International Journal of Farm Sciences **5(1)** : 199-205, 2014

Willingness-to-pay behaviour of farmers for the mobile-based extension services through Reuter's Market Light in Tamil Nadu

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ABSTRACT

A venture promoted and supported by Thomson Reuters, Reuters Market Light (RML) offers highly customized and localized agricultural and related information service. Using a subscription economy model, RML provides information services via mobile phone-based short message service (SMS) primarily aimed at farmers. Based on the aforementioned facts and orientation the investigation was carried out in the Erode district of Tamil Nadu. The Tamil Nadu Reuters Market Light (RML) of Erode utilizes 14 Pallavan Grama Bank to distribute the messages which was purposely selected for the study. A proportional stratified random sampling was used to draw 180 respondents for the study. Majority of the respondents (86.7%) were willing to pay for accessing the RML service followed by 63.4 per cent who were willing to pay Rs 50-100, 23.3 per cent willing to pay Rs100-200 whereas 13.3 per cent were not willing to pay to access the RML service. In probity function analysis five variables such as age, educational level, farm size, income and RML gratification were shown statistically significant to the willingness-to-pay behaviour of farmers.

Keywords: Reuters Market Light (RML); short message service; willingness-to-pay behaviour

INTRODUCTION

The process involved in the disposal of a substantial produce has great economic importance not only for the farmer but also for the country as a whole. The unreasonably low return that the farmer gets for his produce and the excessive margin of profit retained by the intermediaries is of great concern to all policy makers. New opportunities for trade in international markets have also added a new challenge for Indian farmers. Contributions of small holders in securing food for growing population have increased considerably even though they are most insecure and vulnerable group in the society (Anandaraja et al 2009). Farmers are always in need of

authentic advice based on agro-meteorological, marketing and management aspects for land-use decisions and investments. Infrastructure support would be put in place to minimize post-harvest losses and enable agro-processing and value addition at the village level itself to increase employment. Cooperatives and farmers estates are playing role to get a fair deal and ensure profits of their produce. The provision of market information in various aspects like market price, product demand, traders' trend, market arrivals and disbursements would enable the farmers to make right decisions on marketing of their produce.

A venture named Reuters Market Light (RML) has been promoted and supported by Thomson Reuters which offers highly customized and localized agricultural related information service. The RML uses a subscription model to provide information based short message service (SMS) via mobile phone to intended farmers. The SMS covers localized weather forecasts, crop advisory, proximate market data and crop prices along with relevant policy and national and international news. A farmer subscribes to the RML services which equip them to overcome the information asymmetry that impedes agricultural communities' growth and earnings especially in the context of falling yields. Along with factual information the farmers can take firm decisions about their agricultural operations and sales which help to create wealth through a rise in agricultural price/income while wastage and market inefficiencies are minimized. Owing to these it is pertinent to study the willingness-to-pay (WTP) behavior of member farmers who avail mobile-based extension services from RML.

There are two main ways of determining WTP for advisory services (i) a direct or contingent valuation method (CVM) and (ii) an indirect or estimation of demand and supply for agricultural services. The direct approach involves a survey through a structured questionnaire about WTP on hypothetical services referred as CVM. The question is directly asked to respondents to state their exact maximum amount WTP for the particular use or non-use value of the services. The WTP is defined as the amount that must be taken from the farmer's income while keeping his utility constant. The CVM still has serious methodological and theoretical shortcomings when it is used to assess WTP for non-market-based goods and services such as format bias, embedding effect, ordering problem, starting bid effects, strategic bias, information bias, non-response bias, payment vehicle, free rider problem and warm glow effect. Previous efforts to evaluate the WTP for agricultural technologies in developing countries usually used CVM to determine how consumers evaluate goods and services when markets are missing. This approach is relatively easy to implement and provides only a limited amount of information (Dinar 1996). Keeping these points in mind the present

study was carried out to analyze the willingness-to-pay behaviour of the Reuters Market Light farmers and to identify the factors that influence the farmers willingness-to-pay behaviour for extension services offered through RML.

METHODOLOGY

The study was carried out in the Erode district of Tamil Nadu state. There are fourteen Pallavan Grama Banks functioning in Erode district. The district has major group of beneficiaries of RML who were availing services through mobile. The RML utilizes Pallavan Grama Bank (agricultural rural bank sponsored by the Indian Bank) to distribute the messages. RML gets the data base of farmers from the bank to send the messages. All the fourteen banks were selected for the study. From these banks 180 respondents were drawn by using the stratified random sampling with proportional allocation method. A simple random sampling without replacement procedure was adopted with the help of random number table to select the RML farmers who had SMS through the mobile phone. Multivariate probit model was implemented to capture the key determinants of farmers' WTP for agricultural services. In order to explain the behavior of a dichotomous dependent variable one has to use a suitably chosen cumulative distribution function (CDF). The logit model uses the cumulative logistic function. In some applications the normal CDF has been found useful. The estimating model that emerges from the normal CDF is known as the Probit Model or Normit Model. The collected data were analyzed with statistical package for the social sciences (SPSS) techniques.

Following statistical tools were used to analyse the data:

Probit regression model

Assume that in the measure of willingness to pay the decision of the i^{th} respondent's willingness-to-pay or not depends on unobservable utility index I_i that is determined by the explanatory variables in such a way that the larger the value of index I_i the greater the probability of the respondents to pay for the advisory services.

