Awareness of EQIP and Subsequent Adoption of BMPs by Cattle Farmers

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Abstract

In summer, 2003, roughly half of Louisiana cattle producers had never heard of the Environmental Quality Incentives Program. Those who had heard of it and had applied for funds were more diversified, larger, and had contact with Natural Resources and Conservation Service personnel within the past year.

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Introduction

In recent years, incentive programs have been used in the agricultural sector to promote the use of environmentally friendly management practices to conserve the environment. The incentive program of importance to this study is the Environmental Quality Incentives Program (EQIP). The EQIP entails the payment of government subsidies to landowners who implement specific conservation practices. The program uses two types of payments: (1) cost-sharing, which applies to structural and vegetative practices and covers a maximum of 90% of the cost of implementation for limited resource or beginning producers and 75% for others, and/or (2) an incentive payment that is made to producers to encourage them to adopt land management practices they may not otherwise have adopted. The EQIP offers five to ten year contracts.

The EQIP works together with other federal conservation programs that generate environmental benefits, some of which are the Conservation Reserve Program, the Wetlands Reserve Program, and the Wildlife Habitat Incentives Program. The EQIP is the only USDA conservation program that contains an explicit clause targeting funds to address environmental concerns arising from livestock production. Nationally, at least 50% of EQIP funds must be used for natural resource concerns related to livestock. Over the years of its term, the 2002 farm bill significantly increases EQIP funding. In 2002, funding was at $400 million; in 2003, it increased to $700 million; and by 2004, it rose to $1 billion per year. The bill also removed the limit on the eligibility for larger operators to receive cost-share funds for animal waste management facilities. This was to enable larger operators to comply with new Environmental Protection Agency rules. The question now is, are most farmers aware of the EQIP

program, and if so, have they applied for EQIP funding? This study addresses this question.

It can be observed from Figures 1 and 2 that an increase in the cost of production associated with adoption of some conservation practices could increase total cost, TC, as well as average total cost (ATC) and marginal cost (MC) in the short run. If the market price for cattle is represented as P, as would be the case in a purely competitive industry, then additional short-run costs may lead to total costs exceeding total revenue. With the help of EQIP, farmers would be partially compensated for the additional expenses involved in implementing conservation practices, thus helping them to remain in business while implementing BMPs.

The objectives of this study are to: (1) determine the portions of cattle producers who: (a) have no knowledge of EQIP; (b) know of EQIP but have not applied to the program; (c) know of EQIP and have applied, but have not been accepted for funding; (d) know of EQIP, have applied, have been accepted, and have received the payments; and (e) know of EQIP, have applied and been accepted, but cancelled the contract later; and (2) determine the types of producers who fall into each of these categories.

Literature Review

Agricultural nonpoint source pollution remains a major policy challenge, with obstacles that arise from asymmetric information. The ability to measure producer response to policies requires empirical knowledge of the production function, the impact of inputs used on the environment and the risk attitude of producers. Peterson and Boisvert proposed a model to accommodate asymmetric information on farmer preferences and hidden information on technology types and input use in designing

voluntary environmental policies. Results suggested that participation incentives would be inadequate for many risk-averse producers if the government did not account for diversity in risk preferences.

Kilkenny and Huffman examined who was most likely to participate in welfare programs and in the labor force. They compared rural and urban residents. The variables used in the analysis were household composition, capital, labor market conditions and state-specific regulations. Results indicated that the rural poor in the Midwestern U.S. participated more in the labor force and less in the welfare programs than the urban poor.

A number of studies have analyzed the adoption of conservation practices, though they have not addressed producers' knowledge of programs designed to inform producers about the programs. Examples include Rahelizatovo and Gillespie, Kim, and Cardona. These studies generally examine the impact of farm type, demographic variables, financial variables, and other factors on the adoption of conservation practices.

Data and Methods

During Summer, 2003, 1,500 cattle producers in Louisiana were surveyed to determine their knowledge of EQIP, adoption of conservation practices, and willingness to accept EQIP cost-share payments for the adoption of rotational grazing. The stratified sample included farmers with less than 20 animals (26.7%), 20-49 animals (23.3%), 50-99 animals (23.3%), and 100 or more animals (26.7%). An initial questionnaire was sent to the producers, followed by a postcard reminder two weeks later, and followed by a second questionnaire two weeks after the postcard. Guidelines

provided by Dillman for maximizing return rate were considered. The overall return rate was 41%.

