

Ordered Probit Analysis of Farm-Inn Operations in Japan

Kentaro Yoshida*

The purpose of this study is to provide a statistical framework for analyzing the operation of farm-based accommodations (farm-inn). A primary data sample of 386 farm-inn operators located all over Japan was analyzed by an ordered probit model. A variety of sample characteristics, such as the number of years in operation, the number of guestrooms, and the type of accommodation, affected their evaluation of farm-based visitor activities and/or the future prospects of each respondent's own farm-inn business. Operators' attitudes toward better management such as a positive attitude toward host-guest interactions and a greater number of repeat visitors also affected their responses. These results contribute to not only the exploration of a useful tool for tourism research based on a questionnaire survey but also the debate among policy makers' decisions about incorporating the promotion of farm tourism into agro-environmental policy.

Key words : farm tourism, ordered probit analysis, farm-based activities, farm-inn, rural tourism, farm diversification, rural development.

1. Introduction

In Japan, farm tourism has received increased interest since the early 1990s. Farm tourism is hoped by some to be a panacea that helps slow the decline of local economies and the rural exodus. In April 1995, the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) commenced administration of the "Law for Promoting Leisure Activities in Rural Areas" (hereafter, the Rural Tourism Act). Based on the enforcement of the Rural Tourism Act, MAFF began the registration of farm-inns with the Association for Promoting Rural Education (APRE).¹⁾ MAFF also began to provide subsidies to farm tourism operators for farm diversification and rural development.

The number of studies on farm tourism in Japan have been gradually increasing (e. g., Ohe [18], Miyazaki [13], Inoue, Nakamura and Yamazaki [10], Morishima [15]). However, collecting data on small-scale farms or

enterprises engaged in such activities is always attended with much difficulty (Pigram [23]). Therefore, those studies may have relied on only limited information on the farm and rural tourism in a particular region. Furthermore, no prior studies have tried to grasp the nationwide situation. This understudied reality reflects a lack of basic statistics, either government or trade generated, thereby leading to a lack of practical information to adequately inform policy measures or business investment.

Even in other countries, farm tourism is an area of spasmodic interest that remains unaddressed by reliable data sources (Pigram [23]). Only a few articles on farm tourism have appeared in the major tourism and rural journals over the last decade (Oppermann [19]). Certainly, several studies have been made on farm tourism at the national level in terms of a descriptive analysis (Pearce [22], Oppermann [20], Fleischer and Pizam [5], Garcia-Ramon, Canoves and Valdovinos [6], Shakur, Holland and Martin [24], Nickerson, Black and McCool [16]). What seems to be still lacking, however, is a farm tourism op-

*University of Tsukuba

erator survey enabling detailed statistical analysis. The critical importance of identifying factors contributing to individual operator's success and failure in this context has been emphasized (Oppermann [19]).

This study provides a statistical framework for analyzing factors that influence the success or failure of farm-inn business from the operator's viewpoint. Farm-inns are farm-based accommodations owned and managed by a farmer or an agricultural enterprise. The factors are characteristics of the farm-inns and operators' attitudes toward management-related issues. Primary data from a questionnaire survey of farm-inn operators registered with APRE are used to analyze the factors. A Likert scale was employed to elicit their response to questions about future prospects of their farm-inn business and the evaluation of farm-based visitor activities. Rating scales are obtained from the Likert question and then an ordered probit model is applied to facilitate an analysis of such scales. Thus, this survey of farm-inn operations in Japan not only enables us to build a model on the basis of operators' choices and attitudes but also gives an overview of the nationwide situation of farm-inn operations and farm tourism. It will also contribute to the debate among policy makers who may see cause to combine agro-environmental policy with the promotion of farm tourism.

2. Farm Tourism in Japan

In the late 1960s, a great many joint efforts by local governments and private companies to improve outdoor recreation sites, such as skiing areas and beach resorts, were started in many parts of the country. As a consequence of those efforts, many farmers and fishermen diversified into new businesses related to outdoor recreation and rural tourism, some of whom started to provide accommodations for tourists as their side business in summer and winter vacation season. During the late 1980s through the early 1990s, the bubble economy and the Resort Law boosted the development of large-scale outdoor resorts by private initiatives. The Resort Law was enacted in 1987 to facilitate the building of recreational facilities in protected areas. The law led to nationwide reckless development based on careless planning and in-

vited the destruction of the natural environment. When the economic boom died down, Japanese tourists noticed serious environmental damages caused by these huge resorts. Ironically, they were becoming interested in traveling to rural areas to enjoy their pristine atmosphere and a taste of the rural way of life. Since then, some farmers have organized small study groups to examine the feasibility of farm-inn business, and have visited Europe and Oceania to learn how to operate a farmstay business. Consequently, they have begun farm-inn businesses mostly with the support of national and local governments aiming at farm diversification and rural development. In addition, existing local inns targeting mainly skiers and swimmers have also started to provide farm-based activities. Thus, farm tourism has drawn much attention as an alternative type of tourism in rural areas.

As noted earlier, APRE began the registration of farm-inns in order to enforce the Rural Tourism Act in 1995. The primary task of APRE is the publicity and promotion of farm-inns. The provision of some farm-based visitor activities is necessary to register with APRE. Each farm-inn offers a wide variety of farm-based activities, such as planting rice seedlings and harvesting potatoes, and also opportunities to cook local dishes. The number of farm-inns registered is 868 as of July 1998.

