Consumer Preference of Value Added Indigenous Chicken Product: Contingent Valuation Approach

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Abstract:-As revealed by many recent statistics indigenous chicken population is continuously declining in Sri Lanka, to overcome this problem commercialization is identified as better way to conserve the genetic pool. IC products are available with less or zero value addition in Sri Lankan local, undeveloped market chain. This study investigated consumers' willingness to pay (WTP) and consumer preference for value added IC meat and egg which would be available in formal market chain. This study had been done South Eastern region of Sri Lanka, randomly selected samples from formal meat shops and super markets were given structured questionnaire, collected data were adopted to Two-step Hacmann selection model to analyse and found that 98% of consumers prefer value added IC meat and 95% prefer value added IC eggs, further 88% and 80% of consumers willing to pay premium price to value added IC meat and egg respectively and estimated consumers willing to pay is Rs. 746.37 per kg of IC meat and Rs. 27.21 per IC egg this is 24.4% and 36.1% more than current price. Since this product is currently not available in Sri Lankan formal market, and highly demanded provide an opportunity for rural IC producers to develop their business by adding new actor into their IC product value chain this phenomena leads to conserve the genetic pool of indigenous chicken in Sri Lanka. This research is limited with IC in backyard poultry production system.

Keywords:-Two Step Hackman selection model; Indigenous Chicken (IC); Contingent Valuation; Willingness to Pay

I. INTRODUCTION

Livestock is one of the subsectors of agriculture sector; livestock sector contributes around 1.2 percent of Gross National Production (GDP) of Sri Lanka in 2014.Since people may have special preference for chicken and due to availability, lower price and accessibility, poultry products are highly demanded in Sri Lankan. Therefore, poultry industry has enormous growth potential in Sri Lanka(Kothalawala et al., 2014).

Indigenous Chicken (IC) plays a major role in rural economy, as IC acts as an income source for rural society, income is spent for their children's education, health care other routine house hold needs and house hold consumption (Bett, 2014; Bwalya, 2014).Inputs for IC production is lower compare to broiler and layer production since IC is the dominant poultry production in rural area, Yusuf et al. (2014) revealed that IC are allowed to scavenge around the homestead, during scavenging they pray insects and eat kitchen leftover, green leaves and minerals, therefore rural area farmers produce IC with low production cost. IC production system and business are normally observable in rural area however big problem of IC farming sector is not well defined market with very short market channel thus, there only two or three actors involve in the value chain (Weerahewa, 2004).Because of short value chain the degree of interaction between sellers and consumer as well as the benefits gained by all actors involving in value chain will decrease (Bwalya, 2014). according to geneticists observation IC population growth pattern is in declining trend in Sri Lanka and also Sri Lankan prevailing IC market may not grow in future, there is no well-defined IC market and the value chain or marketing channel is very short because of switching of backyard farmers to other industries with growth of economy and emergence of innovative exogenous products (Mafukata, 2015; Weerahewa, 2004).The population of IC is being reduced in the country mainly the reason is introduction of exotic breeds and diminishing rate of market share of IC products over the years (Abeykoon et al., 2013).

There are several ways to conserve genetic resources, among that researchers found commercialization is a better way to conserve genetic resources, for an instance Weerahewa (2004) state that two methods to conserve genetic resources one is preservation of genetic resources the other is conserving though sustainable utilization of resources among these, second approach is identified as only possible method where people always looking for their advantages. IC is selected by consumers for their best taste and high nutrient content in compare to broilers (Okello et al., 2010; Otieno, 2013).IC meat demand is high in urban areas and peri-urban areas (Ayieko, Bett, & Kabuage, 2014). Bwalya (2014) report that large amount of IC are bought by high level income restaurant to produce high level of food like stews. Major constraints to purchase IC products are less available in formal markets, and IC is available in the raw form which is live bird.