A multinomial logit model is employed to analyze the impact of independent variables on farmers' knowledge and use of EQIP. It is a commonly applied model to explain and forecast discrete choice due to its ease of estimation and foundation in utility theory. Examples of studies carried out using the multinomial logit model are Coble et al., Herriges and Phaneuf, and Shwabe et. al. See Greene for a full discussion of the multinomial logit model.

In this study, four alternatives are considered. Farmers either: (1) have no knowledge of EQIP, (2) have knowledge of EQIP but have not applied for EQIP funds, (3) have knowledge of EQIP, have applied for funds, but have not received any payments, or (4) have knowledge of EQIP, have applied for funds, and have received payments. The multinomial logit model analyzes the impact of 10 independent variables on the state in which each of the producers falls. These independent variables are discussed in the following paragraphs.

It is expected that producers with greater numbers of cattle are aware of EQIP and are more likely to have adopted conservation practices under EQIP. Previous studies have shown larger producers to be the greater adopters of technology of most types, including conservation practices (e.g., Rahelizatovo and Gillespie, Cardona). Thus, number of cattle, NCATTLE, (divided by 100 for estimation purposes) is included as a continuous variable.

The production of purebred animals is included to determine whether there are differences in knowledge of EQIP and subsequent adoption of conservation practices

between commercial and purebred producers. PURSEED is a dummy variable indicating whether or not the farmer raises purebred animals.

It is expected that producers who own a greater percentage of the land for their cattle operation are more likely to be informed of EQIP and to have applied for EQIP funds. Producers who own a greater portion of their land are likely to have greater interest in conservation practices that lead to long-run productivity, and are more likely to be interested in entering programs through which the benefits accrue directly to the landowner. Thus, LOWNED, the percentage of land owned by the farmer, is included.

Dummy variable NRCS indicates whether a farmer has met with Natural Resource Conservation Service personnel at least once in the past year. NRCS has the major responsibility for dissemination of information on EQIP; thus, farmers who have been in contact with NRCS are more likely to have heard about it and, subsequently, to have adopted conservation practices using EQIP.

Farmers who have streams running through their farms have land that is at greater risk of runoff and pollution of streams. Thus, dummy variable, RUNSTRM, which indicates whether a stream flows through the farm, is expected to impact whether farmers adopt conservation practices via EQIP.

NAGE is the age of the farmer, divided by 10 for estimation purposes. Age is often used in technology adoption studies, with results frequently showing negative impacts on adoption (e.g., Brox et al., Kilkenny and Huffman, Roberts). It is hypothesized that older farmers are less likely to be aware of the EQIP and subsequently less likely to adopt conservation practices.

COLLEGE is a dummy variable that indicates the farmer holds a Bachelor's degree. COLLEGE is hypothesized to positively influence awareness of EQIP and subsequent adoption of conservation practices, as more educated farmers are generally more likely to be informed of programs and technology.

Farmers with a higher percentage of household net income from the beef operation are hypothesized to have a greater knowledge of EQIP, as well as a greater adoption of conservation practices using EQIP. PBEEFINC is the percentage of household net income from the beef operation.

More diversified farmers are expected to have greater awareness of EQIP and to be greater subsequent adopters of conservation practices under the program. DIVERSE represents the number of enterprises other than cattle on the farm. Farmers with greater numbers of enterprises are more likely to have utilized EQIP, since they may have adopted conservation practices for another enterprise using the program.

FARMTAKOV is a dummy variable indicating whether a member of the farmer's family plans to take over the farm operation after the farmer's retirement. FARMTAKOV is hypothesized to positively impact farmers' knowledge of EQIP, as well as subsequent adoption of conservation practices under EQIP. Having a family member to take over the operation may effectively extend the farmer's planning horizon.

Results

Results indicate that about 51% of the producers were aware of the EQIP. Of these, 55% had applied for EQIP funds. Of those who had applied, 74% had received

the EQIP funds. Of those who had received the funds, 9% later broke the EQIP contract.