In general the index I_i can be expressed as

$$I_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \text{ —— (A)}$$

Assumptions of probit regression model

For each respondent there is a critical or threshold level of the index I_i^* such that if I_i exceeds I_i^* the respondents are willing to pay for mobile-based extension services otherwise not. But the threshold level I_i^* is also not observable. If it is assumed that it is normally distributed with the same mean and variance it is possible to estimate the parameters of equation 'A' and thus get some information about the unobservable index itself. In probit analysis the unobservable utility index (I_i) is known as normal equivalent deviate (NED) or simply normit. Since NED or I_i will be negative whenever $P_i < 0.5$ in

practice the equation 'A' is added to the NED and the result so obtained is called the probit.

ie Probit= NED + (A)= I_i + (A)

In order to estimate β_1, β_2, β_3, β_4, and β_5 equation (A) can be written as

$I_i = A_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + U_i$ —— (B)

Using the above theoretical knowledge the following was the probit regression model specified for the present study:

WTP = f(influencing independent variables), ex- f (AGE, GEN, EDUC, FSIZE, INC)

where

WTP = Willingness of the farmers to pay for the mobile-based agri-advisory services. Assumes 2 if they are willing to pay and 1 if they are not willing to pay
AGE = Age of the farmer
GEN = Gender
EDUC = Education
FSIZE = Farm Size
INC= Income

RESULTS and DISCUSSION

Willingness-to-pay behaviour

Willingness-to-pay refers to the maximum amount of money an individual is willing to pay to obtain a benefit or avoid a loss usually assumed to reflect the values one attaches to the benefit or loss. The information in this regard is presented in Table 1.

Table 1 shows that majority of the farmers (86.6%) were willing to pay money for accessing the extension service offered by the RML and only 13.3 per cent of the farmers were not willing to pay for such service that means that majority of the farmers were willing to pay for accessing the extension services offered by the RML.

The data in Table 2 depict the amount farmers wished to pay for availing the SMS services from RML.

It is evident from that majority of the farmers (63.4%) were willing to pay Rs 50-100 for accessing the extension services through RML followed by 23.3 per cent of them willing to pay Rs 100-200 and only 13.3 per cent who were not willing to pay for accessing the SMS through mobile. From the findings it can be stated that more than 85.0 per cent of the farmers were willing to pay for getting SMS on their mobile through RML.

Table 1. Distribution of respondents according to their willingness-to-pay behavior (n= 180)

Category	Frequency	Percentage
Willing to pay	156	86.7
Not willing to pay	24	13.3

Table 2. Distribution of respondents according to the amount they were willing to pay (n= 180)

Amount	Frequency	Percentage
Rs 50-100	114	63.4
Rs 100-200	42	23.3
No payment	24	13.3

Factors influencing the farmers' WTP for extension services offered through RML

In order to find out the factors that influenced the farmers' willingness to pay for the extension services an econometric model known as Probit Function Analysis was used and the results of the same are presented in Table 3. The model was used because the willingness-to-pay (Y) had two outcomes (2= willing, 1= not willing). The attributes taken for the analysis variables were X_1= age in years, X_2= dummy variable for gender (male= 1, female= 0), X_3= educational level (1= illiterate, 2= primary education, 3= middle school education, 4= high school education, 5= college level), X_4= farm size in acre, X_5= annual income in rupees and X_6= RML gratification.

$$Y = 1.347 + 0.643X1 - 0.401X2 + 0.215X3 + 0.856X4 + 0.448X5 + 0.458X6$$

From the results of the probit function analysis it could be observed that four variables were statistically significant. The significant attributes that contributed to the farmers' behaviour of willingness-to-pay for RML information were age (t= 2.17), educational level (t= 1.555), farm size (t= 1.912) income (t= 3.385) and RML Gratification (t= 3.496). The variables income and RML gratification were found to be significant at one per cent level, farm size and age at five per cent and education was statistically significant at ten per cent level. For a unit increase in age the z-score increased by 0.643, for gender decreased

Table 3. Factors influencing farmers' willingness-to-pay for Reuters Market Light information

Variable	Estimated coefficient	Standard error	't' ratio
Constant	1.347	1.370	0.984
Age	0.643**	0.296	2.172
Gender	-0.401(NS)	0.484	-0.829
Education	0.215 *	0.138	1.555
Farm Size	0.856 **	0.448	1.912
Income	0.448***	0.1323	3.385
RML gratification	0.458***	0.1416	3.496

***Significant at 1% level, **Significant at 5% level, *Significant at 10% level, NS= non-significant

by -0.401, for education increased by 0.215, for farm size increased by 0.856, for income increased by 0.448 and for gratification increased by 0.458. This implied that as the farm size increased the income also increased and the farmers tended to be willing to pay in order to avoid any risk in agriculture and if the farmers were full gratified with RML services they tended to be more willing to pay for availing this service. It infers that these variables had direct influence on the farmers' willingness-to-pay for agricultural SMS through RML. It could also be observed that relatively young farmers were willing to pay for RML. Young farmers had increased access to information and more interest in mobility for technical advice. The young farmers accessed the advice timely at the farm gate level and were ready to utilize the services. Higher education level among farmers resulted in more willing to pay for RML. The WTP was found to have significant and positive relationship with age, education, farm size, annual income and RML gratification of the farmers.

CONCLUSION

Majority of the farmers were willing to pay Rs 50-100 for accessing the extension service offered by the RML. The WTP was found to have significant and positive relationship with age, education, farm size, annual income and RML gratification of the farmers. RML has a lot of opportunity to shape the way farmers think and practice cultivation. The crop advisory information can and should include actionable advice on sustainable agricultural practices. The information that RML sends not only has the potential to make a difference to a farmer's bottom line but to the nation's food security and the environment. Providing information to those who do not have access to it and who are in critical need is an important service independent of the specific benefits to

farmers. Value additions in the Indian agriculture sector as well as value added services in the mobile phone industry are in urgent need of attention and both hold promise for improving the situations of farmers while creating value for several stakeholders including the mobile service companies and content aggregators like RML.

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Received: 26.8.2014 ***Accepted:19.11.2014***