunities and cost reduction probably affect the rural community most directly. Major road construction from, say, Hinche to Cap Haitien could change the marketing and development patterns of the Central Plateau completely, as would opening the Northwest peninsula to Cap Haitien via a good road along the coast.

6. Education

The right investment climate and market development activities are not enough. To attract investment, Haiti needs to be able to offer a pool of trained workers. For farmers to be able to respond to the needs of market forces and make the necessary investment decisions, the rural community needs improved educational opportunities. Current basic and vocational training opportunities should be examined and developed. Those in the provinces should be examined with particular care.

In the private sector, the number of entrepreneurs capable of developing an agro-industrial base is considered limited. The creation of the Management and Productivity Center should help to remedy this, provided that the needs of agro-industry are understood and catered to.

7. Support to the GOH

The role of the administration is a problem which is examined elsewhere in this report. Despite all the criticism that can be leveled at the administration, the Republic of Haiti is a sovereign state, and will control the activities and operations within its borders by one means or another. This should be clearly recognized in project design, and where the administration can be of assistance to project implementation as well as project design, it should be included. Success of most projects will ultimately depend on the willingness of the GOH to let them be successful. Nationwide replication of any successful development action will require the cooperation and assistance of the GOH.

The GOH and A.I.D. have been discussing administrative reform and decentralization for many years. Decentralization in the Ministry of Agriculture is still a policy provision in the

present Title III Agreement, as we have noted earlier. Within the Ministry, there is considerable discussion of the prospect of decentralization. It is fairly obvious that the quality of life in Port-au-Prince is not the highest, and may yet deteriorate further. Yet, the civil servant posted to the provincial town can find himself facing the equivalent of exclusion from the base of power, as well as deprivations in terms of the standard of living he can provide for his family. These factors must be kept in mind when making realistic assumptions about decentralization and the GOH, as well as about the level of public sector service delivery that can really be expected in the rural sector. Also, decentralization must lead to more appropriate and better service delivery; it is not an end in itself.

At the time of this report's writing, the status of the CNG has been brought into question, as has the timing and success of the electoral process. Policy is in flux, and there are rumored to be changes in ministerial positions even if the CNG remains in power. The IMF and the World Bank have recently sent a joint team to Haiti which will make certain policy recommendations. The GOH may or may not be able or willing to implement these recommendations.

The strategic orientation we are suggesting--toward a market-led development approach for the agricultural sector--is one which depends on forward and backward linkages, and on a beneficent policy environment for success. Thus, we hesitate to go too far in our recommendations about particular crops, agro-industries, processing methods, and the like. What we wish to stress, instead, is the interrelatedness of the linkages in the system that must be addressed if this sort of strategy is to be successfully implemented. This obviously has implications for the type, timing and phasing of projects, both those funded by A.I.D. itself, and those of other donors.

C. Programmatic Implications

We believe that a number of existing projects in the ADRO portfolio are on target in terms of the strategic reorientation we are recommending. That is, they provide information, infrastructure, institutional strengthening or other resources which are likely to conserve natural resources while--at the same time--putting improved physical or institutional resources at the disposition of producers. These include:

Agroforestry Outreach Project;
ADS-II: the National Survey component;
Target Watershed Management Project; and
Coffee Cooperative Development.

The veterinary outreach capability currently being developed for the

pig population could also be extended, as appropriate, to the rest of the livestock sector, either as an amendment to the existing project or as a new project start.

OPED, as noted, has developed several projects which will support agro-industry and agribusiness development. These will be critical to the successful marketing of agricultural commodities produced both on the hillsides and on the plains.

Our analysis of the agricultural sector suggests that there are a number of areas which urgently need to be addressed if the current agricultural crisis in Haiti is to be attenuated in the near to medium term. Here, we will list the studies and/or technical assistance needs identified in some greater detail.

