Evaluating a Publicly-Funded, Privately-Delivered Agricultural Extension System in Honduras

by

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Abstract

This paper evaluates a publicly-funded, privately delivered extension program (outsourcing) for small farmers located on the hillsides of Honduras. It provides evidence that (a) the extension program was a success, (b) delivery of public goods can be successfully contracted privately, (c) income-generating activities provide the basis for successful extension programs, implying desirable environmental outcomes are best bundled with profit-making activities, e.g., as in agro-forestry, and (d) women are an important clientele for agricultural extension programs. Economic analyses of extension programs can be improved by a) evaluating extension activities, not extension programs, b) extension programs should be organized as they are perceived by farmers (i.e., profit centers), c) indicators collected to justify payments can play a dual role in analyzing extension program effectiveness, and d) an

outsourced extension program has advantages in overcoming problems in economic evaluations of programs when the treatment populations are different.

Keywords: Outsourcing extension, publicly-funded extension, Honduras, hillside farmers, economic evaluation

Introduction

Traditional public agricultural extension has been under pressure to reform since the 1990s. Many strategies have been offered to increase efficiency and cost-effectiveness (Alex et al. (2002); Anderson and Feder; Collion; Feder (2002), Willett, and Zijp (1999); Marsh and Pannell (2003); Rivera, Qamar, and Crowder (2002). For example, Collion and/or Alex et al (2002). suggest that criticism of extension's effectiveness in an era of public budget downsizing is causing increased emphasis on (a) accountability for use of funds, (b) relevance to needs of clients, (c) targeting of emphasis disadvantaged groups such as low income and women farmers, (d) decentralization rather than top-down extension, and (e) use of a wider range of institutions for delivery.

Three major types of extension delivery have been considered in addition to traditional publicly-funded, publicly-delivered programs (Rivera, 1996): (i) public funding with private delivery, or outsourcing, in which public agencies contract with non-governmental organizations, private companies or farmers to deliver extension programs; (ii) private funding with public delivery, which is fee-for-service delivery where groups of farmers such as cooperatives contract with public extension, and (iii) private funding with private delivery, which is extension that has become totally privatized. Managing the latter is not a policy problem although determining when public support for an extension program should be terminated is. Of the other two alternatives to traditional extension, outsourcing is far more suited to most extension opportunities in developing countries.

Feder, Willett, and Zijp (1999) have evaluated the effectiveness of institutional pluralism (among seven other innovations) in improving extension performance. They cite the ability of outsourcing (an type of institutional pluralism) to include more local communities and farmers in the extension planning

process, but also note an increased expense in setting up extension programs. Several studies report on direct experiences with outsourcing in Uganda, Chile, Ecuador, Venezuela, and Uruguay (Rivera and Alex, 2002). Other applications of outsourcing have occurred in Nicaragua (Dinar and Keynan , 2001) and Ghana (Dorman et al., 2003). Many of these reports note that a process for monitoring and evaluation of these projects has not been developed. Cost-effectiveness is also emphasized as an important criterion (Marsh and Pannell, 2002).

One way to evaluate cost-effectiveness, assuming a large, similar (homogeneous) population, is to conduct a pilot program based on comparison of treatment and non-treatment groups with a randomized sample design. Although the expenses of such careful scientific evaluation may be large, the analysis may be justified when the extension program is scaled up to larger populations. This approach also works when the populations are different (heterogeneous), if the important factors contributing to these differences, such as attitudes, activities, and resources, are publicly observed. However, with highly different populations and lack of public data on these differences, a randomized approach is not appropriate. In this case, achieving benefits may depend on offering the program to villages with the highest potential first and then continuing the program only until villages with sufficiently high benefits are exhausted.

Because extension companies' payments are clearly contingent on performance, they have an incentive to select villages where they can gain the greatest success with the least cost first. Thus, private delivery (outsourcing) can offer a relatively efficient way of ranking villages by potential benefits because private knowledge about village differences is available locally.

Description of Fondo para Productores de Ladera (FPPL)

Fondo para Productores de Ladera (FPPL) is a publicly-funded (World Bank and Honduran government), privately delivered extension system working with small farmers on the hillsides in the states of Yoro, Olancho, and Francisco Morazán. The objectives of FPPL include increasing incomes of small farmers and reducing the soil erosion and deforestation caused by their farming activities. As a pilot

program, FPPL was initiated in June 1999 and completed its first phase in December 2003. A second phase is being implemented to continue through 2008.

