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THE VALUE OF INFORMATION FROM
A NATIONAL AGRICULTURAL SURVEY:
INFERENCES FROM ESTIMATION
OF FSR/E RECOMMENDED PRACTICES IN [illegible]

Report 830

THE VALUE OF INFORMATION FROM A NATIONAL AGRICULTURAL SURVEY: INFERENCES FROM EXTENSION OF FSR/E RECOMMENDED PRACTICES IN HAITI

by

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ADS-II Report #30

THE VALUE OF INFORMATION FROM A NATIONAL AGRICULTURAL SURVEY: INFERENCES FROM EXTENSION OF FSR/E RECOMMENDED PRACTICES IN HAITI

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SUMMARY

This paper examines the value of information derived from a recurrent national agricultural survey in Haiti, West Indies. The information provided by the survey includes seasonal area and yield estimates for all major crops in each of Haiti's nine administrative departments. Using this and the best previously available information, comparisons are made of projections in the net benefits of a proposed program to extend improved practices developed by a Farming Systems Research and Extension (FSR/E) project in the Southern Department of Haiti. The value of the survey information is inferred from differences in the extension program investment decision likely to result from these comparisons. The analysis indicates the survey information and the proposed extension program have a substantial value.

INTRODUCTION

Economic evaluations of information systems such as the Haitian National Agricultural Survey are important, though largely neglected activities. Throughout much of the world, funding for the development of improved information systems is generally given a low priority. Governmental and donor agency policy-makers and analysts need to become aware of the potential value of improved information not only to facilitate choices among alternative information systems but also to understand the trade-offs involved in allocating limited resources to these systems and among other programs which depend upon the information developed by these systems.

FSR/E projects, in particular, are dependent upon national agriculture information. Because FSR/E seeks to examine all relevant interrelationships between the natural and human environment of households' farming systems, this intensive approach is limited in the number of households and locales that can be served directly by farming systems projects. Hence, the considerable cost of undertaking FSR/E may outweigh the benefits of the developed improved management and technology practices if insufficient resources are allocated to related programs of extension to the appropriate recommendations domains. Agricultural information on a national basis is needed to define these national or regional-level recommendation domains in order to focus the extension effort. Even before the extension effort commences, however, national or regional agricultural information is required to evaluate the extension program's projected benefits.

This paper examines the value of information derived from a recurrent national agricultural survey in Haiti via an evaluation of a proposed extension program of FSR/E project results. The analysis concentrates on the crop and area estimates provided by this new information system and compares and contrasts this with that provided by the previous information system. The implications of these estimates and resulting projections of net benefits for the proposed extension program based on results from the FSR/E project in one department of Haiti are presented and discussed. The difference between the value of the extension program investment decision likely to be taken 'with vs without' the new information is presented as a partial estimate of the value of the survey information.

PROBLEM STATEMENT

Information has value if it can lead to improved decision-making. The difficulty faced in assessing the value of information is that its worth will vary according to the user. Since obtaining information is not a costless activity, the valuation of information provides a means to assess the net benefits of information gathering. In the Third World, where a dearth of information exists, such evaluations are especially important. Hence, by evaluating the benefits of information gathering along with other development projects, a more efficient allocation of domestic and donor funds can result.

In an assessment of Haiti's National Agricultural Survey, the value of its crop area and yield estimates is assumed to be equal to the value of the decision concerning future funding for extending FSR/E recommended practices <u>provided that</u> this new information modifies existing or probable decisions using old information. Consequently, the problem under investigation in this paper requires evaluations of the potential net benefits of extending the FSR/E recommended practices under crop area and yield conditions described 'with vs without' the new information system.

To accomplish this, we combine the results of the FSR/E project in the Southern Department of Haiti with the estimates of crop yields and areas from the recurrent national agricultural survey, projecting estimates of net benefits of investment in the extension of improved farming systems practices. The net benefits of this analysis are then compared to an identical evaluation using pre-survey estimates of crop yields and areas for the same recommendations domains. In this manner we are able to show concurrently the value of information derived from the national survey and the value of extension of FSR/E project results.

BACKGROUND

Since February, 1984, the Agricultural Development Support II Project (ADS-II) has been engaged in FSR/E in the Jacmel and Les Cayes regions of

Haiti, located respectively in the Southeastern and Southern Departments of the country. The FSR/E team has worked with virtually all important food crops cultivated in its zones of intervention. However, success in on-farm research has come more quickly for some crops than for others. Although considerable progress has been made towards identifying improved varieties of rain-fed rice, cowpeas, sweet potatoes and bitter manioc, the most successful technology practices introduced and tested by the project have been those developed for maize, sorghum, irrigated rice and black beans. The recommended practices include higher yielding varieties for each of these four crops and the use of fertilizer for the production of maize and rice. A summary of yields under traditional practices for these crops and projected average increases available from adoption of ADS-II recommended practices are presented in Table 1.

