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ESTIMATING THE DEMAND ELASTICITY OF RICE IN BANGLADESH: AN APPLICATION OF THE AIDS MODEL

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ABSTRACT

This study determines the causes of consumption, compensated, and uncompensated demand for rice using the Linear Approximate Almost Ideal Demand System (LA-AIDS) model in Bangladesh. The model was used along with the corrected Stone Price Index. The study's findings showed that the income elasticity of demand for rice was only 0.76, indicating that rice is a normal and necessary food item. The own-price elasticity (compensated and uncompensated) showed that all food items were price inelastic. The rice's own-price elasticity demonstrated that if the price falls by 10%, rice demand will rise by 8.21%. This cross-price elasticity showed the weak substitution effects of a price change. Therefore, price interference may not lead to a substantial effect on food demand.

Contribution/Originality: The study measured the demand elasticity of rice and other major crops of Bangladesh. The effect of change in income on food demand was measured, as shown by income elasticity. It examined consumers' expenditure pattern and demand for rice, including other food items. Researchers and policymakers may use this study's findings to regulate Bangladeshi rice and major crops' price and demand scenario.

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1. INTRODUCTION

Rice is the main staple food (Rahman, Hussain, Hossain, Rahaman, & Chowdhury, 2015) and cash crop in Bangladesh (Rahman, Siddique, Salam, Kabir, & Mahamud, 2013) and its production has increased substantially since the 1980s. This increased production is imperative for augmenting marketed surplus, which provides cereal to the nonagricultural sector of the economy and eases pressure on much needed foreign currency. With increase in production its distribution becomes more important, since a balance between the price of rice output and input is indispensable for protecting the interests of farmers and consumers alike.

Almost the entire population consumes rice in Bangladesh, obtaining about 62 and 46% of its daily calorie and protein requirements, respectively (Siddique et al., 2017). Rice covers 76% of the total cropped area (Rahman et al., 2016) and accounts for more than 93% of food production in the country (Siddique et al., 2017). Because about 38% of rural labor is involved in the rice sector (BBS, 2016) any threat to prices and people's income can affect the economy as a whole (Rahman et al., 2020).

Agricultural prices are notoriously unstable: rice prices influence both farmers' and traders' decisions simultaneously (Eldukhery, Elamin, Kherallah, & Abur, 2010). Farmers frequently face severe fluctuations in price over both time and place, which introduces uncertainty and affects producers and consumers alike. This situation often compels farmers to accept low prices for their products and, subsequently, consumers to pay higher prices. Because wide spread and fluctuation in price is observed in the rice market of Bangladesh, information is essential in regard to changing the existing and upcoming demand and supply of rice due to changes in price and income.

Studies relating to demand for rice are numerous, and diversity has been found regarding the methods used. Islam, Mahabub, and Jaim (2007) estimated rice demand in Bangladesh using a well-accepted econometric (AIDS) model. Lantican, Sombilla, and Quilloy (2013) used the Linear Approximate Almost Ideal Demand System (LA/AIDS) model to assess the demand elasticity of rice in the Philippines. That study found that rice was a normal and essential good in the Philippines because rice demand was inelastic for income and own-price changes. Lazaro, Sam, and Thompson (2017) evaluated the dietary substitutability of imported and domestic rice and maize by estimating price and expenditure elasticity in Tanzania, and found that Tanzanian consumers preferred domestic rice. There was a weak substitution effect of imported rice on domestic rice. Akram and Henneberry (2016) identified the consumption pattern in Pakistan using this method. The price elasticity of rice in Malaysia indicated that rice is an inferior good Tey, Shamsudin, Mohamed, Abdullah, and Radam (2008) and demand elasticity of aromatic and coarse rice was higher in rural areas compared to that of urban areas and cities in Bangladesh (Islam., 2002). Hossain and Yunus (2016) used the LA/AIDS model and showed that the demand for rice and wheat will decrease in rural and urban areas of Bangladesh. Huq and Arshad (2010) also used the AIDS model to estimate the income and own-price elasticity of different food items in Bangladesh. The entire demand system in rural Bangladesh indicated that income elasticity of demand for poor households was very reactive to change in income in regulating their consumption pattern (Ahmed & Shams, 1994).