1. Study Haiti's infrastructural needs in roads, ports, provincial airports and telecommunications. Following the study, a joint funding program should be devised with other donors to cover the needs of the country with particular emphasis on marketing needs and the provision of access to those sections of the rural community that are currently isolated.
2. Study existing agro-industries. The study by Mott and Mooney assessing Haitian agribusiness which was recently carried out does not provide sufficient information about agro-industrial needs and potential. Once these are identified, funding should be assured through one of the existing lending institutions, and appropriate management and technical assistance should be provided.
3. Expand the activities of PROMINEX in the agricultural field. Further technical assistance may be required over the long term, but studies should also be funded on the benefits and modalities of special promotions of Haitian produce, e.g. of coffee.
4. Examine current post-harvest technology, identify financially beneficial techniques for storage, transport and packaging which could be adopted, and preferably manufactured locally. If manufacturing capability is needed, prepare a project to facilitate its development.
5. Study the need for weights and measures control and reinforce the capability to do this if it is found desirable.
6. Examine the current system for collecting price information and consider the merits and modalities of widening access to more market operators, from producer to consumer.
7. Prepare an inventory of domestic marketing premises, both urban and rural. On the basis of this inventory, prepare an improvement program. In the case of Port-au-Prince, this should be done in the context of a broader urban planning exercise.

8. Design a project to support the phasing in of soybean production in the plains--e.g., in Leogane, on land formerly in sugar cane for sugar production. The suggested rotation would also include corn, beans and peanuts. The target would be to produce up to 17% of the oil currently imported under PL 480 concessional sales programs.
9. Continue to explore the viability of encouraging production of Sea Island cotton and indigenous cotton. Such support would have to pass muster in times of the "Bumpers Amendment", as would support to soybean production.
10. In all project design, give closer attention to the role of women in agricultural production, processing and marketing and in farm household decision-making. Studies on these topics should also be funded in advance of specific project designs.
11. Identify and fund a series of well-defined studies that will enable A.I.D. to continue to monitor and understand changes in social structure and formal and informal institutions at the local level. The maintenance of this database is, in its way, as important as that of the national agricultural statistical database being developed under ADS-II. Funding of social science and related studies of this kind has been a hallmark of USAID/Haiti's program, and should be continued. Data should be disaggregated by sex.
12. Representatives of the Mission and the GOH may wish to visit Jamaica to assess the Agro 21 project model, and other Eastern Caribbean islands to examine the new HIAMP project initiatives.

D. Mission Organization and Staffing Implications

The present structure of the Mission reflects both sectoral and cross-sectoral divisions, as well as divisions based de facto on the type of funding being managed. Agriculture, as a key sector, and rural development, as a cross-cutting institutionally-oriented program or perspective, are presently grouped in the ARDO. Meanwhile, assistance to agricultural projects also comes through funding from OPVD to the GOH and to PVOs, and from OPED to new parastatal and private sector entities. While there are a number of inter-office committees, and a well-staffed project development and evaluation (program) office which could and should provide linkages and communication between and among projects, programs and staff, Mission offices--like technical ministries--tend to focus on their own portfolios and counterparts.

The result, from what we have been able to observe, is that there are occasions when there is insufficient technical agricultural input into project design and implementation, and similarly, insufficient input from private sector experts to more technical agriculturally-oriented projects. The rural development emphasis, which is reflected in a

series of projects that have technical agricultural content or linkages as well--agroforestry, coffee cooperatives, TWMP--does not seem to have been well articulated either as a domain, a cross-sectoral institutional focus, or as a cluster of activities. To a degree, the rural development/institutional emphasis is taken as synonymous with the hillside strategy. Other agricultural infrastructure projects (such as PDAI) or swine repopulation, and any eventual coffee production project, are likely to be seen as "real" agriculture activities, which need not reflect the hillside strategy, although the latter is directly linked to hillside agriculture.

Meanwhile, the new OPED projects which are designed to assist the development of agro-industries--whether export or domestically oriented or both--seem to exist at present without any backward linkages to related agricultural production supporting activities. Paradoxically, the project to support the new Agriculture Producers Association (APA), will provide technical assistance from agricultural technicians rather than, for example, from agricultural marketing specialists or agricultural economists. Staffing for the ADO, however, seems markedly short of direct-hire personnel with a technical agronomic background or an agricultural economics orientation. Other social sciences are well represented by contractors, as are some biological sciences by project contract staff.

