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# Determinants of Likelihood Access for Different Livestock Based Enterprises by the Farmers of Tripura, India

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## ABSTRACT

Majority of the farmers are marginal and small even though economy of the state is agricultural oriented; in this perspective integrated farming system (IFS) became a viable option for the farmers for their livelihood. In their farming system with the cultivation of crop and vegetables different livestock based enterprises such as dairy, poultry, piggery, fishery etc. were also important options. This present study was designed to identify the determinants effecting to adopt different livestock enterprises at the farmers level; for that purpose total 100 farmers were selected and to analysis the likelihood assess of different enterprises multinomial logit (MNL) model was applied and result says that different socio- economic variables were influencing differently the farmers to availing the livestock enterprises in different condition; such as age, land holding, experience in farming were influencing significantly the farmers to adopt the different enterprises. Further, the study has also found that norms, ethics etc were also associated within the particular social system, so in this context farmers need to be benefited with the help of different modern innovative technologies and farming practices then might be the small holder farmers of the country also will be able to see the better future.


**Key words:** Determinants, Farming system, Multinomial logit.

## INTRODUCTION

Economy of Tripura is predominantly rural and agriculture oriented where Agriculture has 22.10 per cent share in state domestic product in the year 2013-14 (indiastat.com). But small land holding and gradual declining trend in the average size of farm holding poses a serious challenge to the sustainability as well as to profitability of the farming system. Therefore it is very crucial to develop innovative strategies and agricultural technologies that enable adequate employment and income generation for the small holder farming community of the state as well for country. In this context, integrated farming system which encourages vertical integration of different farming enterprises is possible under the same farming system for the farmers. It is also necessary to integrate variety of land based enterprises like fishery, poultry, duckery, apiaery, field and horticultural crops etc. within the bio-physical and socio-economic environment of the farmers to make farming more profitable and dependable (Behera *et al*. 2004). Different farming combinations proved successful based on different context such as agriculture with poultry, agriculture with sheep rearing and agriculture with sericulture were the important farming system and the relative profitability of the selected farming systems reported that agriculture + sheep was most profitable according to Ravi (2004). Integrated farming system (IFS) are often viewed as a sustainable alternative to commercial farming systems particularly on marginal lands with the objective of reversing resource degradation and stabilizing farm incomes (Devasenpathy *et al*. 1995). North-east India is already well known for its variety of biodiversity; it is also witness of the agrarian farming system includes different crop cultivation, dairy, piggery, poultry and fishery which plays an imperative role as important supplementary options of livelihood for small and marginal farmers; whereas in Tripura this category constitute more than 90 percent of the total farming community which helps them to get year round earning. In this context, a study was conduct to find out the factors or various determinants affecting the access to make choice of combination of different livestock enterprises to follow by the farmers of the study area under the same umbrella of integrated farming system (IFS).

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## MATERIALS AND METHODS

The study was conducted in Tripura, one of the North-eastern states of India and for this ex- post facto research design was followed. Basically crop (rice) and other vegetables farming were common to all of the respondents for this particular study, therefore analysis was carried out based on the collected data to assess the factors influencing to make choice of combination of different enterprises made

by the respondents under their farming systems and to assess this multinomial logit model (MNL) was applied as this model (MNL) for many years provided the fundamental platform for the analysis of discrete choice (Greene and Hensher,2000) For this study, total 100 farmers were interviewed with the help of pretested structured interview schedule. For the multinomial logit model (MNL) the following formula was applied.

$$P\ (y = \frac{j}{x}) = \frac{\exp\ (x\beta_j)}{[1+ \sum_{h=1}^{j} \exp\ (x\beta_h),\ j = 1,.....j}$$

Where βj is K x 1, j=2.....J.

Estimation of coefficients of Multinomial logit model expressed only the direction of the effect of the explanatory variables on the dependent variable; they do not represent actual magnitude of change or probabilities. The marginal effect from the calculated MNL, measures the expected change or probability of making particular choice by the farmers of the study area.

## RESULTS AND DISCUSSION

The majority of the respondents belonged to middle age (35-50 years); had primary and middle level of education and majority of the respondents in the region had medium (5-8 members) family size (Table 1). The study found that 93 percent of the total respondents were marginal farmers in which 77 per cent of them had more than 5 years experience in integrated farming systems. The integrated farming system is a kind of approach which is able to give year round income generation and the annual income of majority (57.00%) of respondents varies from Rs. 143400-184890.

**Table 1:** Socio- economic status of the farmers of the study area.

| Socio economic variables | Values |
|---|---|
| Age (35-50 Years) | 62 % |
| Level of education | Primary (34%), middle (39%) |
| Family education status | 61% |
| Land holding (less than 1 ha.) | 93% |
| Experience in farming(> 5 years) | 77% |
| Annual income (Rs. 143400-184890 ) | 57% |

It has found that crop (rice) and vegetable farming were common to all respondents of the study area, so other than these dairy, piggery, poultry and fishery were vital enterprises which were playing a important role in sustaining live and livelihood of the farmers, hence nominally enterprises were categorised (from where more than 15 per cent of annual income were coming).

