Logit analysis for the entry of farmers into contract Japanese quail farming

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ABSTRACT

The present study was undertaken to analyze the factors determining the participation of farmers in contract Japanese quail farming. The primary data for the study was collected through a pre-tested interview schedule. The determinant factors for farmers participation in contract Japanese quail farming were assessed by the logit model and the results of the analysis revealed that the farm size and profitability were found to be the positive determinant factors and investment was found to be a negative determinant factor for the participation of farmers in contract Japanese quail farming.

Key Words: Contract Japanese quail farming, Logit model, Farm size, Profitability, Investment

INTRODUCTION

Poultry is one of the important components of Animal Husbandry, which provides additional means of employment opportunities to a large number of people with the new and innovative approaches practiced. One of the innovative approaches getting popular now is an institutional arrangement that enables farmers to access markets called as 'Contract Farming'. Contract farming is a viable alternative farming model in India, which can provide assured and reliable input services to the farmers and desired farm produce to the contracting firms. The concept of contract farming promises i) to provide a proper linkage between the farm and market ii) promote high degree of competition at the supply and market end and iii) minimize intermediaries in order to increase farmer's income.

The alternate poultry production in India is gaining momentum and attention from the farmers, entrepreneurs, professionals and researchers. Among different types of contract poultry farming, contract Japanese quail farming is relatively a new venture in Tamil Nadu. As the Indian economy grows, there will be an increase in the number of people with high disposable income and consciousness about quality and health who will demand food products of certain specifications. Japanese quail is an efficient biological machine for converting feed into animal protein of high biological value and hence is one of the cheapest

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sources of animal protein for human diet. Japanese quail has unique qualities of hardiness and adaptability to diversified agro-climatic conditions. The population trend appears to be stable, and hence the species does not approach the thresholds for vulnerable under the population trend criterion (>30% decline over ten years or three generations). For these reasons, the species is evaluated as least concern. (Arya *et al.*, 2018)

Japanese quail production requires less investment and gives quick returns, higher profits and hence can be adopted by rural masses quickly. A very important point is that so far the benefits of Japanese quail farming have not fully reached the rural masses.

The inherent lacunae associated with contract Japanese quail farming are yet to be documented. No systematic study was carried out to find the determinant factors of participation of farmers in contract Japanese quail farming. Keeping the factors in mind, the present study was designed with the objective of finding the factors determining participation of farmers in contract Japanese quail farming.

MATERIALS AND METHODS

For the present study, the western zone of Tamil Nadu was purposively selected since the districts in this zone (Erode, Tiruppur and Coimbatore) have high concentration of Japanese quail farming activities. The primary data for the present study was collected from thirty contract Japanese quail farmers with a well-designed pre-tested interview schedule.

To assess the determinant factors of participation in contract Japanese quail farming, logit model was used. In explaining a dichotomous dependent variable (Y_i), where "one" represents participation of farmers in contract Japanese quail farming and "zero" represents participation in non-contract Japanese quail farming, a logit model is used to examine the determinant factors of participation in contract Japanese quail farming because of its simplest mathematical structure. The relationship between dependent and independent variables is non-linear; a logistic function is used to estimate the association between binary, endogenous variable (Y) and the independent variables (Xs). The following mathematical form of the model was used in this study.

$$\ln\left(p_i/(1-p_i)\right) = \beta_o + \sum_{j=1}^{k} \beta_j X_{ij}$$

where, p_i is the probability of the i^{th} farm being in contract and X_k is the k^{th} explanatory variable. The dependent variable ln (p_i / (1-p_i)), in the equation is the log-odds ratio in favour of participation in contract farming (Begum and Alum, 2005)

Consideration of model variables (factors)

Factors	Definition
X_1	Age in years
X_2	Education in number of years
X_3	Gender (Male-1; Female-0)
X_4	Experience in years
X_5	Landholding in acres
X_6	Farm size of respondents
X_7	Livability in per cent
X_8	Marketing weight in Kgs
X_9	Feed efficiency of birds
X_{10}	Profitability of the farm
X_{11}	Investment in rupees

Following these arguments, the following logit model was postulated.

$$\ln (p_i / (1- p_i)) = \beta_o + \beta_1X_1+ \beta_2 X_2+ \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X8 +\beta_9X_9 +\beta_{10}X_{10} +\beta_{11}X_{11}$$