The expected yield percentage increases stemming from the adoption of recommended practices were calculated from ADS-II FSR/E results of farmer managed pre-extension trials. These trials took place in four sub-zones of intervention involving some 600 households between 1984-86 [ADS-II Report #33]. Because a majority of the trials in the Southern Department involved monoculture crops, the projected percentage yield increases indicated should be considered applicable only to monoculture cropping systems which are found primarily in the intensively cultivated plains and hill-sides of the Southern Department.

Table 1. Estimated Average Yields under Traditional Farming Practices and Expected Percentage Increase in Yields with Recommended Practices for the South Department of Haiti

Crop	Yield Estimates (kg/ha) Traditional Practices MARNDR	ADS II	Expected % Increase in Yield with Improved Practices
Maize	593	680	109
Sorghum	556	710	132
Rice	1221	1400	39
Black Beans	475	400	125

MARNDR: Haitian Ministry of Agriculture, Natural Resources and Rural Development
ADS-II: Agricultural Development Support Project II, National Agricultural Survey

The ADS-II National Agricultural Survey was initiated in April, 1985. Beginning as a pilot survey in the Southern Department during the second agricultural season of 1985, the survey has gradually expanded its seasonal geographical coverage to the entire country. The survey uses an open-segment area frame methodology [ADS-II Report #21] and has generated the first comprehensive information derived from a probability sample ever presented on basic agricultural activities in Haiti.

The ADS-II survey estimates presented in Table 1 are the average,

seasonal yields, based on farmer recall, from the intensive plain or intensive mountain stratum in the South Department for the years 1985-86 [ADS-II Report #28]. The intensive strata are defined as those areas having at least 40% of total land area in field crop production as determined by interpretations of aerial photography of the region. Yields from these strata were used in the analysis since households in these strata bear the closest resemblance to the farming systems types present in the zones where the FSR/E research trials were conducted and recommended practices developed.[1] Households within these strata also tended to have higher percentages of monoculture crops present.

The Haitian Ministry of Agriculture estimates presented in Table 1 were derived from informal surveys of ministry officials and, prior to the ADS-II survey, represented the best available information on crop areas and yields [Service de Statistiques Agricoles]. Within the context of this analysis, these estimates represent the results of the previous information system. The MARNDR estimates have no probability basis, few statistical pretensions, and are not available at any sub-departmental level. Because these estimates are only on a departmental basis, they represent an average of yields for crops grown in monoculture and also in association. Since the yields for crops grown in association are generally lower than that for monoculture crops, a departmental average of the two together would likely give lower yield estimates than one would expect for the relevant recommendation domains in the analysis. The ADS-II estimates suffer the same problem since they too are yield estimates that are averages of crops grown in monoculture and in association. However, since the ADS-II estimates are on a sub-departmental level representing yields from the intensive plain and mountain strata where monoculture practices are much more common than in the Department as a whole, the downward bias is likely to be less than for the MARNDR data.

CONCEPTUAL MODEL

Any discussion of the economic theory of the value of information generally begins by associating this value to the 'expected utility gain' that can be obtained through the use of the information in question. For example, Perrin [p.55] defines the value of information as "... the increment in expected payoff (in terms of utility) that can be realized by utilizing the information in making the decision". Although 'expected utility gain' is the accepted theoretical criterion for measuring the value of information, economists universally opt for an admittedly inferior, though practical approximation when dealing with applied problems: the expected monetary payoff is substituted for the abstract and

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[1] FSR/E traditional yield trial estimates were generally higher, especially in the case of rice, than those indicated for the survey. These yields were not used in the analysis since they cannot be considered representative of average yields for the entire stratum in question.

unmeasureable utility concept.

In applied economic analysis, the expected monetary payoff criterion is many times manifested by attempts to identify what consumers of some commodity would b 'willing to pay' for different quantities of the commodity. Implicit in the usage of willingness to pay is the assumption that consumers can evaluate in monetary terms the expected utility payoff received from the commodity and could express this payoff in terms of the amount they would be willing to pay for it. In benefit/cost analyses of public policies or investment decisions, willingness to pay is many times assumed to equal the sum of the monetary benefits which accrue to affected parties. In analyzing these types of problems, economists seek to estimate the net monetary benefits that have or would accrue 'with vs without' the policy or investment.