The FPPL contracts with private extension companies, which are local, to provide agricultural extension programs to farmers (Hanson et al.). A typical project includes eight villages with approximately 20 to 25 families per village. The extension company must hire at least one agricultural technician for every four villages which are then visited once per week. Quarterly payments to the companies depend on completion of goals and contract renewal depends on performance. As a result, the extension companies have a significant incentive to select villages in which their efforts will be most effective. Between 2000 and 2003, FPPL funded 51 projects serving 387 villages and 8,500 families. Only extension, training, and research activities were financed (except in the first year when some money was provided to buy basic tools and vegetative plant material).

The contract administrator for FPPL is the Honduran office of Centro Agronómico Tropical de Investigación y Enseñanza. To certify performance for quarterly payments, the technical specialist for the contract administrator randomly selects two of eight villages for evaluation. Physical measurements are taken for the quantitative evaluation, three families are selected from each village for qualitative evaluation interviews, and the technicians that work with these villages are interviewed.

Evaluation for Program Continuation or Revision

Thirty-one projects have completed three years of extension educational programs. Fifty percent or 16 projects were randomly selected for study. Six of the projects were in Olancho and ten projects were in Yoro. The six projects in Olancho were operated by three extension companies and the ten projects in Yoro were operated by six. To complete the outcomes evaluation, interviews with the extension companies and farm villages were conducted in June 2003. Fifty percent of the villages in the 16 identified projects were randomly selected for interview (25 percent of all villages that have completed three years in the program).[1]

[1] In Olancho, data collected by Interviewer 2 had to be discarded. Data collected by Interviewer 2 showed an implausibly strong systematic upward bias. To test for the statistical significance of interviewer bias, a separate

In Yoro, 38 villages were interviewed. Data from six villages were not used because the farmers were unwilling or unable to answer all the questions. While non-response raises the potential of bias, the local interviewer did not feel that non-responses were related to project performance, but rather that those villages were neither biased for or against the project. Data from 32 villages were used in the Yoro analysis. In the final analysis, data were used from 44 villages or 18 percent of all villages that have completed three years in the program.

People in the villages were asked about the net benefits associated with the improved practices taught by the extension company. Roughly 40-75 percent of the families responded to an invitation to an interactive interview regarding the program. Although less than full representation may introduce sample selection bias, the oral survey was conducted by a two-person team from the contract administrator (one each from the national and regional offices), rather than from the extension companies, to enhance objectivity.

The farmers were asked to estimate the (i) annual net benefits per manzana (seven-tenths of a hectare) on land where improved practices were implemented for crop production, (ii) annual net benefits per village resulting from improved forest production, (iii) annual net benefits per village for improved livestock management, (iv) the net increase in the value of land from improved soil conservation measures, and (v) the annual net benefits per family for improved practices associated with better gardens and homes. Net benefits could be positive, zero, or less than zero. They were also asked about the number of units to which these improved practices were applied. For example, the number of manzanas in a

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regression was estimated for each production type as well as for total production. In each model, the net benefit values from data collected by all interviewers were regressed on dummy variables for all interviewers except an interviewer included in the constant term. The results show that the net benefits data collected by Interviewer 2 had significantly larger values than the data collected by the other interviewers for all production types as well as total production (significant at the 1 percent level for three production types and total production and at the 10 percent level for the two other production types). These differences were insignificant at the 10 percent level for all other interviewers and production types including total production except for one production type for one interviewer that was significant at the 5 percent level, i.e., a 1 in 20 outcome on 18 other tests, which matches statistical expectations as closely as possible when no other effect is present. As far as we could determine, the bias for Interviewer 2 had nothing to do with distinguishing characteristics of the villages but rather appeared to owe to misinterpretation of the questions by Interviewer 2. After excluding data collected by Interviewer 2 of the 21 village interviews in Olancho, 12 were used in the analysis.

village to which improved practices of crop production were applied was multiplied by the associated net benefits per manzana to assess net benefits per village.

To obtain cost data, separate interviews were conducted with the extension companies. They were asked about their allocation of effort among the five extension activities (crop production, forestry, livestock, soil conservation, and family gardens and homes). The sum of these efforts had to add to 100 percent. Since the amount of the total contract was known, it was possible to allocate expended funds to separate extension activities. Utilizing these net benefit and cost data, benefit-cost ratios and internal rates of returns are calculated for the five extension activities in Olancho and Yoro. Additionally, data from the quantitative certification of extension companies were analyzed. One advantage of publicly-funded, privately-delivered extension programs is that payments are based on the collection of data that are also useful for analysis.