According Ayieko, Bett & Kabuage (2014) urban consumers do not have time to process live birds. Therefore there is a potential for value addition of IC product. For value added and IC available informal markets consumers' willingness to pay would be high (Otieno, 2013).Because of that it is important to estimate consumers' willingness to pay for

value added such as slaughtered, dressed and well packed with health certification of IC chicken meat as well as cleaned well packed IC egg available in formal markets like super market.

II. LITERATURE REVIEW

Willingness to pay (WTP) is the maximum amount an individual is ready to expend for acquiring a good or avoiding something objectionable. Kohli and Mahajan (1991) defined WTP "Consumer's reservation price for a new product is determined by his or her (estimated) utility for the product in relationship to the price and utility for his or her most preferred product among all product offerings in his or her evoked set." Monroe (2003) revealed that, WTP estimation can be used to forecast market response to price changes and for modelling demand functions. Furthermore, various approaches to measure brand equity.

Krystallis & Chryssohoidis (2005) did a study for the purpose of finding that, does the same set of factors that influence purchasing of conventional food on consumers' willingness to pay of organic food, study found that factors include food quality and security, trust in the certification, and, for some products, brand name influence willingness to pay on organic food. In contrast to those organoleptic characteristics such as; taste, odour, colour and texture, prices and consumers' socio-demographic profiles do not constitute determinants of organic WTP.

Complementary study was done in Unaided States of America the researchers used a choice experiment to estimate two different organic labelled chicken breast. General organic labels and a USDA certified organic label on chicken breast were experimented, found that consumers are willing to pay a premium of 1.193$/lb for the general organic label and 3.545 $/lb for the USDA organic label. In addition to that study result revealed that WTP also differs between demographic groups as well as between different types of consumers based on the purchase frequency of organic meat products (Looa et al., 2011).

A study conducted by Skuras & Vakrou (2002) to estimate consumers' willingness to pay for original labelled wine, study used dichotomous choice model to identify socio-economic characteristics that influence consumers' willingness to pay, result of the study show that consumers' willingness to pay varies only according to social and demographic characteristics. Furthermore, consumer decision is found to be dependent only upon education and affiliation with the place of origin.

Furthermore a study conducted by Baltzer (2004) found that Danish consumers are willing to pay a relatively high premium for improved animal welfare and organic production methods and somewhat less for food safety.

Bett et al. (2013) did a study on consumers' willingness to pay for IC products in Kenya, contingent valuation experiment was used in empirical data collection. The two-step Heckman selection model was utilized to analyse consumer's decisions and the amount they were willing to pay. Study found that higher WTP for IC meat and egg affected by socioeconomic factors like age, income, education and family size significantly determines consumers' willingness to pay. Other important factors include the indigenous chicken meat substitutes' prices, attributes like taste, flavour and the product's form on purchase and yolk colour and size of eggs determined the consumers' willingness to pay.

A study was done in Spain to estimate the WTP for organic food, study result show that consumers concern on healthy diet and environmental degradation are the reason to buy organic food and willing to pay premium price (Gil et al., 2000).

Goddard et al. (2007) studied about consumer attitudes, willingness to pay and revealed preferences for different egg production attributes like specialty eggs, including Omega-3, organic, free run or range, vitamin enhanced and vegetarian egg, the result says that healthy behaviours, health conscious consumers are willing to pay more for specialty eggs, older consumers and families with children are significantly more price sensitive and hence, have constraints on their ability to purchase specialty eggs.

IC mostly sold alive with zero value addition and minimum safety standards, a study found that mostly purchased indigenous animal products are IC eggs and IC meat the price of IC egg without any value addition was 10 to 20 percentage premium over commercial eggs similarly price of a IC products was not fluctuated as commercial chicken products (Weerahewa, 2004). These literatures reveal WTP estimation used for consumer preference on market goods, this study found a gap that there are certified value added IC products would be a potential good in formal market chain and it would develop the value chain as this sector exist with short value chain with few actors.