On the other hand, cross-price elasticity showed strong substitution effects that had significant consequences on pricing strategies. Talukder (1993) revealed with the income elasticity estimation that except rice and wheat all other considered commodities (i.e., potato, pulses, fish, and edible oil) were superior goods. The superior goods means that the demand of these commodities would deteriorate with the increase in income. Wheat was non-preffered inferior good in rural and preffered inferior in urban. There were a small deviation between expenditure and quantity elasticities of the commodities. Therefore, both rich and poor used to pay the same price for the selected food item concerning their changes in income. Analysis of critical income level, the turning point (zero income elasticity) of individual foods, revealed that, except for oil, the range of income over which food items remained as superior goods was wider in urban areas than for rural households.

Therefore, this study was aimed at examination and analysis of the demand elasticity of rice, the Bangladeshi people's staple food. To illustrate the significant suggestion of price change, substitution linkage among different food items was also a key focus of this study.

2. METHODOLOGY

2.1. Data sources

The study's location was the Northwestern (NW) and Greater Mymensingh (GM) regions of Bangladesh, which are leading paddy-producing areas. The agricultural sector's share of the household income is highest in the NW region (21.41%), followed by the GM region (20.15%). Surplus districts were selected purposively based on their production and availability of rice. The NW region is comprised of Bogra, Rangpur, and Dinajpur while the GM region covers Mymensingh, Sherpur, and Kishoregonj districts. The study was constituted by 242 sample farmers and 200 rice traders. We randomly selected 40 farmers from each district in cooperation with the Department of Agricultural Extension (DEA), which has a complete list of farmers. It should be mentioned that we selected 42 farmers from Mymensingh district, where two additional farmers were the key informants. We surveyed 100 different (Faria/Bepari, Paiker/miller, Aratdar/wholesaler, and retailer) traders from each region randomly. Moreover, secondary information was collected from various published and unpublished sources, including the Bangladesh Bureau of Statistics (BBS), the Department of Agricultural Marketing (DAM), the Food Planning and Monitoring Unit (FPMU) of the Ministry of Food, and various issues of the publication *Economic Trends of Bangladesh Bank*.

2.2. Empirical model specification

Several studies have been conducted in Bangladesh and elsewhere since the early 1970s related to demand estimation (Ahmed & Shams, 1994; Chowdhury, 1982; Deb, 1986; Lantican et al., 2013; Mahmud, 1979; Rahman & Hossain, 1988).

The AIDS model is usually defined in the following budget share form (Deaton & Muellbauer, 1980) and can be expressed as follows:

$$W_i = \alpha_i + \sum_j \gamma_{ij} \ ln\, P_j + \beta_j ln\left(\frac{X}{P}\right) + \mu_t \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where

W_i= the i^{th} good's share on a budget (i.e., $W_i = PQ/X$)

P_j = price of j^{th} goods

X = total household expenses on all goods in the model

μ_t = residual (assumed normally distributed)

α_i, β_i and γ_i are parameters

P = a price index for the group, defined as

$$LnP = \alpha_0 + \sum_j \alpha_j \ln P_j + \frac{1}{2}\sum_i \sum_j \gamma_{ij} \ln P_i \ln P_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Equation (2) becomes nonlinear through the price index from equation (1) that raised empirical complications.

Different studies employed Stone (1954) Price Index (P^*) for P to avoid nonlinear approximation. Blanciforti and Green (1983) used Stone's Price Index and expressed it as LA/AIDS. Estimation of the parameters of the AIDS model with highly collinear prices is accomplished by the LA/AIDS model, because the factor of proportionality of P to P^* is integrated within the intercept (Green & Alston, 1990).