More significant perhaps than the matter of discipline, is the centrality of the rural sector to the present and short-term future USAID/Haiti portfolio, vis-a-vis the way the resources of the Mission staff are organized to deal with it. The economic skills are focused in the Economic Analysis unit, which concerns itself primarily with macroeconomic indicators, factors and studies, although it is also involved in monitoring microeconomic studies under the Title III program. "Private sector"-related expertise is divided between OPED and OPVD, both of which have agriculture-related activities, as we have seen. If Title II and Title III funding allocated to agriculture is combined with ARDN account funding, given present planning guidelines, the proportion represented in the total OYB is 47% for FY 87, 41% for FY 88 and 44% for FY 89.

The combination of the importance of the rural sector to the economy of Haiti, as well as the bureaucratic and funding factors noted above which are significant for Mission management, may constitute a rationale for reallocating staff resources within the present staffing pattern. This would mean combining those DH and contract staff who are managing projects with a direct agriculture or rural development content and orientation into one unit, to be complemented and supported by the EA agricultural economics staff, or perhaps joined with them. If this step were taken, the resulting unit should be managed by an Assistant Director for Agriculture and Rural Development, because of the magnitude of the funding, the size of the staff, and the weight and range of the portfolio.

Recommendation:

USAID/Haiti should seriously consider a reorganization of the Mission's structure—and related staffing implications—given the importance to the program and of the rural sector. This would include a reallocation of staff resources such that projects and programs relating to agriculture, agricultural marketing, agro-industry, and rural development would be managed in a single, multidisciplinary unit, or at least such that bridges among offices (and programs) are created and maintained.

ANNEX A

SCOPE OF WORK

A. Analyze the Constraints of the Farming Systems

Based on the descriptive analysis above, the objective in this task will be to analyze the constraints which prevent rural households within the dual agricultural systems from achieving increased productivity, income, and welfare. These constraints that will be analyzed include: a) the farm level constraints as access to productive resources and natural resources (climate and ecology), and b) support systems constraints (marketing, GOH policies, institutional, and general investment climate).

B. Assess Agricultural Program Strategy

The Technical Assistance Team will rank order the constraints identified in task 3 above; review the Mission's current program for agricultural development, including the institutional mechanisms for carrying them out, i.e., GOH versus NGOs; review host country government goals and policies and activities begin undertaken by other donors. In light of this analysis and those conducted in tasks 1 and 2, the team will recommend a program strategy that offers the most promising solutions to the problems identified and demonstrated that the result will be commensurate with the needs and effective in terms of cost. The Technical Assistance Team will recommend to the Mission adjustments to the current strategy and propose a program that can be initiated during the course of the next 5 years.

C. Description of Duties

1. Conduct an Analytical Description of Haiti's Agricultural Sector

This task will result in a technical and analytical description of the agricultural sector and will place the sector within the country's macro economic framework and analyze its contribution to GNP, balance of payments, supply of food and raw materials (domestic and export), employment, income and overall government revenues. The analysis in this task should be conducted utilizing available data from USAID studies, Project Papers, Action Plan, completed since 1982, as well as those from GOH, World Bank, IMF, emphasizing the relative growth rates over the last 5 to 10 years and make projections for the next 5 to 10 years. The report will provide a description of important subsectors, i.e., forestry, food crops, livestock, etc.

2. Provide a Description and Analysis of Haiti's Dual Agricultural Systems

Given the duality of the Mission's strategy in the past few years, this task will provide an analysis of hillside agriculture versus plain agriculture.

The overall objective of this task will be to identify potential beneficiary groups of the Mission's future programs. Such indicators as farm income, crop production or other surrogate indicators of the quality of life of farm families in both farming groups should be analyzed. Emphasis should be placed on describing the resource base of both groups in terms of land holdings, labor productivity, capital, technology, tenure, and the orientation towards markets (percentage of total farm production sold for cash or bartered as distinct from that consumed; marketing arrangements in terms of how they sell their products, i.e., to cooperatives, middlemen or self-marketing, etc.