Having 100 additional cattle in the operation increased the probability of having applied for EQIP funds but not receiving the payments by 0.007. NRCS greatly influenced awareness of EQIP and subsequent adoption of BMPs under EQIP, as expected. Contact with NRCS reduced the probability of never having heard of EQIP by 0.34, increased the probability of having applied for EQIP funds, but not receiving payments by 0.05, and increased the probability of having applied for EQIP funds, being accepted, and subsequently adopting by 0.29. Thus, the increased probability associated with receiving the funds if applied for was greater than the increased probability associated with not receiving funds if applied for.

Having a greater percentage of income from the beef enterprise increased the probability of having heard of EQIP but not applying for funds, and having heard of EQIP, applying, but not receiving payments. Diversification was highly associated with EQIP awareness and subsequent BMP adoption. An additional enterprise reduced the probability of never having heard of EQIP by 0.06, increased the probability of having heard of EQIP but not applying for funds by 0.04, and increased the probability of having heard of EQIP and applying for funds but not receiving them by 0.02.

Having a family member to take over the operation upon the farmer's retirement increased the probability of having applied for EQIP but not receiving payments by 0.04, and surprisingly decreased the probability of having applied for EQIP, being accepted, and implementing the practice by 0.11.

Variables PURSEED, LOWNED RUNSTRM, NAGE, and COLLEGE were not found to influence knowledge of EQIP or the subsequent adoption decision. These variables had been significant in some of the previous probit models assessing the adoption of individual conservation practices (Kim). In some cases, the variables increased adoption, while in others, they decreased adoption; thus, when placed into the context of a count data model, it is not surprising that they would not be significant.

Conclusions

This research indicates that interaction with NRCS has the greatest influence on whether producers have heard of EQIP and whether they will subsequently adopt conservation practices. Thus, if society wishes to have producers adopt conservation practices, funding of educational efforts via NRCS is likely to be an effective way to meet this end.

Other results support previous research that has shown larger, diversified producers who receive a greater amount of their income from the enterprise to be the more informed producers of agricultural programs, as well as the greater adopters of conservation practices. Thus, if greater adoption rates of conservation practices are desired, then smaller, specialized, part-time farmers might be targeted. It is, however, acknowledged that these producers constitute a disproportionately small percentage of the cattle produced, and their current production practices may not be considered to be "intensive" in nature, with potentially low grazing rates, etc.

The difficulties encountered in this research are mainly with the model used in the analysis. The multinomial logit model assumes independence of irrelevant alternatives, which may not be an appropriate assumption in our case. As this research

continues, we hope to further analyze the problem using models that may relax this assumption, such as the nested logit model. There is also the need to apply this study to other regions to verify how well producers are aware of the EQIP program and the adoption of conservation practices.

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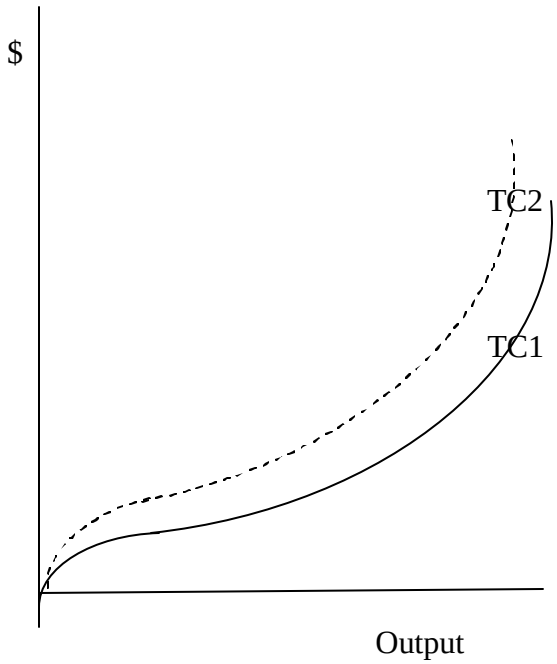

Figure 1.