LA/AIDS is expressed as $lnP^* = \sum_j W_j lnP_j$, highly collinear P becomes approximately proportional to P^*, and therefore $P \cong \zeta P^*$. In the extreme situation, P becomes perfectly proportionate to P^* and then the LA/AIDS model can be employed to estimate the AIDS model parameters.

To be consistent with consumer utility theory, equation (2) must be satisfied with the following restrictions for any estimated demand systems. The adding-up condition is automatically fulfilled in the AIDS model and is proficient at satisfying the other three limitations, but does not essentially do so accordingly. The adding-up condition implies:

$$\sum_i \alpha_i = 1, \sum_j \gamma_{ij} = \sum_i \beta_i = \sum_i \Phi_i = \sum_i \theta_i = 0, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Homogeneity is satisfied if – and only if – for all i and j, $\sum_j \gamma_{ij} = 0$, $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$

while symmetry is satisfied provided, $\gamma_{ij} = \gamma_{ji}$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$

According to the micro model in equation (1), the following equations are considered to estimate the expenditure elasticity (η_i) and own- and cross-price elasticity (ε_{ij}) of the different types of cereal:

$$\eta_i = 1 + {}^{\beta_i}/_{w_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$\varepsilon_{ij} = -\delta_{ij} + (\gamma_{ij} - \beta\omega_{ij})/\omega \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

where 'δ_{ij}' is known as Kronecker delta. Here, $\delta_{ij} = 1$ for own-price elasticity and $\delta_{ij} = 0$ for cross-price elasticity. When the expenditure and uncompensated price elasticities are assessed, compensated (Hicksian) own- and cross-price elasticities can be calculated using the Slutsky equation's elasticity form. The Slutsky equation can be written as:

$$\varepsilon_{ij} = \varepsilon_{ij}^H - w_j\eta_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

or

$$\varepsilon_{ij} = -\delta_{ij} + (\gamma_{ij}/w_i) + w_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Here, the compensated price elasticity is 'ε_{ij}^H' (Ahmed & Shams, 1994; Deaton & Muellbauer, 1980; Moschini, 1995).

3. RESULTS AND DISCUSSION

3.1. Measurement of coefficients of the LA/AIDS model for major food items

Tables 1, 2, and 3 show the estimated coefficients of major Bangladeshi food items by employing the LA/AIDS model according to the different areas (rural, urban) and country average.

The coefficients of the assessed parameters show the reaction of total expenditure share due to variation in the variables used. Elasticities were measured by rural, urban, and, finally, as an entire household basis, of the samples. The sign of household size coefficient was negative and significant, which suggests that increases in household size responded to a decrease in food expenditure per capita. In rural Bangladesh, among the household food demand estimation parameters, out of 54 considered variables 33 showed significant influence. The same number of variables (54) was considered for the urban area and all of Bangladesh. The results showed that 27 and 29 variables significantly influenced household food demand in urban areas and the whole of Bangladesh, respectively. Estimated parameters demonstrated the high level of control of rice expenditure in rural and urban areas, indicating the overarching importance of rice in the total household budget.

Table-1. Estimated parameters of the AIDS model of demand for food items in rural Bangladesh.