III. METHODOLOGY

Random utility framework is an appropriate theoretical model for contingent valuation survey data with binary discrete responses (Hanemann M. , 1984). Random utility model can be used to assess consumer's decision to give premium price for products. This theoretical framework gives a base to develop an empirical model to estimate consumers' willingness to pay.Two-step Hackmann selection model was used to analyze consumers' WTP for the value added IC products.

In this study, each respondent was asked whether they are willing to pay for a premium price to value added (slaughtered, dressed and well packed with health certification of IC chicken meat as well as cleaned well packed IC egg available in formal markets like super market) IC products based on the current prices and quality of the IC products available in the current markets. The respondent was expected to answer 'YES' or 'NO'.The WTP function for the ith individual is:

$$WTP_i = \alpha + \beta S_i + \lambda Y_i + \gamma X_i + \ldots\ldots\ldots\ldots\ldots + \gamma X_i + \varepsilon_i , \; i = 1\ldots n \ldots\ldots\ldots\ldots\ldots(A)$$

The, β, λ, and γ are unknown parameters of the dichotomous model; those are estimated using maximum like LaHood (MLE) method. The inverse Mill's ratio (IMR) is one of the factors used in Ordinary Least Square (OLS) model (Eq. B) estimated using Probit model (Eq. A).The second stage OLS equation would then be as follows:

$$K = \alpha + \beta S_i + \lambda Y_i + \gamma X_i + \ldots\ldots\ldots\ldots\ldots + \gamma X_i + \psi IMR_i + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots (B)$$

Where K is the maximum amount that consumers are willing to pay for value added IC products and IMR is Inverse Mill's ratio.

This study stacked to dichotomous method to elicit the bid value that a consumer willing to pay for value added IC products since, questionnaire was constructed indicated IC products are not value added and not available in formal market chain, responders were given knowledge which value addition is to be added to current indigenous chicken products. Other demographic characteristics and other related variables were included in the questionnaire. A sample of 160 individuals were collected using sampling technique from consumers who came to super market and other retail meat shops in coastal urban area of Ampara district. 2 supermarkets and 3 retail meat shops were randomly selected. Each odd number of customer was selected from first selected consumer, and respondent was asked to select a price from the list of bid on questionnaire, the initial bit was higher than the current price of IC products thus; current price of IC meat is Rs. 600 per kilogram and Rs. 20 per IC egg.Descriptive statistics were obtained using Microsoft Excel 2010 and STATA version 13.

IV. RESULT AND DISCUSSION

A. Consumer Characteristics

Survey results indicate that, the respondents' age on the average was 36.28 years. Males (85%) were the predominant respondent. 53 percentages of consumers in tertiary level and 38 percentages of consumers in collegiate level of education, about three quarter of respondent was married. The average size of household was four members with one to two children (age below fifteen years old) per house hold and 83% of respondent were employed with Rs. 35000 to Rs.45000 per month average household income level. The consumers who were unwilling to pay for the premium

Charecteristic	Unit	Mean	Standard Deviation	Maximum	Minimum
Age	Years	36.283	9.833	56	17
Family Size	No	4.383	1.658	10	2
Number of Children	No	1.416	1.062	4	0

Table 1: Consumer Characteristics

Characteristic	Percentage	Characteristic	Percentage
Male	85	Female	15
Married	73	Single	27
Employed	83	Unemployed	17