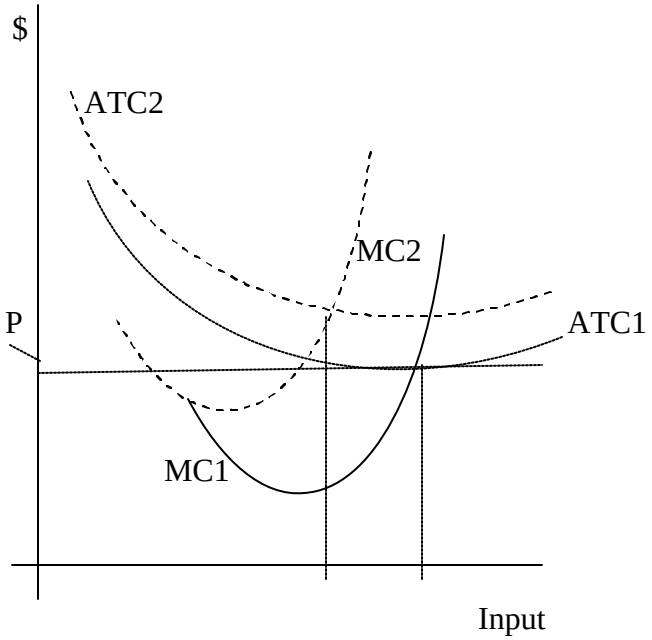

Figure 2.

Table 1. Marginal Effects of the Multinomial Logit Model.

Y=0: Have Never Heard of EQIP.

x-VARIABLES	COEFFICIENTS	STANDARD ERROR	P-VALUE
NCATTLE	-0.164*10-1	0.159*10-1	0.302
PURSEED	-0.112	0.781*10-1	0.150
LOWNED	-0.340*10-1	0.769*10-1	0.658
NRCS	-0.341	0.553*10-1	0.000
RUNSTRM	0.143*10-1	0.564*10-1	0.800
NAGE	-0.190*10-1	0.229*10-1	0.408
COLLEGE	0.346*10-1	0.606*10-1	0.568
PBEEFINC	0.662*10-3	0.366*10-1	0.986
DIVERSE	-0.603*10-1	0.277*10-1	0.029
FAMTAKOV	0.623*10-1	0.625*10-1	0.319

Y=1: Have Heard of EQIP but Have Never Applied.

x-VARIABLES	COEFFICIENTS	STANDARD ERROR	P-VALUE
NCATTLE	-0.672*10-2	0.135*10-1	0.618
PURSEED	0.383*10-1	0.631*10-1	0.544
LOWNED	0.889*10-3	0.652*10-1	0.989
NRCS	0.885*10-3	0.431*10-1	0.984
RUNSTRM	0.699*10-1	0.469*10-1	0.136
NAGE	-0.154*10-2	0.193*10-1	0.936
COLLEGE	0.500*10-1	0.499*10-1	0.316
PBEEFINC	0.578*10-1	0.273*10-1	0.034
DIVERSE	0.398*10-1	0.215*10-1	0.063
FAMTAKOV	0.117*10-1	0.515*10-1	0.820

Table 1. Continued.

Y=2: Have Heard of EQIP, Have Applied, but Have Not Received Funds.

x-VARIABLES	COEFFICIENTS	STANDARD ERROR	P-VALUE
NCATTLE	0.744*10-2	0.374*10-2	0.047
PURSEED	0.338*10-1	0.234*10-1	0.149
LOWNED	-0.177*10-1	0.285*10-1	0.536
NRCS	0.483*10-1	0.176*10-1	0.006
RUNSTRM	-0.238*10-1	0.206*10-1	0.247
NAGE	0.754*10-3	0.852*10-2	0.929
COLLEGE	0.825*10-3	0.212*10-1	0.969
PBEEFINC	-0.324*10-1	0.186*10-1	0.081
DIVERSE	0.209*10-1	0.784*10-2	0.007
FAMTAKOV	0.362*10-1	0.199*10-1	0.069

Y=3: Have Heard of EQIP, Have Applied, and Have Received Funds.

x-VARIABLES	COEFFICIENTS	STANDARD ERROR	P-VALUE
NCATTLE	0.157*10-1	1.000*10-2	0.116
PURSEED	0.402*10-1	0.550*10-1	0.464
LOWNED	0.507*10-1	0.585*10-1	0.386
NRCS	0.292	0.369*10-1	0.000
RUNSTRM	-0.603*10-1	0.423*10-1	0.154
NAGE	0.197*10-1	0.173*10-1	0.255
COLLEGE	-0.162*10-1	0.432*10-1	0.707
PBEEFINC	-0.261*10-1	0.281*10-1	0.353
DIVERSE	-0.365*10-3	0.190*10-1	0.985
FAMTAKOV	-0.11	0.479*10-1	0.021