Food item	Rice	Pulses	Oil	Fruits and vegetables	Fish and meat	Milk and milk products
Constant	−0.015 (0.000)	−0.0004 (0.030)	−0.0005 (0.000)	0.007 (0.000)	0.012 (0.000)	−0.003 (0.000)
LnRice	0.219 (0.000)	−0.0015 (0.000)	−0.005 (0.010)	−0.137 (0.000)	−0.042 (0.000)	−0.034 (0.000)
LnPulses	−0.001 (0.000)	0.035 (0.000)	−0.013 (0.000)	−0.013 (0.000)	−0.004 (0.000)	−0.004 (0.000)
LnOil	−0.005 (0.000)	−0.013 (0.000)	0.049 (0.000)	−0.032 (0.010)	−0.007 (0.000)	0.004 (0.000)
LnFruits and vegetables	−0.137 (0.020)	−0.013 (0.000)	−0.032 (0.000)	0.427 (0.000)	−0.075 (0.000)	−0.169 (0.000)
LnFish and meat	−0.041 (0.000)	−0.004 (0.000)	−0.007 (0.000)	−0.075 (0.000)	0.152 (0.000)	−0.104 (0.040)
LnMilk and milk products	−0.034 (0.000)	−0.004 (0.000)	0.004 (0.000)	−0.169 (0.000)	−0.023 (0.000)	0.231 (0.000)
LnFamily size	−0.031 (0.000)	0.0014 (0.050)	0.0016 (0.000)	0.031 (0.000)	−0.013 (0.000)	0.011 (0.000)
LnStoneprice (q)	−0.082 (0.000)	0.004 (0.000)	0.004 (0.000)	0.005 (0.070)	0.062 (0.000)	0.006 (0.000)
R^2	0.56	0.29	0.43	0.59	0.74	–

Note: Values in parentheses indicate probability level.

Table-2. Estimated parameters of AIDS model of demand for food items in urban Bangladesh.

Food item	Rice	Pulses	Oil	Fruits and vegetables	Fish and meat	Milk and milk products
Constant	0.046 (0.000)	0.004 (0.000)	−0.001 (0.000)	0.041 (0.000)	0.023 (0.000)	−0.114 (0.090)
LnRice	0.132 (0.000)	−0.006 (0.000)	0.004 (0.000)	−0.139 (0.000)	−0.012 (0.000)	0.021 (0.000)
LnPulses	−0.006 (0.000)	0.074 (0.000)	0.006 (0.000)	−0.033 (0.000)	−0.013 (0.000)	−0.026 (0.000)
LnOil	0.004 (0.000)	0.006 (0.000)	0.009 (0.000)	−0.025 (0.000)	0.004 (0.000)	0.001 (0.000)
LnFruits and vegetables	−0.139 (0.000)	−0.033 (0.000)	−0.025 (0.000)	0.497 (0.000)	−0.149 (0.000)	−0.149 (0.000)
LnFish and meat	−0.012 (0.000)	−0.013 (0.000)	0.004 (0.070)	−0.149 (0.000)	0.097 (0.000)	0.073 (0.000)
LnMilk and milk product	0.021 (0.000)	−0.026 (0.000)	0.001 (0.000)	−0.149 (0.000)	0.073 (0.000)	0.080 (0.000)
LnStone price (q)	−0.127 (0.050)	−0.002 (0.000)	−0.001 (0.000)	−0.010 (0.000)	0.081 (0.000)	0.060 (0.000)
Ln Family Size	−0.068 (0.000)	0.007 (0.000)	−0.001 (0.000)	0.012 (0.000)	−0.025 (0.000)	0.075 (0.000)
R^2	0.26	0.27	0.07	0.61	0.31	–

Source: Field survey data, 2016.
Note: Values in parentheses indicate probability level.

3.2. Major household food expenditure patterns

The budget share for rice, oil, milk, and milk products was higher than that of the national average. On the other hand, the household budget share for oil, milk, and milk products almost doubled in the survey year (2016) compared to the national level average. The budget share for fish meat was somewhat lower than the country average. Over 45% of household food expenditure went on rice in rural areas, then 20.10% for fish and meat, 13.22% for fruit and vegetables, 8.23% for milk and milk products, and 7.35% for pulses. On the other hand, urban households spent comparatively less on rice (33.74%) and pulses (4.13%) and more on other food items. This indicates that the urban population spend more for higher quality as well as on nutrient enrich food. The budget share of rice compared to food expenditure in rural and urban areas shows its marked predominance over household consumption expenditure (Table 4). The marginal propensity to consume, or marginal budget share, of rice, obtained as the product of average budget share and expenditure elasticity, was 37.27, 28.45, and 34.05% for rural, urban and all households, respectively (Table 5).