Table 2: Consumer Characteristics

B. Consumer preferences on IC Product Attributes

Most of the respondent (98%) preferred indigenous chicken meat as compared with exotic chicken meat as well as only 5 percent of respondent did not prefer IC egg as compare to exotic chicken egg. In addition, they look for specific qualities in IC products drive them to buy IC products thus, a consumer perceive if IC meat was more taste (97%), contain more nutrient (80%) and more dark colour (83%) compare to exotic chicken meat. Also a consumer perceive if IC egg was contain more nutrient (88.3%), more

yellowish egg yolk colour (75%) and more reddish egg shell colour (65%) compare to exotic chicken egg this results shows that more than 60 percentages of the consumers prefer IC meat and egg based on the special characteristics marked above and this is the trusted evidence for high demand of IC products. The previous study conducted by Weerahewa (2004) in western belt of Sri Lanka revealed that although IC meat is smaller and dark in colour consumer prefer this meat over the exotic chicken meat since consumer perceived that IC meat is more nutritious, taste and dark.
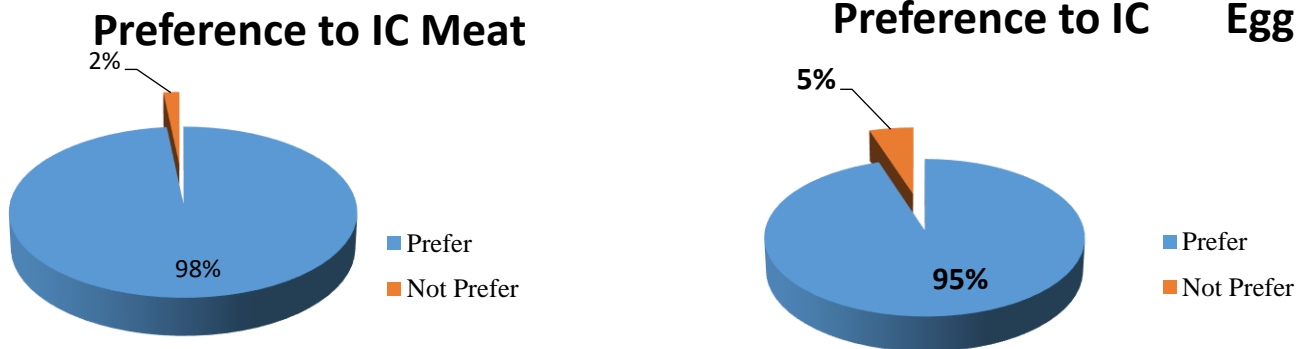

Figure 1: Consumer Preference for Indigenous Chicken Products

C. Consumers mean willingness to pay for IC products

The total percentage for a 'yes' response was 88% for meat and 80% for eggs (Fig. 4-12 & 4-13). The consumers were willing to pay a mean price of Rs. 746.37 per kg for IC meat

and Rs. 27.21 per egg (Table 4.8), if they were available in formal market with value addition including package and health certification. This gives a percentage increase of 24.4 per kg of meat and 36.1 per an egg.
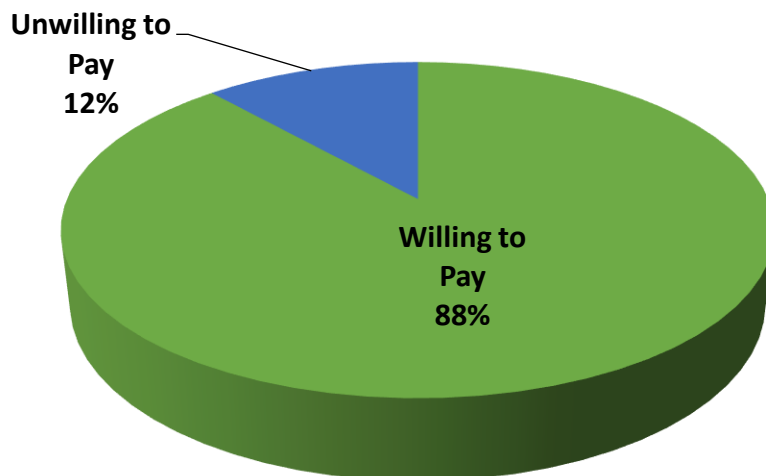