According to comparative analyses of Japan and other countries, the type of accommodation was one of the great differences across countries (Ohe [18], Inoue, Nakamura and Yamazaki [10]). These studies also indicate that the variations across countries might stem from differences in the style of farmhouses. In countries of Europe and Oceania, farmers often use rooms made available by the departure of grown children for guest accommodation. On the other hand, in Japan, only a few farmers have enough rooms that can be used for guest accommodation, so most of the farmers have to build an annex or a new house if they want to begin farm-inn business. Hence, space constitutes a relatively high entry barrier to Japanese entrepreneurs when trying to open a farm-inn while it is not a problem in New Zealand (Oppermann [21]). Result of the present study

show that only 37.2% of Japanese operators could open the farm-inn without building an annex or a new house. On the contrary, most of them were forced to remodel their farm-houses substantially. The primary motivation was local building and safety codes, according to their statements in the questionnaire.

3. Literature Review of Farm Tourism

Farm tourism has not attracted as much attention as other tourism aspects (Oppermann [21]). Farm tourism is still based on a special interest of tourists (Hall and Weiler [8]). However, in some countries where farm tourism is considered to be a prospective business sector, the promotion of farm tourism is becoming an emerging issue in conjunction with farm diversification and rural development. Therefore, a few nationwide surveys have been attempted during the last decade (Shakur, Holland, and Martin [24], Oppermann [21], Pearce [22]). Furthermore, OECD [17] has tried to establish better rural amenity policy measurement for rural development among its member countries. In this context, farm tourism has been considered one of the important factors in order to make local people aware of the importance of rural amenities and to bring about additional income sources.

The farmstay operator survey in New Zealand revealed that personal satisfaction and the need to supplement traditional farm income were the main motivations for establishing a farmstay business (Shakur, Holland, and Martin [24]). In addition to these reasons, a major incentive to try out farm tourism business was the low entry barrier to running a farm tourism operation due to ready availability of the existing accommodation facilities (Oppermann [21]). Another study used an interview-based analysis of farm tourism home stays in New Zealand to review the goals, cognitive structures, environmental setting, social roles, communication, and activities as well as their sequences in terms of the host-guest social situation (Pearce [22]). Elsewhere, based on a survey of rural operators and tourists in Southern Germany, it was found that farm tourism provides only a small side-income, partly because of legal limitations (Oppermann [20]). In Spain, farm tourism is a valuable alterna-

tive for women that allows the combination of domestic responsibilities with tourism work and also represents an income source, supporting continued small-scale farming and conservation of the countryside environment (Garcia-Ramson, Canovers and Valdovinos [6]). Most Israeli operators went into the business in order to supplement their income and enable them to stay on the farm (Fleischer and Pizam [5]). A questionnaire survey to vacation farm operators in the Canadian province of Saskatchewan revealed that the typical enterprise was established during the 1990s in order to supplement the income base and major visitor activities included wildlife viewing, hunting, and casual photography (Weaver and Fennell [26], Fennell and Weaver [4]). The financial returns most often did not measure up either to the expectations of the politicians or to that of the farmers, but rural tourism contributed positively to the innovation of a new tourist product (Hjalager [9]). A survey on American vacation farms and dude ranches revealed that rural people and their cowboy and farm cultures attracted vacationers more than traditional activities (Vogeler [25]). Survey results in English counties showed that holiday accommodation "guidebooks" produced by private companies and organizations represented the most popular methods of advertising used by farm businesses (Evans and Ilbery [3]). The findings showed that different communication techniques were used by different levels in the consortium and capitalized on existing skills and strengths (Clarke [2]).

Some of the above-mentioned studies certainly dealt with future prospects of farm tourism business and the usefulness of visitor activities. However, most of them have not succeeded in revealing factors and characteristics which impinge on future prospects of the farm-inn business and the usefulness of the activities in terms of a statistical analysis. Although the importance of a detailed descriptive analysis cannot be overstated, the exclusive reliance on such general indicators seems to cause a lack of statistical basis in their analyses.

4. Ordered Probit Model

This study proposes a statistical frame-

work for analyzing factors affecting the success or failure of farm-inn operations. Response choices in an opinion survey often appear as a discrete choice set rather than a continuous one. Econometric methods to analyze the discrete choice variables have been developed recently (Greene [7], Maddala [12], Ben-Akiva and Lerman [1]). Discrete choice variables fall into two categories: the first is an ordered variable and the second is an unordered variable. In the area of tourism analyses, a multinomial logit model is often employed for a choice behavioral analysis of tourists (Morey [14], Luzar et al. [11]). Variables used in these analyses are mostly unordered variables, such as hotel selection and participation decision. On the other hand, variables obtained by some questions, such as the rating of hotels and the degree of guest satisfaction, often have the characteristics of a Likert scale. In the case of the latter sort of questions, an ordered probit model can facilitate an analysis of this kind of rating data.