Table-3. Estimated parameters of AIDS model of demand for food items in Bangladesh (pooled).

Food item	Rice	Pulses	Oil	Fruits and vegetables	Fish and meat	Milk and milk products
Constant	0.003 (0.000)	0.005 (0.000)	0.001 (0.060)	0.018 (0.000)	0.022 (0.000)	0.994 (0.000)
LnRice	0.105 (0.000)	−0.0005 (0.000)	0.004 (0.000)	−0.126 (0.050)	0.045 (0.000)	−0.028 (0.000)
LnPulses	−0.0005 (0.000)	0.020 (0.000)	−0.021 (0.000)	0.010 (0.000)	0.007 (0.000)	−0.002 (0.000)
LnOil	0.004 (0.000)	−0.021 (0.000)	0.028 (0.000)	0.013 (0.000)	0.002 (0.000)	0.004 (0.010)
LnFruits and vegetables	−0.126 (0.000)	0.010 (0.000)	−0.013 (0.030)	0.335 (0.000)	0.063 (0.000)	−0.143 (0.000)
LnFish and meat	0.045 (0.01)	−0.007 (0.000)	−0.002 (0.000)	0.063 (0.000)	0.095 (0.000)	−0.069 (0.000)
LnMilk and milk products	−0.028 (0.000)	−0.002 (0.000)	−0.002 (0.020)	0.004 (0.000)	0.143 (0.000)	−0.069 (0.000)
LnFamily size	−0.058 (0.000)	0.023 (0.000)	−0.013 (0.000)	0.005 (0.000)	0.005 (0.000)	0.058 (0.000)
LnStone price	−0.073 (0.000)	0.005 (0.000)	0.003 (0.000)	0.023 (0.020)	0.059 (0.000)	−0.018 (0.000)
R^2	0.12	0.53	0.49	0.08	0.37	–

Source: Field survey data.
Note: Values in parentheses indicate probability level.

Table-4. Major household expenditure patterns in Bangladesh.

Food item	Average budget share (%)			National average (%)
	Rural	Urban	Pooled	
Rice	45.49	33.74	42.72	36.78
Pulses	7.35	4.13	4.65	4.51
Oil	5.53	8.30	6.18	3.59
Fruits and vegetables	13.22	15.40	14.32	15.00
Fish and meat	20.10	29.10	22.68	25.22
Milk and milk products	8.23	9.33	8.45	4.86

Table-5. Marginal budget share for household food items in Bangladesh.

Food item	Marginal budget share (%)		
	Rural	Urban	Pooled
Rice	37.27	28.45	34.05
Pulses	7.74	13.72	4.66
Oil	6.01	11.65	6.19
Fruits and vegetables	13.80	15.99	15.48
Fish and meat	26.28	22.96	23.32
Milk and milk products	8.82	6.69	12.45

3.3. Expenditure (income) elasticity

Table 6 represents the income elasticity (IE) of major food items in Bangladesh. The IE articulates the change in quantity demanded of the food item due to change in household income. The estimated result shows that the IE of rice for the entire sample is 0.76, showing that a 10% rise in household income stimulates rice demand by 7.6%. Most of the considered food items in this study had positive IE, which means that the selected food is normal and essential for household consumption.

The results also showed that the luxury food items were milk, milk products, and fish meat, as these are income elastic. On the other hand, pulses, oil, fruit, and vegetables were found to be unitary elastic. However, the results also revealed that (income) expenditure elasticity of demand for milk, milk products, fish meat, fruit, pulses, vegetables, and oil in rural areas was higher than for urban areas. Therefore, improvement in the income of rural households would boost dietary quality in rural areas of Bangladesh (Table 6).