The model used to derive the estimated net benefits from adoption of the FSR/E recommended practices with extension, calculated with vs without the new information, is presented in expression 1.

Expression 1.

$$NB = \left| \sum_{i=1}^{i} \sum_{n=1}^{n} [(([(Hs_{in}Ys_iP_iAe_{in} - Hs_{in}C_iAe_{in}) - (Hs_{in}Ys_iP_iAc_{in} - Hs_{in}C_iAc_{in})] - [(Hm_{in}Ym_iP_iAe_{in} - Hm_{in}C_iAe_{in}) - (Hm_{in}Ym_iP_iAc_{in} - Hm_{in}C_iAc_{in})])/(1 + r)^n] \right|$$

where: NB = Absolute difference between the dollar value of the discounted projected net benefits of an extension program of FSR/E recommended practices calculated from ADS II and MARNDR crop area and yield estimates.

Hs_{in} = Estimated crop area recommendation domain, in hectares, derived from the ADS-II survey using the FSR/E recommended practices for crop i in time period n.

Hm_{in} = Estimated crop area recommendation domain, in hectares, derived from the MARNDR using the FSR/E recommended practices for crop i in time period n.

Ys_i = Estimated expected increase in yield (kg/ha) derived from ADS-II National Survey estimates from using FSR/E recommended practices for crop i.

Ym_i = Estimated expected increase in yield (kg/ha) derived from MARNDR estimates from using FSR/E recommended practices for crop i.

P_i = Average price (US $/kg) for crop i in 1986.

C_i = Marginal cost (US $/ha) from using the FSR/E recommended practices for crop i in 1986.

Ae_{in} = Proportion of the area of the defined recommendation domain using the FSR/E recommended practices as a result of the extension program, for crop i in time period n.

Ac_{in} = Proportion of the area of the defined recommendation domains using the FSR/E recommended practices without an extension program, for crop i in time period n.

r = Discount rate.

n = Time period in years.

Implicit in expression 1 is the likelihood that the greater the difference in the projected net benefits calculated from the two sources of information, the greater is the chance that the ADS-II national survey information may change an existing or future decision to invest (or not invest) in the extension program of the FSR/E recommended practices, Ceteris Paribus. If the difference in the projected net benefits of extension between the two information sources is sufficient to change a policy decision from non-investment to investment in an extension effort, the value of information from the ADS-II survey is equal to the sum of the discounted net benefits, calculated using the survey estimates of crop areas and yields, less the discounted cost of the extension effort.

Expression 1 may be solved in its entirety or by component parts. The first bracketed term, $[(Hs_{in}Ys_iP_iAe_{in} - Hs_{in}C_iAe_{in}) - (Hs_{in}Ys_iP_iAc_{in} - Hs_{in}C_iAc_{in})]$, is the projected increase in aggregate net benefits from adoption of the FSR/E recommended practices with an extension effort less the projected increase in aggregate net benefits from adoption of the FSR/E recommended practices which would occur without an extension effort, using the crop areas and yields estimates from the ADS-II survey. The second bracketed term, $[(Hm_{in}Ym_iP_iAe_{in} - Hm_{in}C_iAe_{in}) - (Hm_{in}Ym_iP_iAc_{in} - Hm_{in}C_iAc_{in})]$, is this same projected increase in aggregate net benefits but calculated using the MARNDR estimates of crop areas and yields.

The net benefits from adoption of the recommended practices that would occur without a formal extension effort are subtracted from the net benefits that would occur with an extension effort in both bracketed terms in order to avoid an overestimation of net benefits attributed to the extension effort. A formal extension effort is seen as a method to raise the natural rate of adoption so as to ensure an earlier accrual of the projected net benefits. An illustration of this concept is given in Figure 1. A formal extension program for recommended practices causes a shift in the natural adoption curve to a new and higher adoption curve. Conceptually, the gross benefits of a formal extension program is represented by the discounted value of the area between the two adoption curves. If these gross benefits exceed the cost of the extension effort, then the extension program has a positive societal value.

Due to a variety of factors including the relative riskiness and profitability of the individual recommended practices, differing adoption rates for each crop in expression 1 would be expected. However, for simplicity we have assumed equal relative adoption rates over all crops in each extension scenario presented below in the analysis.