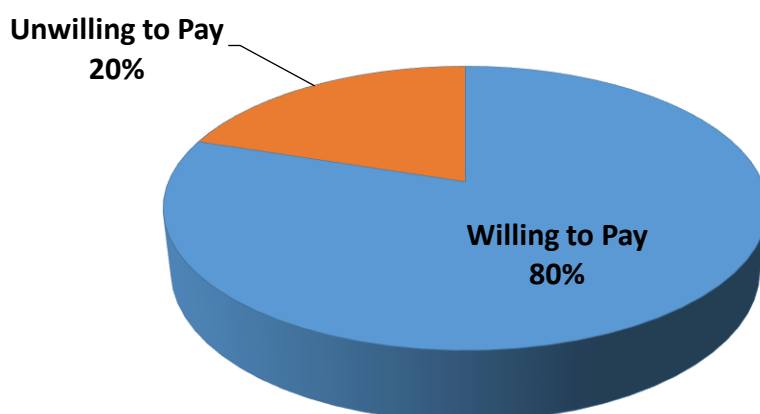Figure 2: Willingness to Pay for Value Added Indigenous Chicken Meat

Figure 3 Willingness to Pay for Indigenous Chicken Egg

D. Consumption of IC Products

Average frequency of consumption of IC egg was four times per month and IC meat was two times per month due the poor availability of IC products in market only a few seller sell IC meat in their retail shops and since indigenous chicken were sold alive therefore people were less prefer to buy, in addition to that average frequency of exotic chicken egg and meat consumption was four and three times per month respectively. Maximum price for alternative meat and egg was given to mutton, farm egg which was 1500 rupees and 18 rupees respectively.

Characteristics	Unit	Mean	Standard Deviation	Maximum	Minimum
Frequency of IC meat consumption	Times/month	2.17	1.61	7	0
Frequency of exotic chicken meat consumption	Times/month	4.33	2.52	14	0
Frequency of IC egg consumption	Times/month	3.90	2.84	10	0
Frequency of exotic chicken egg consumption	Times/month	3.35	3.31	10	0

Table 3: Meat and Egg Consumption of Consumer

E. Econometric Results

This section explains the estimation of WTP for two different value added IC products such as IC meat and IC egg. There are two analysis techniques were estimated for Two-step Hackmann selection model such as Probit regression and Ordinary Lean Square (OLS). Both Probit and OLS results were expressed in different table as follows:

Probit Model			
WTP	Coefficient	Std. err.	P Value
Household Size	-0.263	0.238	0.269
Number of Children	0.147	0.352	0.675
Reason to Prefer IC meat	9.082	1.250	0.00***
Frequency of IC meat consumption	-0.707	0.277	0.011**
Area	1.793	0.921	0.052*
Satisfaction to formal market	2.504	1.339	0.061*
Satisfaction to contemporary IC market	8.267	.	.
_cons	-9.025	.	.
Pseudo R^2 = 0.5295	***** 1 %, **5% * 10% level of significance**		

Table 4: Heckmann Two-Step Selection Results for WTP for IC Meat (Model- I)

The result of Probit model explains that consumer perception of IC meat quality was positively and significantly (1%) effect the willingness to pay for value added IC meat thus, if a consumer perceive whether the IC is very taste and it contains high nutrient, has 90.8 percentage more probability to give premium price for IC meat rather than a consumer perceive if IC meat is only tastier. Frequency of IC consumption of a consumer significant (5%) and negative effect on consumers' WTP, a consumer eats IC meat one time more per month he or she 70.7 percentages less probability to give premium price for value added IC meat. Consumer lives in urban areas have a 179.3 percentages higher probability to provide premium price in compare to rural consumers. If a consumer was satisfied when the IC meat would be available in formal market, he/she has a 2.5 percentages higher probability to give premium price for value added IC would buy in formal market (Table - 4).