In this survey, in order to analyze factors affecting the degree of success, future prospects of farm-inn business were first asked because operators are generally unwilling to respond to straightforward questions about their income and the economic conditions of their operations.²⁾ Direct questions often generate a large number of missing values due to protest answers and lead to poor estimation results. Importantly, the success of farm-inn operations should be analyzed from several indicators because farm-inn operations are mostly a side-business of farming activities. If farmers pursue only additional income, income could best describe the degree of success. However, there are a number of farmers diversified into farm-inn business mainly for interactions with guests. Those farmers may value their farm-inn business highly and answer "very optimistic" when they are satisfied with guest interactions. The second best way to use this type of question format would be as an integrated indicator of the success of farm-inn operations. Next, the evaluation of farm-based activities was called for to assess whether or not the present farm-inn policy of MAFF is appropriate to develop farm-inn business.³⁾

Multiple response choices to the above

questions can be transformed into Likert rating scales. Such multiple choices, however, can be categorized into two groups, so that they can be treated as a binary choice set. This approach enables the application of a conventional binary logit or probit model. Nevertheless, the ordered probit model, which can make full use of every response choice, is statistically more efficient than the binary logit or probit model. Therefore, the ordered probit model is employed in this study. The ordered probit model is formulated as

$$y^* = \beta'x + \varepsilon. \quad (1)$$

The underlying tendency or trait of an observed phenomenon, y^* , is unobserved. It is assumed that ε is normally distributed with zero mean. β' is a vector of unknown parameters to be estimated, and x is a vector of respondent's characteristics. What we observe is

$$\begin{aligned} y &= 0, \text{ if } y^* \leq \mu_0 (= 0), \\ &= 1, \text{ if } \mu_0 \leq y^* \leq \mu_1, \\ &= 2, \text{ if } \mu_1 \leq y^* \leq \mu_2, \\ &\vdots \\ &= J, \text{ if } \mu_{j-1} \leq y^*, \end{aligned}$$

where y is observed in J number of ordered categories, and the μ s are unknown threshold parameters separating the adjacent categories to be estimated. The first threshold parameter, μ_0 , is typically normalized to zero, so that we have $j-1$ parameters to estimate. With the normal distribution, we have the following probabilities,

$$\text{Prob}(y = j) = \Phi(\mu_j - \beta x) - \Phi(\mu_{j-1} - \beta x),$$

where $\Phi(\cdot)$ denotes the standardized cumulative normal distribution. In order for all the probabilities to be positive, we must have

$$0 < \mu_1 < \mu_2 < \cdots < \mu_{j-1}.$$

Here, take future prospects of farm-inn business for example. The dependent variable is an ordered choice set with five categories. Response choices to the question are classified as "very pessimistic ($y=0$)," "slightly pessimistic ($y=1$)," "neutral ($y=2$)," "slightly optimistic ($y=3$)," and "very optimistic ($y=4$)." Then we have,

$$\begin{aligned}
\text{Prob}(y = 0) &= \Phi(-\beta'x), \\
\text{Prob}(y = 1) &= \Phi(\mu_1 - \beta'x) - \Phi(-\beta'x), \\
\text{Prob}(y = 2) &= \Phi(\mu_2 - \beta'x) - \Phi(\mu_1 - \beta'x), \\
\text{Prob}(y = 3) &= \Phi(\mu_3 - \beta'x) - \Phi(\mu_2 - \beta'x), \\
\text{Prob}(y = 4) &= 1 - \Phi(\mu_3 - \beta'x).
\end{aligned}$$

It is evident that this is a generalization of the binary probit model. Then, the log-likelihood function can be derived by defining, for each individual, $d_{ij}=1$ if alternative j is chosen by individual i , and 0 if not. Thus, the log-likelihood function takes the form

$$\ln L = \sum_i \sum_{j=0}^4 d_{ij} \ln \text{Prob}(y_i = j). \quad (2)$$

5. Data

In July 1998, a self-administered questionnaire with a cover letter and a free post envelope was mailed to all farm-inn operators listed in the APRE farm-inn directory. The response rate of the overall survey was 44.8 % reflecting a return of 388 of the total 866 samples. Since accommodations without farm-based activities were also included in the whole sample, 35 responses were excluded before the estimation. Most of the excluded questionnaire responses provided only fishery-based visitor activities or forestry-based visitor activities. While 292 out of 353 samples were usable for the estimation on future prospects of farm-inn business, only 258 samples were usable for the estimation on the evaluation of the farm-based activities. Some of the samples had no participants in the farm-based activities. Some respondents may have had no idea about the evaluation of the activities and therefore skipped the related questions, explaining why these operators reported no participation in farm-based activities.

The geographical distribution of the samples collected is as follows: Kanto/Tozan (37.0%), Hokuriku (24.6%), Tohoku (8.3%), Tokai (6.6%), Kinki (6.6%), Chugoku (6.3%), Kyusyu (5.2%), Hokkaido (3.2%), and Shikoku (2.0%). The ratio of Kanto/Tozan and Hokuriku is relatively high in comparison with other regions since there are many farm-inns targeting skiers.

6. Outline of Survey

This is the first survey of farm-inn operators at the national level in Japan. It may be

useful to outline farm-inn operations on the basis of the unique data before explaining empirical results of the ordered probit analysis.