The analysis of existing farming systems in the study area found that 38 per cent respondents i.e. in plain (44 %) and in hilly (32 %) were following crop-horticulture-dairy-piggery- goatary-poultry farming combination, followed by crop-horticulture-dairy-fishery farming system where 24 per cent of respondents i.e. in plain (34%) and in hilly (14%) were engaged. Other than these crop-horticulture-dairy-piggery-fishery farming system and crop-horticulture-goatary-fishery farming combination were also followed by the farmers of the study area (Table 2).

Some socio-economic variables such as age, family education status, land holding, experience in farming and utilisation of source of information were considered to analyse the likelihood access of different enterprises by farmers; these all were consider taken as explanatory variables and the result shows that out of 5 different explanatory variables, two variables were significantly influencing dairy based system, three variables to pig-fish based system, two variables to pig based system and only one variable to poultry based farming were found to be affected the choice of combinations to follow the farm enterprises under their small holding farming system. The study conducted by Mangla (2008) also revealed that agriculture-horticulture-forestry-dairy-vermicompost (62.14%), agriculture-horticulture-forestry-dairy-vermi-compost-forage crops (21.43%) were also popular among farmers of Darwad district of Karnataka. Integrated farming system (IFS) is a holistic approach which addresses the wellbeing of a farm as a whole; integration of different enterprises depends on particular context of the farming system and availability of resources.

The analysis of marginal effect (Table 3) shows that the likelihood accessing to dairy based farming system increases by 1 per cent for an increase in age of the respondents and in case of pig-fish based farming system the marginal effect shows that the likelihood access to this farming system decreases by 2 per cent for an increase in family education status of the respondents, as higher

**Table 2:** Combination of integrated farming systems in the study area.

| Combinations | Plain(n=50) | Hilly(n=50) | Pooled(n=100) |
|---|---|---|---|
| C+H+D++F | 17(34.00) | 7(14.00) | 24(24.00) |
| C+H+D+P+Po | 22(44.00) | 16(32.00) | 38(38.00) |
| C+H+D+P+F | 2(4.00) | 13(26.00) | 15(15.00) |
| C+H+G+F | 2(4.00) | 11(22.00) | 13(13.00) |
| C+H +D+Po +F | 7(14.00) | 3(6.00) | 10(10.00) |

C: Crop, H: Horticulture, D: Dairy, P: Pig. Po: Poultry, G: Goatary, F: Fishery.
Figures in parentheses indicate percentage.

**Table 3:** Multinomial logit regression on choice of enterprises of farming system.

| Independent / explanatory Variables | Coefficient Estimates | | | | Marginal effect | | | |
|---|---|---|---|---|---|---|---|---|
| | Dairy based | Pig+Fish based | Pig based | Poultry based | Dairy based | Pig+ Fish based | Pig based | Poultry based |
| Age (years) | 0.13( 0.011)* | 0.08( 0.53) | 0.06(0.02)** | 0.12 (0.059) | 0.01 | 0.04 | 0.01 | 0.02 |
| Family Education Status | 1.06(0.12) | -1.19(0.032)** | -1.63(0.0671) | -0.34(0.47) | 0.03 | -0.02 | -0.14 | 0.01 |
| Experience in IFS | -0.08(0.03)** | -0.23(0.28) | 0.30(0.144) | -0.62(0.581) | -0.03 | 0.00 | -0.01 | -0.04 |
| Land Holding | -7.57(0.00) | 0.91(0.024)** | 1.25(0.56) | 0.58(0.005)* | -0.28 | 0.24 | 0.24 | -0.18 |
| Utilisation of source of information | 2.36(0.38) | 2.10(0.068) | 1.28(0.16) | -3.13(0.28) | -0.14 | 0.20 | 0.08 | -0.04 |

** Indicates significant at 5 % level of significance, in a two tail test.

* Indicates significant at 10 % level of significance, in a two tail test.

education level drive peoples to follow advanced technologies and helps to access the benefit of higher level of farming.

Further it shows that the likelihood accessing to pig-fish based farming system increases by 24 per cent for an increase in land holding of the respondents in the study area i.e. farmers were ready to incorporate fishery and piggery enterprises under their integrated farming system if they get more cultivable land holding. Like -wise, in case of pig based and poultry based farming system also age and land holding shows significant result respectively. Hence it has found that as apart from crop and vegetables cultivation dairy, poultry, piggery and fishery remain as critical sources of livelihood for the farmers of the state. Other than this analysis there are some social or economical belongings which are directly or indirectly influencing the choice to incorporate any particular enterprise by the respondents under their particular farming system.

## CONCLUSION

The study found that majority of the farmers were marginal, were having low income level compare to national, suffering from accessing basic farm inputs, high cost of production etc. so many constraints were affecting the farmers in the study area but even though the farmers were not only depends on crop farming or vegetables cultivation; along with these dairy, poultry, fishery, piggery etc. were under the shadow of farmers' integrated farming system for their lives and livelihoods. Likelihood accesses of different farm enterprises were assessed by applying multinomial logit model and it shows that definitely different socio economic variable influencing the farmers to access different enterprises. Though the farmers of the state are middle in age and literate enough but their fragmented land hold farming, low per capita income, more over handicapped transportation and poor storage facilities are remain as constraints from the past to recent now. So the study concluded that if the farmers get their rightful facilities then irrespective of their various socio economic hurdles they can avail the benefit of different innovative technologies or farming practices and can get advantage from their small land holding also.

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