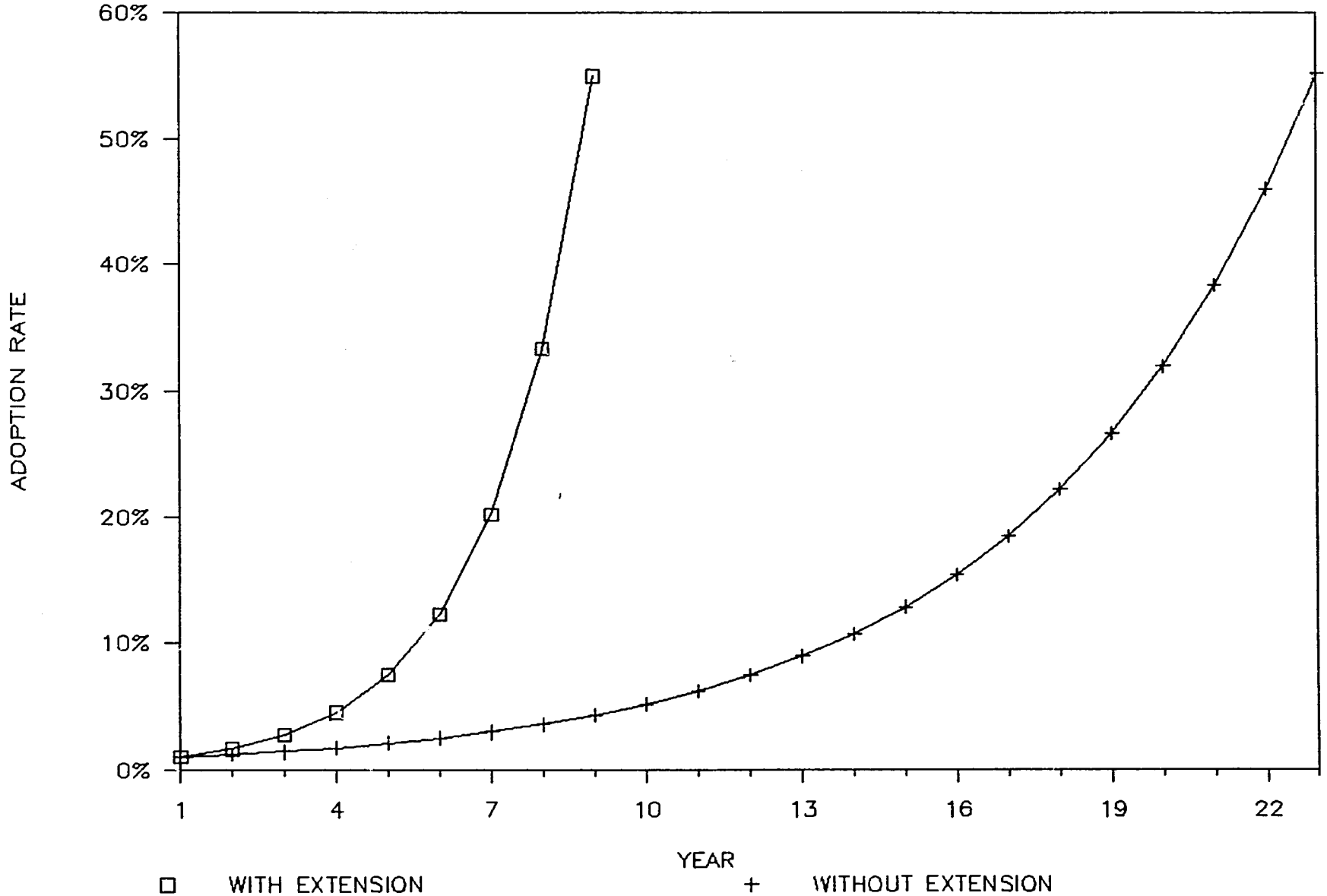
For ease of interpretation, expression 1 may be rewritten as in expression 2:

Expression 2.

$$NB = \sum_{i=1}^{i}\sum_{n=1}^{n}[(Ae_{in} - Ac_{in})\ [(Hs_{in}Ys_iP_i - Hs_{in}C_i) - (Hm_{in}Ym_iP_i - Hm_{in}C_i)]]/(1 + r)^n$$

HYPOTHETICAL ADOPTION RATES OVER TIME

WITH VS WITHOUT EXTENSION



This expression indicates that the difference in projected net benefits of extension from the two information sources equals the difference between the program-induced and natural rates of adoption multiplied by the difference in net benefits implied by each information source.

By differentiating expression 2 with respect to the adoption rates with and without extension, one can determine the effect upon the difference in the projected net benefits of extension implied by the two sources of information as the adoption rate rises from an extension effort. This is illustrated in expression 3:

Expression 3.

$$\partial NB/\partial(Ae_{in} - Ac_{in}) = \sum_{i=1}^{i}\sum_{n=1}^{n}\frac{[(Hs_{in}Ys_iP_i - Hs_{in}C_i)-(Hm_{in}Ym_iP_i - Hm_{in}C_i)]}{(1 + r)^n}$$

As the difference in adoption rates with and without extension increases, the difference in the projected net benefits from the two sources of information also increases.