First of all, characteristics of farm-inns are reported. Although the survey showed 23.4 years as the average number of years in operation, 27.3% of all respondents have started their operation in the 1990s. The average number of guestrooms is 11. This average number seems to be relatively large for small-scale farm-inns. It may be because more than 60% of farm-inns constructed new buildings to provide guest accommodations. The size of their facilities is likely to be bigger than that of remodeled farm-inns. Those farm-inns with a larger number of guestrooms are now specialized in farm-inn business rather than farming activities. Figure 1 shows that main motives to provide farm-based activities vary with the number of guestrooms. Additional income tends to be a major motive for larger farm-inns in contrast with the opportunities for interaction with visitors for smaller farm-inns.

The survey result also shows that major motives to provide the activities are interactions with guests (47.1%) and additional income (29.5%) in total. Surveys conducted in New Zealand revealed that a main motive to establish farmstays was to meet people (Pearce [22], Shakur, Holland and Martin [24]). In a strict sense, both questions and response choices were slightly different from each other. From those results, however, it can be said that host-guest interactions are likely to be the major driving force to start the farm-inn business in addition to extra income or income diversification.

The average income of the operators from their farm-inn business constitutes 62.3% of the total income while that from agriculture constitutes only 14.6%. The share derived from the farm-inn business is large when compared with Germany and New Zealand, where the farm-inn (farmstay) contributes 17% and 35%, respectively (Oppermann [20], Shakur, Holland and Martin [24]). Such international comparative differences may stem partly from the difference in average farm size, the number of guestrooms, and the occupancy rate. The survey of the present study revealed that the average farm size of

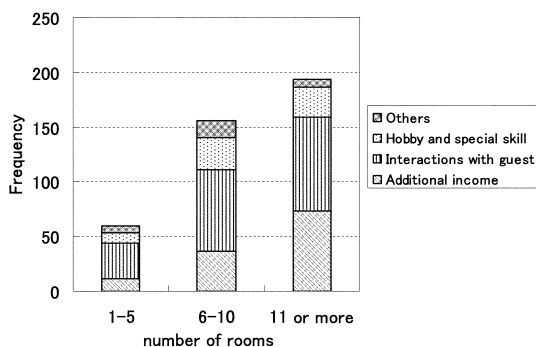


Figure 1. Differences in main motives to provide farm-based activities by the number of rooms (M. A.)

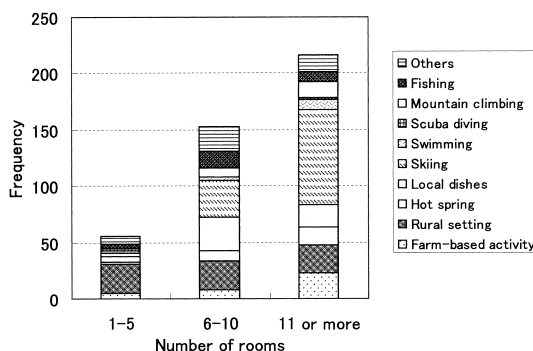


Figure 2. Differences in main purposes of guests by the number of rooms (M. A.)

the respondents was 2.1 ha, whereas that of New Zealand was 291 ha (Shakur, Holland and Martin [24]).

Next, let us leave the supply side of farm-inn business and turn to the demand side. The target of this survey was not tourists but operators. However, operators were questioned about some aspects of their guests. Therefore, we could obtain some information on the demand side of farm tourism.

The average number of guests of each farm-inn was 2,337 during 1997. As for the ratio of repeat visitors, 35.4% of the operators answered “very high,” and 22.3% “slightly high” based on their own inference. Most of the farm-inn operators are likely to use word-of-mouth communication for advertising, so more than half of farm-inns depended on repeat visitors.

Figure 2 shows differences in main purposes of guests by the number of guestrooms. This question used a multiple choice format. In total, skiing (28.5%) was the most common purpose of the guests at a farm-inn. However, if we look at differences in purposes by the number of rooms, the rural setting was more important for small-scale farm-inns. 44.6% of operators with less than 6 rooms answered that a main purpose of their guests was rural setting. On the basis of this fact, one can infer that most of small-scale farm-inns recently started their operation targeting urban people who liked to stay on a farm. Therefore, other activities related to outdoor sports might be of less importance for those farm-inns.

Although the registration with APRE and

the acquisition of government supports require operators to provide a variety of farm-based activities, the survey results show that the farm-based activity is a main purpose for less than 10% of the respondents. According to this survey result, just half of the respondents provided these activities before registration. Finally, it should also be added the fact that guests who participated in the activities were mainly made up of families with children (54.4%) and school children on educational trips (30.1%).

7. Empirical Results

1) The evaluation of farm-based activities

In the questionnaire, respondents were asked to evaluate the usefulness of farm-based activities for the growth and development of their business. Choice probability of the question was as follows: very useful (16.7%); slightly useful (43.8%); neutral (26.0%); not useful (13.6%). The response to the question, considered within a framework of an ordered probit model, is assumed to be a function of characteristics and attitudes of the farm-inn business and the operator. The choice model of respondents can be formulated by using equation (1) under the following general form :

$$\text{EVALUATION} = f(\text{YEAR}, \text{ROOM}, \text{GUEST}, \text{ACTIVITY}, \text{INTERACTION}, \text{PARTICIPATION}, \text{FIELD}, \epsilon).$$

EVALUATION is 3 if activities are very useful, 2 if slightly useful, 1 if neutral, and 0 if not useful.