3. Documentation to be Consulted Before Arrival in Haiti

- (1) Clarence Zuvekas, Jr., AGRICULTURAL DEVELOPMENT IN HAITI (May 1978) A.I.D./W.
- (2) Terry L. Roe, AN ECONOMIC EVALUATION OF THE HAITIAN AGRICULTURAL MARKETING SYSTEM (1978) A.I.D./W.
- (3) Roe Borsdorf & Kathy Foster (KSU), THE EDIBLE OIL AND FAT SECTOR IN HAITI (1983) Report No. 93.
- (4) Roe Borsdorf, Kathy Foster & Ekramul Haque, FEASIBILITY OF A GRAIN PRICE STABILIZATION PROGRAM IN HAITI (KSU)(1985) Report No. 103.
- (5) John Erikson, N. Nicholson, et al 1982, FOOD SECTOR STRATEGY STUDY, USAID/Haiti.

ANNEX B

SECRETARIAT TECHNIQUE A L'AMENAGEMENT DES BASSINS VERSANTS (STAB)
NAMES OF THE PRINCIPAL PROJECTS CONCERNED
WITH WATERSHEDS IN HAITI

Agricultural Development Support Project II
Afe Neg Combite
Cooperative for American Relief Everywhere
Convention Baptiste d'Haiti
Centre Canadien d'Etudes et de Coop Internationale
Concile des Eglises Evangeliques d'Haiti
Centre Emmaus Papaye Hinche
Centre de Formation en Amenagement de Morne
Centre de Formation de Grepin
Comite Haitien pour le Developpement
Centre Haitien d'Education Rentable de Papaye
Caritas Nationale d'Haiti
Comite de Developpement et de Planification
Coude a coude pour le Developpement Valleen
Comite Evangelique pour le Developpement Agricole
Comite Paroissial de Bainet
Centre de Recherche-Developpement Gris-Gris
Centre de Recherche-Developpement La Vallee
Developpement Communautaire Chretien d'Haiti
Dev Communautaire de l'Eglise Methodiste
Dev Commun. Lafond, Areguy, Montagne la Voute
Developpement Rural Integre L'Azile
Developpement Regional Integre Jeremie
Dev Reg Int Petit-Goave-Petit-Trou-de-Nippes
Fond Agricole Terre Neuve
Frere de l'Instruction Chretienne
Eglise Evangelique d'Haiti
Fond Haitiano-Allemend pour le Developpement
Hopital Bon Samaritain Limbe
Institut Chretien de la Vie Rural
Ilot de Developpement Bongnotte
Integred Rural Developpement
Mission Baptiste Conservatrice
Mennonite Central Committee
Mission Emmanuel International
Mission Eglise Evangelique d'Haiti
Madian Salagnac Aquin
Organisme de Dev Bassin Fleuve Artibonite
Organisme de Dev du Nord-Quest
Organisme de Dev de la Plaine des Gonaives
Organisme de Dev de la Vallee de l'Artibonite
Organisation Pour Rehabilitation de l'Environnement
Projet d'Amen des Bassin Versants
Pan American Developpement Foundation
Projet Agro-Sylvo-Pastoral
Projet Developpement Agricole Integre

Projet Developpement Integre de Desarmes
Projet Developpement Regional Integre de Jacmel
Projet Developpement Rural des Verettes
Projet Forestier National
Projet Inter-aide Ennery
Projet a Haute Intensite de Main d'Oeuvre
Plan de Parrainage
Projet Production Cafe Cacao
Protection Pic Macaya Sud
Projet Rehabilitation Rural de Gebeau
Projet Riviere Blanche
Projet Riviere Froide
Projet Riviere Grise
Protection Source Kartov
Projet Sauver Terre Okay
Projet Trois Rivieres Integre
Rotary Club International
Save the Children
Service Chretien d'Haiti
Service Haitien d'Etude & d'Execution Projet Agr
Service Oecumenique d'Entraide (SOE)
Service Prochain Haitien
Union des Cooperative de la Region Sud
World Vision International

ANNEX C

Agroforestry (AF) and Soil Conservation (SC) Interventions and Application

Richard Pellek

The following general descriptions pertain to the agroforestry (AF) and soil conservation (SC) interventions in current use in Haiti; more importantly, the descriptions amount to de facto definitions as I interpret the terms.