Differentiating expression 2 with respect to the discount rate, we see that as the discount rate increases, the difference in the projected net benefits of extension from the two information sources decreases. Hence, the higher the discount rate, the smaller is the difference in the net benefits of extension between the ADS-II crop area and yield estimates and the MARNDR information. This is illustrated in expression 4.

Expression 4.

$$\partial NB/\partial r = \sum_{i=1}^{i}\sum_{n=1}^{n}\frac{-n[(Ae_{in} - Ac_{in})[(Hs_{in}Ys_iP_i - Hs_{in}C_i)-(Hm_{in}Ym_iP_i - Hm_{in}C_i)]]}{(1 + r)^{n+1}}/$$

ANALYSIS AND DISCUSSION

The data used to analyze the problem is presented in Table 2. The crop areas for the ADS-II National Survey represent estimates of the areas of the relevant recommendation domains and are equal to the total estimates of areas grown in monoculture for each crop in the Southern Department of Haiti. Although no department-level estimates for monoculture areas from the MARNDR source exist, national estimates of monoculture proportions are available [Service de Statistiques Agricoles]. These proportions were assumed to be the same for the Southern Department and the MARNDR crop area estimates were adjusted accordingly.

Market prices used to evaluate the net benefits of the recommended practices are annual averages of price data collected weekly by the

ADS-II FSR/E team from five local markets in the South department throughout 1986. The marginal cost data for the recommended practices were obtained from the previously mentioned farmer managed pre-extension trials undertaken between 1984-86.

Table 2. Crop Area and Yield Estimates for the FSR/E Recommendations Domains, Market Prices and Projected Marginal Costs per Crop with Adoption of the Recommended Practices

CROP	HECTARES MARNDR	HECTARES ADS-II	AVERAGE YIELD (kg/ha) MARNDR	AVERAGE YIELD (kg/ha) ADS-II	PRICE (US$/kg)	MARGINAL COST (US$/ha)
Maize	15,087	19,720	593	680	0.360	66
Sorghum	16,485	31,130	556	710	0.446	97
Rice	3,871	7,360	1,221	1,400	0.698	187
Black Bean	3,575	5,390	475	400	0.890	0

MARNDR: Haitian Ministry of Agriculture, Natural Resources, and Rural Development.
ADS II: Agricultural Development Support Project II, National Agricultural Survey.

Table 2 indicates that, with the exception of the yield estimate for black beans, all ADS-II estimates are higher than corresponding MARNDR estimates. Thus, even without the benefit of using expression 1, it is apparent that the projected net benefits of an extension program would be higher using the ADS-II estimates than with the MARNDR estimates. However, as previously discussed, it is probable that the MARNDR yield estimates have a greater downward bias than do the ADS-II yield estimates. Nevertheless, it is extremely unlikely that bias-adjusted yield estimates would be sufficient to offset the large differences in area estimates in the net benefit calculations.

The values in Table 2 were used to solve the component parts of expression 1 under differing scenarios of projected adoption rates and discount rates. It was assumed that the maximum rate of adoption would be achieved at the end of the fifth year of a formal extension effort. Under the extension effort scenarios, maximum adoption rates of 10%, 25% and 50% of the estimated areas for each crop were assumed. Adoption of the recommended practices without extension was assumed to be 1% of the estimated areas for each crop at the start of year 1 and to increase at a compounded rate of 10% per year. In all three extension effort scenarios, the adoption of the practices at the start of year 1 was the same as for the natural rate of adoption without an extension effort.

The rate used to discount future costs and benefits is crucial in determining the value of the projected net benefits of an investment. Often, the market rate of interest is used since it should reflect the opportunity cost of the capital invested in a proposed project. Disadvantages of this approach include the fact that there is never one

single market rate of interest and that, even if one existed, such a rate would not adequately reflect society's regard for consumption by future generations. Hence, in investment evaluation it is useful to determine the sensitivity of projected net benefits to different discount rates. The three discount rates chosen to determine the net benefits of an extension program of the FSR/E recommended practices were 10, 25 and 40%. The 25% discount rate is the approximate rate of interest on borrowed (bank) capital in Haiti. The 10% rate is close to the discount rate currently used by the United States Agency for International Development in Haiti (USAID/Haiti) for evaluation of project investments. The 40% rate reflects the authors' bias concerning the appropriate rate of discount to use for public investment decisions in Haiti.

The projected net benefits of a five year extension effort under the differing scenarios of adoption rates and discount rates is presented in Table 3.