YEAR is the number of years in operation

Table 1. Estimates of the ordered probit model : the evaluation of farm-based activities

Variable	Coefficient	<i>p</i> value	Mean of <i>x</i>
Constant	0.861	0.000	—
YEAR	-0.012	0.008	22.849
ROOM	-0.761	0.005	0.097
GUEST	0.042	0.036	2.380
REGISTRATION	0.325	0.032	0.558
INTERACTION	0.719	0.000	0.252
PARTICIPATION	0.016	0.000	13.892
FIELD	0.500	0.002	0.279
μ_1	0.978	0.000	—
μ_2	2.502	0.000	—

Note : $n=258$; model chi-square ($8df$) = 83.1. μ_1 and μ_2 are threshold parameters.

(year).

ROOM is 1 if the number of guestrooms is less than five, 0 otherwise.

GUEST is the number of guests during 1997 (1,000 persons).

ACTIVITY is 1 if an operator provided farm-based activities before registration, 0 otherwise.

INTERACTION is 1 if an attitude toward host-guest interactions is very positive, 0 otherwise.

PARTICIPATION is a percentage of guest participation in farm-based activities (%).

FIELD is 1 if specific fields are prepared for farm-based activities, 0 otherwise.

Of the independent variables above, YEAR, GUEST, and PARTICIPATION are continuous variables, and the rest are discrete variables.⁴⁾ The ordered probit model was estimated using the LIMDEP version 7 (Econometric Software, Inc.). Maximum likelihood parameter estimates and corresponding tests of significance are shown in Table 1. Other independent variables on sample characteristics and the attitudes were all excluded because of statistical insignificance.

Coefficients shown in Table 1 were all significantly different from zero at least at the 5% significance level. Threshold parameters, μ_1 and μ_2 , were also significant at the 1% level, and the following relationship, $0 < \mu_1 < \mu_2$, was confirmed as well. Highly significant, positive and ordinal μ estimates indicate that the four categories in the response are indeed ordered.

As with other discrete choice models, marginal effects on event probability in an ordered probit model are the partial derivative of probability with respect to x . Marginal effects facilitate the interpretation of the effects of coefficient estimates. The marginal effects of each variable can be assessed in two different ways. If the variable is a continuous variable, the marginal effect should be calculated by taking the partial derivative. On the other hand, if the variable is a discrete variable, the marginal effect should be calculated by computing the change in predicted probability given a unit change in x with the other variables held at their sample means.

Marginal effects are presented in Table 2. With one year of increase in the number of years in operation (YEAR), the probability of being classified as "not useful ($y=0$)" will increase by 0.002 and that of being classified as "very useful ($y=3$)" will decrease by 0.003. This result indicates that the operators of the newer farm-inns tend to make better use of farm-based activities for the growth and development of their business. The results for the rest of the continuous variables can be interpreted in the same way. With a unit of increase in the number of guests (GUEST), the probability of being classified as "not useful" will decrease by 0.007, and that of being classified as "very useful" will increase by 0.008. With one percentage of increase in the guest participation in the farm-based activities (PARTICIPA-

Table 2. Marginal effects of independent variables : the evaluation of farm-based activities

Variable	Prob [$y=0$]	Prob [$y=1$]	Prob [$y=2$]	Prob [$y=3$]
YEAR	0.002	0.003	-0.002	-0.003
GUEST	-0.007	-0.009	0.007	0.008
PARTICIPATION	-0.003	-0.003	0.003	0.003
ROOM=0	0.081	0.256	0.528	0.135
ROOM=1	0.262	0.372	0.335	0.031
Change	+0.181	+0.115	-0.193	-0.104
REGISTRATION=0	0.127	0.308	0.478	0.087
REGISTRATION=1	0.071	0.241	0.537	0.150
Change	-0.055	-0.067	+0.059	+0.063
INTERACTION=0	0.127	0.308	0.478	0.087
INTERACTION=1	0.031	0.157	0.551	0.261
Change	-0.095	-0.151	+0.072	+0.174
FIELD=0	0.118	0.300	0.488	0.094
FIELD=1	0.046	0.194	0.553	0.207
Change	-0.072	-0.106	+0.065	+0.113

Note : YEAR, GUEST, and PARTICIPATION are continuous variables and the rest are discrete variables.

TION), the probability of being classified as “not useful” or “neutral” will decrease by 0.003, respectively, while that of being classified as “very useful” or “slightly useful” will increase by about the same amount.

As for discrete variables, they are interpreted in a slightly different way. If the number of guestrooms (ROOM) is less than five, the chance of being classified as “not useful” will increase by 0.182 and that of being classified as “very useful” will decrease by 0.104. Likewise, the provision of farm-based activities before registration (REGISTRATION) will decrease the chance of being classified as “not useful” by 0.081 and will increase that of being classified as “very useful” by 0.063. This result implies that such operators have accumulated the know-how to make farm-based activities profitable. If an operator has a very positive attitude toward interactions with guests (INTERACTION), the chance of being classified as “not useful” will decrease by 0.095, and that of being classified as “very useful” will increase by 0.174. Finally, if specific fields (FIELD) are pre-

pared for the farm-based activities, the chance of being classified as “not useful” will decrease by 0.072, and that of being classified as “very useful” will increase by 0.113.