Results

Table 1 shows the net benefits in US dollars per unit and number of improved units by extension activity for the six projects in Olancho and ten projects in Yoro. For example, in an average village in Olancho, farmers improved their crop production on 26 manzanas with an average net benefit of $37 per manzana. Net benefits for forest production and livestock are listed per village. Net benefits for family gardens and homes are shown per family.

For each of the extension activities, other than soil conservation, respondents were asked to estimate the increase in net benefits (net revenue) from the different activities. For soil conservation, we assumed farmers would have difficulty distinguishing the net long-term benefits from soil conservation from the net short-term benefits of improved crop production practices, i.e., reducing erosion through soil conservation practices may both slow the reduction in crop yields in the short run, and preserve farmland productivity in the future. Consequently, farmers were asked how much the value of their land had increased because of the installation of soil conservation measures. This increase in value of land was converted to revenue through an income capitalization formula for estimating land value. With the value of land (original plus improved) and the net revenue from improved crop practices, the capitalization rate

could be computed. Multiplying that rate by the net increase in value due to soil conservation provides an estimate of the net revenue associated with soil conservation. Consequently, the imputed net revenues per manzana for soil conservation are $10 and $37 for Olancho and Yoro, respectively.

Table 1. Average net benefits and number of improved units per extension activity in Olancho and Yoro, 2000 to 2003[a]

		Olancho		Yoro	
Extension Activity	Unit	Benefits ($/unit)	Number of Units Improved	Benefits ($/unit)	Number of Units Improved
Crop Production	Manzana	$37	26	$93	11
Forest Production	Village	96	1	16	1
Livestock	Village	90	1	17	1
Soil Conservation	Manzana	10	6	37	9
Family Gardens & Homes	Family	19	12	51	7

[a] Olancho includes 6 projects with an average of 8 villages per project and 184 families per project. Yoro includes 10 projects with an average of 8 villages per project and 176 families per project.

Annual benefits and costs per family in Olancho and Yoro were calculated. Benefits per family were calculated by dividing the benefits per village in Table 1 by the number of families in a village. Since all direct costs are known, costs were allocated among extension activities from interviews with the extension companies based on how they allocated their time.

Benefit-cost ratios were computed using discount rates of 5 percent and 10 percent with a 15-year time frame in Table 2. Internal rates of return are also calculated. The survey that estimated net benefits was conducted at the end of Year 3. Based on intuitive understanding from informal discussions in the field, we assumed that Year 1 and Year 2 net benefits were 33 percent and 67 percent, respectively, of Year 3 net benefits. To facilitate this analysis, we arbitrarily assumed that the net benefits of innovations would continue over the remainder of a 15 year horizon from project initiation, once reaching their peak in Year 3. Costs were computed using actual project expenditures for Years 1 through 3 and allocated among different activities according to extension company effort reports. Costs for Years 4 through 15

were assumed to be zero, assuming the project is terminated after Year 3. The analysis was conducted on averages across the selected projects in Olancho and in Yoro.

Overall, the FPPL had a positive internal rate of return (IRR) of 8 percent and 10 percent in Olancho and Yoro, respectively. The most successful extension activity was crop production followed by family gardens and homes. Poor peasant farmers value improved income making opportunities. Also, educational programs for the women (through the family gardens and home initiatives) provide positive private economic returns as well as social returns. The net benefits for forestry and livestock did not generate positive economic returns under any discount factor. It could be that the programs for forestry were ineffective or perhaps the returns were too far in the future to have importance to these farmers. Also, not many farmers had livestock, and those that did viewed the livestock as an 'asset in the bank' rather than an income producer.