Table 3 indicates a wide range of values for the projected net benefits of an extension program. The highest total net benefit projections are, respectively, some 29 million and 59 million dollars for the MARNDR and ADS-II estimates calculated under the 50% adoption and 10% discount rate assumptions. The lowest total projected net benefits stem from the 10% adoption and 40% discount rate assumptions and are approximately 0.7 and 1.4 million dollars, respectively, for the MARNDR and ADS-II estimates.

The total projected net benefits for each discount rate under the different adoption rate assumptions are presented graphically in Figure 2. To facilitate comparisons, a total projected extension program investment cost of 2 million US dollars is also indicated. This total cost for a formal extension effort spread over a 5 year period seems reasonable by current project standards in Haiti. These funds are assumed to be obligated at the start of year one.

Figure 2 indicates that the net benefits from the extension program outweigh costs under all scenarios using ADS-II data except those under the 10% adoption and 40% discount rate assumptions. Using the MARNDR data, costs exceed benefits under the 10% adoption rates for the 25% and 40% discount rates and the 25% adoption rate for the 40% discount rate assumptions. Since Expression 1 is linear in adoption rates given any discount rate, the figures may be used to determine approximate break-even adoption rates for each discount rate scenario. Thus, under the 25% discount rate assumption using the MARNDR information, a 2 million dollar investment in extension would break-even if the extension effort converted approximately 12% of the crops' areas to the new technologies. Using the ADS-II information for the same scenario, the extension program would more than break-even over the entire range of indicated adoption rates. Under the 40% discount rate scenario, the break-even adoption rates would occur around 13% and 29%, respectively, for the ADS-II and MARNDR information. Under the 10% discount rate scenario, both information sources indicate the extension program would more than break-even over the entire range of indicated adoption rates.

Table 3. Net Present Values of an Extension Program for the FSR/E Recommended Practices by Adoption Rate, Discount Rate, Information Source, and Crop (US 1986 $ 000's)

	50% ADOPTION RATE					
	DISCOUNT RATE					
	10%		25 %		40%	
	MARNDR	ADS-II	MARNDR	ADS-II	MARNDR	ADS-II
Maize	8,368	13,174	2,281	3,592	1,009	1,588
Sorghum	12,535	32,996	3,417	8,995	1,511	3,978
Rice	1,819	4,633	496	1,263	219	559
Black Bean	6,274	7,966	1,710	2,172	756	960
TOTAL	28,996	58,770	7,905	16,022	3,496	7,085

	25% ADOPTION RATE					
	DISCOUNT RATE					
	10%		25 %		40%	
	MARNDR	ADS-II	MARNDR	ADS-II	MARNDR	ADS-II
Maize	4,184	6,587	1,141	1,796	504	794
Sorghum	6,267	16,498	1,709	4,498	756	1,989
Rice	909	2,317	248	632	110	279
Black Bean	3,317	3,918	855	1,086	378	480
TOTAL	14,498	29,385	3,952	8,011	1,748	3,543

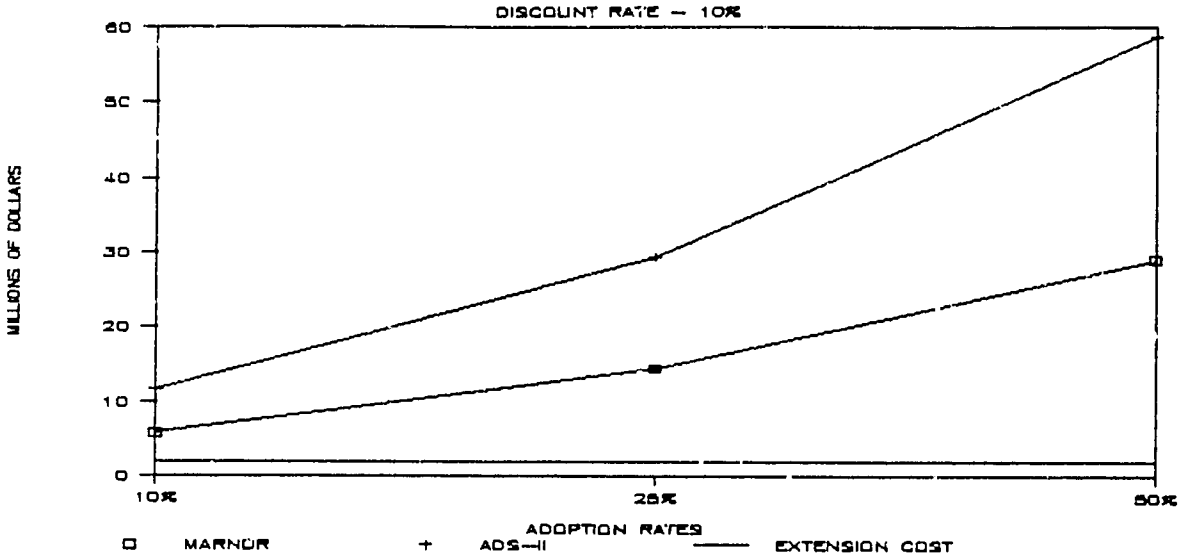
	10% ADOPTION RATE					
	DISCOUNT RATE					
	10%		25 %		40%	
	MARNDR	ADS-II	MARNDR	ADS-II	MARNDR	ADS-II
Maize	1,674	2,635	456	718	202	318
Sorghum	2,507	6,599	683	1,799	302	796
Rice	364	927	99	253	44	112
Black Bean	1,255	1,593	342	434	151	192
TOTAL	5,799	11,754	1,581	3,204	699	1,417