Of the independent variables above, REGISTRATION, INTERACTION, and FIELD imply positive attitudes of the operators. Importantly, these variables impinge positively on the evaluation of the farm-based activities. The estimation results are consistent with what these variables imply.

2) Future prospects of farm-inn business

In this section, factors that affect future prospects of an operator’s farm-inn business are analyzed. Respondents were asked how they perceive the prospects for future success or failure of their farm-inn business. The response choices to the question fall into five categories. Choices were as follows : very optimistic (2.7%) ; slightly optimistic (27.4%) ; neutral (36.3%) ; slightly pessimistic (29.5%) ; very pessimistic (4.1%). The choice model of operators can be formulated by using equation (1) under the following general form :

**Table 3. Estimates of the ordered probit model :
future prospects of farm-inn business**

Variable	Coefficient	<i>p</i> value	Mean of <i>x</i>
Constant	1.894	0.000	—
TYPE	−0.485	0.022	0.099
YEAR	−0.011	0.009	23.305
ROOM	0.176	0.465	0.099
REPEAT	0.360	0.012	0.356
REGISTRATION	0.249	0.063	0.517
SKI	−0.463	0.001	0.353
INTERACTION	0.333	0.032	0.229
SUCCESSOR	0.341	0.022	0.425
μ_1	1.453	0.000	—
μ_2	2.490	0.000	—
μ_3	4.070	0.000	—

Note : $n=292$; model chi-square ($7df$) = 52.6. μ_1 , μ_2 and μ_3 are threshold parameters.

PROSPECT = $f(\text{TYPE, YEAR, ROOM, REPEAT, REGISTRATION, SKI, INTERACTION, SUCCESSOR, } \epsilon)$.

PROSPECT is 4 if the prospect is very optimistic, 3 if slightly optimistic, 2 if neutral, 1 if slightly pessimistic, and 0 if very pessimistic.

TYPE is 1 if the type of accommodation is *pension* (European-style inn), 0 otherwise.

REPEAT is 1 if the ratio of repeat visitors is very high, 0 otherwise.

SKI is 1 if a main destination activity of guests is skiing, 0 otherwise.

SUCCESSOR is 1 if an operator has a successor, 0 otherwise.

The rest of the independent variables to be used here have all been presented in the previous section. Of the independent variables above, only YEAR is a continuous variable, and the rest are discrete variables. Maximum likelihood parameter estimates and corresponding tests of significance are shown in Table 3.

Coefficients are significantly different from zero at least at the 5% threshold level except for ROOM and REGISTRATION. ROOM is not excluded from this estimation, although the reason is only to allow comparison with the parameter estimate shown in Table 2. REGISTRATION is statistically significant at the 10% threshold level. Thresh-

old parameters, μ_1 , μ_2 , and μ_3 , are also significant at the 1% level and the following relationship, $0 < \mu_1 < \mu_2 < \mu_3$, is confirmed as well.

Marginal effects are presented in Table 4. First of all, the results relating to the continuous variable are interpreted. With one year of increase in the number of years in operation (YEAR), the probability of being classified as “very pessimistic ($y=0$)” will increase by 0.001 and that of being classified as “very optimistic ($y=4$)” will decrease by 0.0004. This result indicates that the older farm-inns are more likely to have negative perceptions for their future business.

Next, the implications regarding discrete variables are presented. The type of accommodation of a farm-inn that is defined as a *pension* by law (TYPE), will increase the chance of being classified as “very pessimistic” by 0.044 and will decrease that of being classified “very optimistic” by 0.013. If repeat visitors (REPEAT) account for the very high portion of the guests, the chance of being classified as “very pessimistic” will decrease by 0.021 and that of being classified as “very optimistic” will increase by 0.016. The provision of farm-based activities before registration (REGISTRATION) will decrease the chance of being classified as “very pessimistic” by 0.016 and will increase that of being classified as “very optimistic” by 0.010. If a main visitor activity of guests is

**Table 4. Marginal effects of independent variables :
future prospects of farm-inn business**

Variable	Prob [$y=0$]	Prob [$y=1$]	Prob [$y=2$]	Prob [$y=3$]	Prob [$y=4$]
YEAR	0.001	0.003	-0.0002	-0.003	-0.0004
TYPE=0	0.024	0.278	0.396	0.284	0.018
TYPE=1	0.069	0.418	0.355	0.153	0.005
Change	+0.044	+0.140	-0.040	-0.131	-0.013
REPEAT=0	0.036	0.330	0.390	0.232	0.011
REPEAT=1	0.016	0.226	0.390	0.341	0.028
Change	-0.021	-0.104	-0.000	+0.109	+0.016
REGISTRATION=0	0.036	0.330	0.390	0.232	0.011
REGISTRATION=1	0.021	0.257	0.395	0.306	0.021
Change	-0.016	-0.073	+0.005	+0.074	+0.010
SKI=0	0.018	0.245	0.393	0.320	0.024
SKI=1	0.052	0.380	0.374	0.186	0.007
Change	+0.034	+0.135	-0.019	-0.134	-0.016
INTERACTION=0	0.032	0.315	0.393	0.247	0.013
INTERACTION=1	0.015	0.219	0.388	0.349	0.030
Change	-0.018	-0.095	-0.005	+0.102	+0.016
SUCCESSOR=0	0.038	0.335	0.389	0.227	0.011
SUCCESSOR=1	0.017	0.236	0.392	0.330	0.029
Change	-0.021	-0.099	+0.003	+0.103	+0.015