OLS			
Maximum Price	**Coefficient**	**Std. err.**	**P Value**
Age	-0.093	1.621	0.954
Education Level	28.312	20.570	0.169
Marital Status	90.072	32.953	0.006***
Household Size	5.520	7.443	0.458
Employment Status	-99.760	43.034	0.02**
Household Income Level	-19.788	10.606	-1.87
Alternative Meat Price	0.029	0.060	0.48
Frequency of IC Meat Consumption	-7.691	7.785	-0.99
_cons	746.37	97.305	0.00
IMR	35.084	56.585	0.535
*** 1 %, **5% * 10% level of significance			

Table 5: Heckmann Two-Step Selection Results for WTP for IC Meat (Model- II)

The above model estimated that consumers' WTP for vale added IC meat was Rs. 746.37 and this amount was Rs. 146.37 more than the current price. The WTP amount was positively and significantly (1%) affected by marital status, married consumers willing to pay Rs. 90 higher than an unmarried consumer pays. Employment status of the consumer negatively and significantly (5%) influences the willingness to pay amount, unemployed consumer prefer to give Rs. 99.8 more than an employed consumer give (Table - 5).

Probit Model			
WTP	**Coefficient**	**Std. err.**	**P Value**
Household Size	0.463	0.266	0.082*
Number of Children	-0.148	0.358	0.678
Reason to Prefer IC Egg	1.018	0.340	0.003***
Frequency of IC egg consumption	-0.255	0.093	0.006***
Area	0.414	0.588	0.482
Satisfaction to formal IC egg market	1.087	1.201	0.365
Satisfaction to contemporary IC egg market	0.407	0.785	0.604
_cons	-2.307	1.497	0.123
Pseudo R^2 = 0.3740		***** 1 %, **5% * 10% level of significance**	

Table 6: Heckmann Two-Step Selection Results for WTP for IC Egg (Model I)

House hold size of consumer positively and significantly (10%) influences the consumer WTP, if a consumer's family has one additional family member, this particular household has 46.3 percentage higher probability to give premium price. Reason to prefer IC egg positive and significant (1%) influence on WTP decision, if a consumer perceived IC egg was more nutrient and radish egg shell colour than exotic chicken egg 101.8 percentages more probability to give WTP. Frequency of IC egg consumption negatively and significantly (1%) affected the WTP, additionally one time IC egg consumption per month 25.5 percentage less probability to pay premium amount for value added IC egg (Table - 6).

OLS			
Maximum Price	**Coefficient**	**Std. err.**	**P Value**
Age	-0.012	0.072	0.869
Education Level	0.819	0.852	0.337
Marital Status	-1.901	1.412	0.178
Household Size	-0.001	0.370	0.997
Employment Status	-0.183	1.815	0.92
Household Income Level	-0.571	0.421	0.176
Alternative Egg Price	0.059	0.094	0.528
Frequency of IC Egg Consumption	-0.018	0.232	0.937
_cons	27.21	3.405	0
IMR	1.597	2.414	0.508
*** 1 %, **5% * 10% level of significance			

Table 7: Heckmann Two-Step Selection Results for WTP for IC Egg (Model II)

The above model estimated that consumers' WTP for vale added IC egg was Rs. 27.21 and this amount was Rs. 7.207 more than the current price. However WTP amount was not affected by any the studied factors.

V. CONCLUSION

The high demand was observed for value added IC products which is not available in Sri Lankan formal market chain in the study area thus result revealed that about 100 percentages of consumers prefer value added IC products furthermore consumers willing to pay is24.33 percentages more for value added IC meat which would be in a formal market in compare to the price of non-value added IC meat available at informal market. Mean time with regards to the value added IC egg, consumers' willing to pay 35 percentages higher than current price of non-value added IC egg.Therefore value added IC products will should have huge market demand in Sri Lanka. Since this products is not identified in Sri Lankan formal market this would be an opportunity for rural IC producers to develop their business by adding new actor into their IC product value chain this phenomena leads to conserve the genetic pool of indigenous chicken in Sri Lanka.

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