Terrasses Vives (living terraces) (AF)

The planted grasses, shrubs or perennials on the contour, particularly in moderately sloping to strongly sloping land, for the purpose of erosion control, production of fodder, green manure and/or edible commodities.

Haies Vives (Hedgerows) (AF)

Similar to living terraces, but may also be found on land that is not particularly sloping. The emphasis in "hedgerow" technology is on the layout, architecture and species composition of the hedgerow itself.

Alley Cropping (AF)

A complementary land use system where in the chief emphasis is put on the crops between the adjacent hedgerows. Due to the novelty of the alley cropping systems in Haiti (or in other places in the Western World for that matter) the complementarity of alley cropping and hedgerows has not yet been demonstrated or elaborated.

Rampe de Paille (litter terraces) SC)

A traditional Haitian techniques whereby straw, sticks and dead branches or other material is interwoven in contoured lines on the hillside. The 'rampes de paille' are anchored with pegs that are driven into the ground, also along the contour.

Greffes (Grafting) (AF)

An adjunct intervention which pays soils conservation and potential cash income benefits in the purported agroforestry strategies in Haiti. Grafting is done on high value fruit trees primarily. Also, most grafting is done off-site by skilled grafters at a relatively high cost per grafted tree. Some on-site grafting on farmers' lands is being promoted by the Organisation pour la Rehabilitation de l'Environnement ORE in the South-West of Haiti. Grafted trees, however, remain only as incentives which reach only token numbers of beneficiaries in development programs.

Bandes Enherbes (AF) or (SC)

Similar to Haies Vives and Terrasses Vives, the 'bandes enherbes' are interventions of which I have no personal experience. The choice of species, height, rationale and efficacy are subjects which should be publicized.

Structures Mecaniques, Cordon de Pierre and Structures Biomecaniques (SC)

All of the above are soil conservation interventions which employ stone, dry masonry, or, in some cases, concrete contour walls, gully plugs and check dams to impede overland flow of water and to trap the soil behind them. In the case of "structures biomecaniques", shrubs, grasses or perennials are also planted either above or below the structure to take advantage of the impeded moisture promoting more rapid growth. Developing roots also stabilize the structures themselves. In Haiti mechanical structures have proven largely ineffective because of the high rate of in situ infiltration and percolation of rainwater, and also because of the general absence of soil fines, particularly clay, that could act as a barrier to the movement of soil particulate matter.

The practice of constructing mechanical devices persists as a holdover of institutional policy within "development organizations", and stems from the fact that such soil conservation practices work effectively in the soil types of other countries where peripatetic conservationists may have worked.

Canal de Contour (SC)

A moderately deep trench (30-60 cms.) dug into the soil along the contour to trap and diffuse rainfall. Although contour canal digging could be justified on its own merits, in most cases the canal itself is part and parcel of the "terrasses vives", "bandes enherbes" and "structures biomecaniques". The canal itself is overlooked where it is part of the more sophisticated approaches undertaken.

Applications of Terminology

It must be said that terms such as "living terraces" or its common variants, e.g. "rampes vivants", "leucaena hedgerows", etc. are not really synonyms, nor are they true terraces. The "terraces" are seldom more than 1.2 meter wide. True terraces are rarely seen in Haiti.

There is little or no hard data on the efficacy of any agroforestry or soil conservation interventions as practiced in Haiti. In light of the enormous attention being given to the promotion of the wide variety of interventions, and to the actual expenditures being made, it would be justified to call for some fundamental research.

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