Note : YEAR is a continuous variable and the rest are discrete variables.

skiing (SKI), the chance of being classified as “very pessimistic” will increase by 0.034 and that of being classified as “very optimistic” will decrease by 0.016. If an operator has a very positive attitude toward interaction with guests (INTERACTION), the chance of being classified as “very pessimistic” will decrease by 0.018 and that of being classified as “very optimistic” will increase by 0.016. If an operator has a successor (SUCCESSOR), the chance of being classified as “very pessimistic” will decrease by 0.021 and that of being classified as “very optimistic” will decrease increase by 0.015. As for the number of guestrooms (ROOM), it was not significantly different from zero, while it was an important factor with respect to the evaluation of the farm-based activities.

8. Discussion and Conclusions

It has been emphasized that research was required on factors contributing to individual operator’s success and failure (Oppermann [19]). This study demonstrated that the ordered probit model could be used to analyze factors that influence farm-inn operator’s success and failure. Empirical results clearly showed that a variety of attributes, such as the number of years in operation, the number of guestrooms, and a positive attitude toward interactions with guests, affected their choice with respect to the evaluation of farm-based activities. As for the future prospects of their farm-inn business, a variety of attributes, such as the number of years in operation, and the type of accommodation, affected their choice. In addition, their

choices on this question was also affected by attitudes toward better management such as a positive attitude toward interactions with guests, the greater number of repeat visitors and the existence of a successor.

It is also noteworthy that the evaluation of farm-based activities is relatively low for smaller farm-inns. In Japan, governments and authorities recommend that prospective operators open a farm-inn with less than five rooms, mainly due to legal limitations and cost-effectiveness, only if they operate their farm-inns to diversify from farming activities. Actually, farm-inns with less than five rooms constitute 31.7% of those with less than ten-year experience. MAFF and local governments have emphasized the importance of farm-based activities and promotion to establish relatively small-scale farm-inns by using vacant rooms within existing farmhouses. In spite of their efforts, this study showed that the farm-based activities did not necessarily contribute to the small-scale farm-inn business though operators might consider the activities as convenient tools for host-guest interactions. In addition, about 20% of all respondents answered that the percentage of participants in farm-based activities was less than 1%, and about 30% of them did not answer the question. Such a response may indicate that the farm-based activities are neither necessary nor important for those farm-inns.

The survey data and estimation results should also inspire government officials to reconsider their current policy for the promotion of farm tourism. For example, the rural setting was the most important factor for small-scale farm-inns to attract guests. Even though farm-based visitor activities contribute somewhat to greater guest satisfaction and the number of repeat visitors, it is important to preserve rural amenities such as landscapes and biodiversity in rural areas. Preservation and enhancement of the attractiveness of rural amenities by combining agro-environmental policy with the promotion of farm tourism, including deregulation and direct financial support to build accommodations, are critical factors in order to promote farm tourism.

When it comes to future prospects of farm-inn business, it is noteworthy that operators

managing somewhat old-fashioned accommodation, such as a *pension* or a skier's inn, were not optimistic about their future success. These types of accommodation had been popular in Japan during the 1960s through the 80s. They have certainly tried to attract tourists who are interested in farm-based activities as well as skiing and other off-farm activities. It is difficult to say that they have fully succeeded in appealing to those tourists. In addition, they tend to be more pessimistic about their future business. It is necessary for the government and its agencies to adequately inform them of trends in farm and rural tourism and give them training opportunities to develop their farm-inn businesses.

On the other hand, operators who have made serious effort to interact with guests and to acquire a greater number of repeat visitors are more likely to be optimistic. Furthermore, the size of farm-inn did not affect future prospects in spite of the promotion by the government to increase small-scale farm-inns. The government and its agencies will be required to turn their attention to those who are more interested in urban-rural interactions regardless of the size and the positive attitude toward farm-based activities.

Farm tourism in Japan is a rapidly growing segment of the tourism industry (Miyazaki [13]). This study might capture only a moment of the growth process and only from the viewpoint of the supply side. However, observations of this survey include a wide variety of farm-based accommodations in spite of significant difficulty in collecting data on those farms or enterprises that are of relatively smaller scale (Pigram [23]). Thus, the survey generates useful information with respect to the implementation of policy measures not only in Japan, but also in any other countries where farm tourism is now drawing attention as one of the means of farm diversification. This nationwide survey could reveal general aspects of farm-inn operations and farm tourism. The next step for researchers is to focus on an analysis of the demand side and to conduct area studies to obtain more specific information about farm tourism. Greater elaboration of analytical tools is also required to explore further useful information from questionnaire surveys.

- 1) APRE was merged into the Organization for Urban-Rural Interchange Revitalization in 2001.
- 2) The full text of the question is as follows. "What is your perception of the future of your farm-inn business?"
- 3) The full text of the question is as follows. "Are farm-based activities useful for the growth and development of your farm-inn business?"
- 4) Demographics of operators and variables regarding their farming activities could not be incorporated into these models because of a number of missing values and insignificant estimation results. Since a significant number of respondents had only small sizes of farmland, operators did not fill out questions about their farming activities. As such, the status of their farming activities might not affect their attitudes toward farm-inn operations.