N.B. Totals may not add due to rounding error.

The appropriate scenario to use in evaluating the potential value of the FSR/E research via investment in the extension program and, concurrently, the value of the national survey information remains somewhat subjective. The subjectivity stems more from likely disagreements concerning the appropriate discount rate to use than from

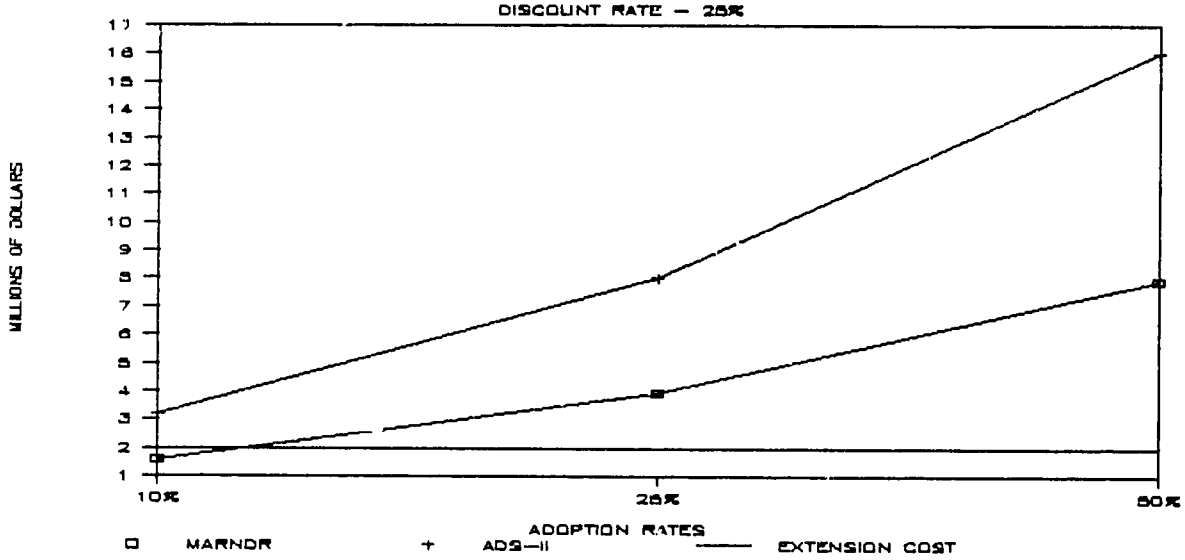
PRESENT VALUE OF FSR/E RESEARCH

DISCOUNT RATE — 10%



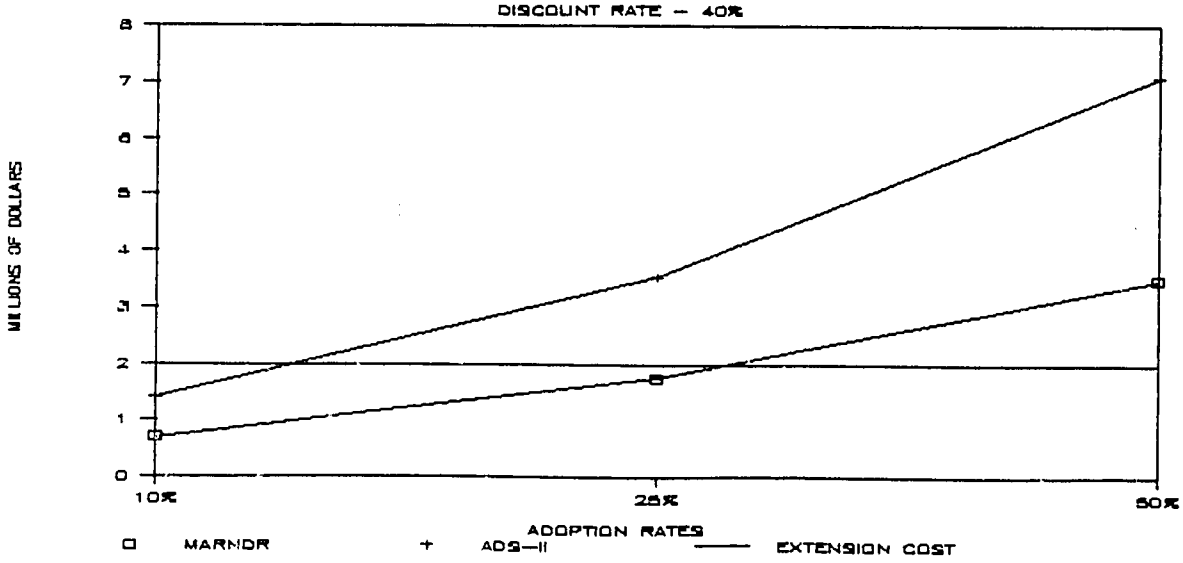
PRESENT VALUE OF FSR/E RESEARCH

DISCOUNT RATE — 25%



PRESENT VALUE OF FSR/E RESEARCH

DISCOUNT RATE — 40%



disagreements concerning appropriate and feasible target extension adoption rates. Probably most policy analysts would accept an adoption rate of 25% of the recommendations domains as an appropriate and feasible target for a formal extension effort in the Southern Department. 25% adoption would represent a conservative but, at the same time, substantial contribution to welfare of Haitian farmers. The appropriate discount rate is another issue.

We argue that, given the present uncertain socio-political climate in Haiti, the low relative level of development and the large number of potential and cost-effective alternative investment programs this underdevelopment implies, and the high informal interest rates paid by Haitian farmers, a high discount rate would be appropriate for evaluating any proposed extension project. Consequently, we argue for the most conservative discount rate scenario presented above.

Given the results of the analysis in Table 3 for the 25% adoption and 40% discount rate scenario, estimated values for both the potential benefits of the extension program of FSR/E recommended practices and the national survey information can be determined directly. The total estimated value of the FSR/E recommended practices is some 3.5 million dollars. If a 2 million dollar extension project is required to achieve the 25% adoption rate in the Southern Department, this would imply a benefit/cost ratio of 1.77. Furthermore, since the analysis using the MARNDR information would preclude the extension project and the gain in net social benefits resulting from the 25% adoption rate, the value of the national survey information in this case is equal to the difference between the total benefits and the cost of the extension project, or, some 1.5 million dollars. This sum would be sufficient to support all the activities of the national agricultural survey in all nine departments for about two years.

CONCLUSIONS