Where,

p_i = Probability of participation in contract farming

$(1- p_i)$ = Probability of non-contract farm

β_0 = Constant term

β_i's = Coefficient

X_i = Determinant factors

RESULTS AND DISCUSSION

The results of the logit model to analyze the factors determining the participation of farmers in contract Japanese quail farming are presented in Table1. On observing the contents of the table, it could be noted that the model χ^2 was 38.368, meaning that the model is statistically significant. Among the 11 variables presumed to be the determinants of participation of farmers in contract Japanese quail farming, the factors viz., experience, farm size, profitability and initial investment were found to be statistically significant and the remaining factors were statistically non-significant ($P>0.05$). Among the significant variables, the variables, farm size ($P<0.01$), profitability ($P<0.01$) and experience

(P<0.05) were the positive determinant factors for farmers participation in contract farming. The variable initial investment (P<0.01) was found to be negatively influencing the farmers participation in contract Japanese quail farming.

Profitability is a positive determinant factor and if it is significantly more than the following costs or risks which farmers would usually encounter (both in short-run and long-run), then more farmers will decide to participate in contract Japanese quail farming. Farm size is a positive determinant factor and has a direct influence on the profit and yield of the farm. This result concurs with the result of Mishra *et al.* (2018) who found that farm size has a positive and significant impact on profits and yield. Increase in experience might improve the scientific knowledge of the farmers and could rectify their faults, if any, in running the farm and more experience made them self-reliant to take farm operation decisions and willingness to participate in contract Japanese quail farming. Increase in initial investment might increase the financial risk of the farmers and it acts as a negative determinant factor for the participation of farmers in contract Japanese quail farming. The results concur with the result of Nagaraj *et al*. (2008) who found that low initial investment was one of the factors determining farmers participation in contract farming.

The reliability of the usage of the logit model for the correct prediction of determinant factors of contract and the non-contract farming were tested by comparing the observed and predicted values. The percentage of correct prediction by the logit model was 96.70 per cent. This model was successful in predicting the contract farmers (100.00 per cent) correctly than the non-contract farmers (93.30 per cent) (Table 1).

Table 1 Determinants of participation in contract Japanese quail farming

X_i	Variables	Coefficients β_i	Wald-statistic	P-value
X_1	Age in years	0.037	0.016	0.901
X_2	Education in number of years	-0.076	0.584	0.445
X_3	Gender (Male-1; Female-0)	-0.083	1.246	0.264
X_4	Experience in years	0.230 *	3.951	0.047
X_5	Landholding in acres	0.035	0.111	0.739
X_6	Farm size of respondents	0.253 **	12.271	0.000
X_7	Livability in per cent	- 0.010	0.019	0.891
X_8	Marketing weight in Kgs	0.030	0.172	0.679
X_9	Feed efficiency of birds	0.026	0.216	0.642
X_{10}	Profitability of the farm	0.574 **	8.026	0.005
X_{11}	Investment in rupees	-0.313 **	11.253	0.001
β_0	Constant	1.840 *	4.247	0.039
Model χ^2 value = 38.368 **				
Dependant Variable : Participation in contract Japanese quail farming Yes = 1 ; No = 0				
* - P<0.05 ** - P<0.01				

Classification Table

Observed		Predicted		
		Participation in contract Japanese quail farming		Percentage correct
		Yes	No	
Participation in contract Japanese quail farming	Yes	30	0	100.00
	No	2	28	93.30
Overall Percentage				**96.70**

CONCLUSION

Among the significant factors, the variables, farm size (P<0.01), profitability (P<0.01) and experience (P<0.05) were the positive factors determining the participation of farmers in contract Japanese quail farming. The variable initial investment (P<0.01) was found to be a negative factor influencing the farmers participation in contract Japanese quail farming. Contract Japanese quail farming increases the income of participating farmers and results in better management of technology. Contract Japanese quail farming has both positive and negative aspects but benefits overweigh the negative effects which can be addressed through the involvement of institutions related to the governance of the contract farming business. However, in the present context, contract Japanese quail farming is clearly a win -win situation for both the companies and the farmers. The future of contract farming in India is quite promising due to increasing consciousness about the quality demands of the export market in the developed countries.

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