References

- [1] Ben-Akiva, M. and S. R. Lerman. *Discrete Choice Analysis: Theory and Application to Travel Demand*. Cambridge, MA : The MIT Press, 1985.
- [2] Clarke, J. "Farm Accommodation and the Communication Mix," *Tourism Management*, Vol. 17, No. 8, 1996, pp. 611-620.
- [3] Evans, N. J. and B. W. Ilbery. "Advertising and Farm-Based Accommodations: A British Case Study," *Tourism Management*, Vol. 13, 1992, pp. 415-422.
- [4] Fennel, D. A. and D. B. Weaver. "Vacation Farms and Ecotourism in Saskatchewan, Canada," *Journal of Rural Studies*, Vol. 13, No. 4, 1997, pp. 467-475.
- [5] Fleischer, A. and A. Pizam. "Rural Tourism in Israel," *Tourism Management*, Vol. 18, No. 6, 1997, pp. 367-372.
- [6] Garcia-Ramon, M. D., G. Canoves, and N. Valdovinos. "Farm Tourism, Gender and the Environment in Spain," *Annals of Tourism Research*, Vol. 22, No. 2, 1995, pp. 267-282.
- [7] Greene, W. H. *Econometric Analysis*, 4th Ed. Upper Saddle River, NJ : Prentice Hall, 1999.
- [8] Hall, M. C. and B. Weiler. "Introduction. What's Special about Special Interest Tourism?" in B. Weiler and C. M. Hall, eds., *Special Interest Tourism*. London : Belhaven Press, 1992, pp. 1-14.
- [9] Hjalager, A.-M. "Agricultural Diversification into Tourism," *Tourism Management*, Vol. 17, No. 2, 1996, pp. 103-111.
- [10] Inoue, K., O. Nakamura, and M. Yamazaki. *Nihongata Green Tourism (Japanese-Style Green Tourism)*. Tokyo : Toshibunkasya, 1996.
- [11] Luzar, E. J., A. Diagne, C. Gan, and B. R. Henning. "Profiling the Nature-Based Tourist: A Multinomial Logit Approach," *Journal of Travel Research*, Vol. 37 (August), 1998, pp. 48-55.
- [12] Maddala, G. S. *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge : Cambridge University Press, 1983.
- [13] Miyazaki, T. ed. *Green Tourism to Nihon no Noson (Green Tourism and Rural Areas in Japan)*. Tokyo : Norintokeyokai, 1997.
- [14] Morey, C. L. "Discrete Choice Analysis of the Impact of Tourism Prices," *Journal of Travel Research*, Vol. 33 (Fall), 1994, pp. 8-14.
- [15] Morishima, T. "Marketing Strategies for Farm Inns in Hokkaido," *Journal of Rural Life Society of Japan*, Vol. 46, No. 3, 2002, pp. 32-39.
- [16] Nickerson, N. P., R. J. Black, and S. F. McCool. "Agritourism : Motivations behind Farm/Ranch Business Diversification," *Journal of Travel Research*, Vol. 40 (August), 2001, pp. 19-26.
- [17] OECD. *Cultivating Rural Amenities : An Economic Development Perspective*. Paris : Organisation for Economic Co-operation and Development, 1999.
- [18] Ohe, Y. "Present Situation of Farm-Inn Activity and its Perspective," *Chugoku National Agricultural Experiment Station Rural Economy Report*, 117, 1995, pp. 15-35.
- [19] Oppermann, M. "Holidays on the Farm : A Case Study of German Hosts and Guests," *Journal of Travel Research*, Vol. 34 (Summer), 1995, pp. 63-67.
- [20] Oppermann, M. "Rural Tourism in Southern Germany," *Annals of Tourism Research*, Vol. 23, No. 1, 1996, pp. 86-102.
- [21] Oppermann, M. "Farm Tourism in New Zealand," in R. Butler, C. M. Hall, and J. Jenkins, eds. *Tourism and Recreation in Rural Areas*. Chichester, West Sussex : John Wiley & Sons, 1998, pp. 225-233.
- [22] Pearce, P. L. "Farm Tourism in New Zealand : A Social Situation Analysis," *Annals of Tourism Research*, 17, 1990, pp. 337-352.
- [23] Pigram, J. J. "Planning for Tourism in Rural Areas : Bridging the Policy Implementation Gap," in D. G. Pearce and R. W. Butler, eds., *Tourism Research: Critiques and Challenges*. London/New York : Routledge, 1993, pp. 156-174.
- [24] Shakur, S., J. D. Holland, and K. Martin. "A Survey of Farmstay Tourism in New Zealand," in K. S. Chon, ed., *Conference Proceedings of Third International Conference on Tourism in Indo-China and Southeast Asia: Development, Marketing and Sustainability*. OMNI press, 1998, pp. 145-151.
- [25] Vogeler, I. "Farm and Ranch Vacationing," *Journal of Leisure Research*, Vol. 9 No. 4, 1977, pp. 291-300.
- [26] Weaver, D. B. and D. A. Fennel. "The Vacation Farm Sector in Saskatchewan : A Profile of Operators," *Tourism Management*, Vol. 18, No. 6, 1997, pp. 357-365.