The value of recurrent agricultural survey information in Haiti was investigated by analyzing a potential investment decision with vs without the survey information. It was found that the projected net benefits of a proposed extension project designed to disseminate FSR/E developed recommended practices vary considerably depending upon the information source, the target adoption rate and the discount rate. Under conservative assumptions, it was found that the survey information was sufficient to affect the investment decision and therefore had significant value. The value of the national survey information was shown to be the difference between the projected net benefits and the cost of an extension program, calculated using survey estimates.

The results also indicated that regardless of the discount and adoption rate assumptions used, the ADS-II project FSR/E research completed to date has a very significant potential value. However, if this potential is to be realized, extension efforts to raise the adoption rates must be undertaken.

We recognize that the subject FSR/E project has additional benefits not included in this analysis. The target recommendations domains were limited to monoculture areas in one department in order to synchronize FSR/E, national survey and MARNDR information. A complete definition of the appropriate recommendations domains would include areas in virtually all other departments of Haiti. Also, the recommended practices developed or being developed for crop associations, specialty crops, agro-forestry, animal husbandry and soil conservation have been omitted from the analysis. Consequently, this analysis should not be interpreted as a complete evaluation of the ADS-II FSR/E project.

Similarly, we recognize that the evaluation of survey benefits is also understated. All secondary costs and benefits from the survey have been omitted. It is also clear that the survey information has much more potential value than this one example. A large number of similar project-level problems could be analyzed and decisions modified as a result of this new information. Other survey information, available nowhere else, could be used to estimate agricultural supply functions, farm income and other macro-level variables of interest to policy-makers. Probably the greatest benefit is the analytical environment established by the survey information system. Such an environment facilitates problem identification and analysis, and the development of policy priorities and prescriptions.

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