Table 2. Outcomes analysis utilizing an economic evaluation of extension activities, Olancho and Yoro, 2000 to 2003.[a]

	Olancho			Yoro		
	Benefit-Cost Ratio for Discount Rate		Internal Rate	Benefit-Cost Ratio for Discount Rate		Internal Rate
Extension Activity	5%	10%	of Return[b]	5%	10%	of Return[b]
Crop Production	2.24	1.74	25%	2.79	2.16	35%
Forest Production	0.51	0.39	-5%	0.09	0.07	-22%
Livestock	0.44	0.34	-7%	0.10	0.08	-21%
Soil Conservation: Revenue Increase	0.32	0.24	-11%	1.01	0.79	5%
Family Gardens & Homes	1.21	0.94	9%	1.11	0.86	7%
Total	1.15	0.89	8%	1.31	1.02	10%

[a] The assumed time stream for benefits was 33% in Year 1, 67% in Year 2, and 100% in Years 3 through 15 of estimates for Year 3. Costs are 100% of actual costs in Years 1 through 3 and 0 thereafter.
[b]The internal rate of return is the discount rate that makes the benefit-cost ratio equal to 1. Negative internal rates of return are difficult to interpret intuitively, but are indicators of a poor investment.

The evaluation of soil conservation was mixed. The IRR was positive in Yoro (5 percent) but negative in Olancho (11 percent). Olancho's poor estimated payoff may be due to the inability of farmers to differentiate the net benefits of soil conservation from crop production. Also, significant environmental benefits for those activities producing public goods such as forestry and conservation are not included.

Further accomplishments by extension companies with villages over a two-year period is summarized in Hanson et al. (2002) based on data collected to justify payments. These data show that private extension companies can accomplish important goals set by contract and help to verify the economic data.

Conclusions

Effectiveness of Publicly-Funded, Privately-Delivered Extension Programs

1. *Fondo para Productores de Ladera (FPPL) is an overall success thus far:* Families placed more value on what they learned than the cost of delivering the extension programs to them.
2. *Contracting for the Delivery of Public Goods:* Properly specified contracts between rural villages and private delivery companies can be utilized to accomplish social goals in addition to those associated with profit-making.
3. *Importance of Income-Generating Activities:* Farmers want to reduce soil erosion, but they need to make money at the same time. Income-generating activities (i.e., crop production) are important as lead-ins to environmental improvement.
4. *Importance of Extension Programs for Women:* Significant economic benefits were achieved by working with women on family gardens, homes, and income generation. This was the second most productive extension activity, which underscores the importance of identifying programs for women in traditional settings. A common income-generating activity developed by women was bread baking in a self-financed village oven. In support of this conclusion, Colverson explores ways to improve extension training to rural women farmers in Honduras.
5. *Increased Emphasis on Contract Administration:* The technical specialists employed by the contract administrator spend 25 percent of their time verifying contractual accomplishments. While their time might have been better spent improving the professional capabilities of the extension companies, the process appears to be relatively efficient. The relevant portion of their salary averaged only 1.5 percent of the contract costs they monitored.

6. *New Approaches: Agro-Forestry:* Reforestation is a priority within FPPL. However, farmers did not perceive high economic returns to that activity. Even though environmental benefits are likely, they are likely too far in the future and regarded as largely contingent on the behavior of other farmers (a local public good). One possible solution is to combine crop production with forestry into an agro-forestry activity.

Suggestions for Improving Economic Evaluations

1. *Evaluate Extension Activities, not Extension Programs:* Extension programs can be better evaluated if broken into their component parts or activities. In FPPL, these were crop production, forestry, livestock, soil conservation, and family gardens.
2. *Farmers' Perceptions of How Extension Activities are Organized:* In FPPL, farmers had difficulty differentiating the benefits of soil conservation from crop production. Crops, livestock, and home gardens are "profit centers" that generate income (or reduce food purchases) for the family. Soil conservation is an investment in better crop production. Direct evaluation by farmers should focus on direct private benefits whereas indirect benefits, such as from soil conservation, should be evaluated indirectly (e.g., indicator analysis).
3. *Improving the Use of Indicators:* With outsourced extension programs, contracts are based on the collection of data to justify payments, e.g., linear meters of live grass barriers planted. This is an advantage of publicly-funded, privately-delivered extension programs in that they generate data that can be used for inexpensive evaluation.
4. *Self-Selection and Bias:* Peasant farmers likely realize that their evaluations affect future funding. A standard way to address this potential bias in large-scale extension projects, when populations are similar or important factors contributing to these differences are publicly observed, is a randomized comparison of treatment and non-treatment subjects (Duflo). While this approach removes bias in farmer selection, it can create bad feelings and poor public perceptions. The advantages of outsourcing are particularly strong in the case where the important factors contributing to these differences are not publicly observed but can be exploited by private extension companies. Informal

interviews of farmer participants can be done with inconsequential expense and combined with data available through normal administrative records. Then to check for bias, the implications of interviews can be compared to physical indicators, so that words can be verified by deeds.

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