3.4. Own-price elasticity for major food items

The uncompensated own-price elasticity of rice assessed at the national (pooled) level showed that a 10% fall in rice price would stimulate an increase of 8.21% in demand. Where the substitution effect is 5.89% (compensated own-price elasticity), this means that an increase of 8.21% in rice demand due to a 10% price reduction had a 5.89% pure-price effect, and the income effect of a 10% price fall on rice demand was 3.70% (8.21 − 4.51). A 10% reduction in rice price might raise income per capita by 10%, which would raise demand by 15.82% (8.21 + 7.61). However, an increase

in per capita income would signify a move in the rice demand curve that would usually lead to an upsurge in rice prices (Tables 6, 7, and 9).

Table-6. Expenditure (income) elasticity of demand for major food items in Bangladesh.

Food item	Expenditure (income) elasticity		
	Rural	Urban	Pooled
Rice	0.81	0.73	0.76
Pulse	1.12	1.01	1.09
Oil	1.11	1.00	1.06
Fruits and vegetables	1.24	0.89	1.06
Fish and meat	1.41	1.06	1.20
Milk and milk products	1.21	0.98	1.16

Source: Authors' estimation based on field survey.

Table-7. Own-price elasticity of demand for food items in Bangladesh.

Food item	Rural		Urban		Pooled	
	UC	C	UC	C	UC	C
Rice	−0.699	−0.5856	−0.688	−0.357	−0.821	−0.451
Pulses	−0.969	−0.934	−0.843	−0.843	−0.984	−0.978
Oil	−0.955	−0.950	−0.169	−0.139	−0.974	−0.971
Fruits and vegetables	−0.579	−0.543	−1.033	−1.023	−0.688	−0.658
Fish and meat	−0.909	−0.834	−0.854	−0.841	−0.964	−0.893
Milk and milk products	−0.775	−0.769	−0.663	−0.607	−1.065	−1.056

Source: Authors' estimation based on field survey.
Note: UC, uncompensated; C, compensated.

Table-8. Uncompensated own- and cross-price elasticity of major food items in Bangladesh.

Food item (price)	Demand for					
	Rice	Pulses	Oil	Fruits and vegetables	Fish and meat	Milk and milk products
Rice	−0.688	0.389	0.087	−0.091	0.113	0.040
Pulses	−0.157	−0.843	−0.059	0.029	−0.002	−0.021
Oil	−0.103	−0.831	−0.169	−0.170	−0.008	−0.007
Fruits and vegetables	−0.106	−0.169	−0.782	−1.033	−0.060	0.176
Fish and meat	−0.024	−0.116	−0.396	−0.177	−0.854	−0.104
Milk and milk products	0.350	0.426	0.386	−0.424	−1.144	−0.663

Table-9. Compensated own- and cross-price elasticity of major food items in Bangladesh.

Food item (price)	Demand for					
	Rice	Pulses	Oil	Fruits and vegetables	Fish and meat	Milk and milk products
Rice	−0.589	0.451	−0.017	−0.034	0.050	−0.024
Pulses	0.120	−0.843	−0.059	−0.029	−0.002	−0.021
Oil	−0.058	0.831	−0.169	−0.170	−0.007	−0.007
Fruits and vegetables	−0.010	−0.159	−0.772	−1.023	−0.051	−0.166
Fish and meat	0.319	−0.103	−0.392	−0.184	−0.841	−0.098
Milk and milk products	0.104	0.370	−0.330	−0.368	−1.088	−1.607

3.5. Cross-price elasticity

Estimates of own-price elasticity revealed that the income effect of price change was minimal for food items except for rice and fish meat, because the shares of those food items were very small compared to rice and fish meat in household expenditure patterns.

The uncompensated cross-price elasticity results show positive cross-price elasticity of rice to pulses, indicating that rice price and pulse demand change in a similar direction. So, it can be demonstrated that a 10% fall in rice price would decrease household demand for pulses by 3.9% (Table 8). The results of rice to pulse cross-price elasticity (compensated), which is the change in rice price effect on pulse demand, show that the demand for pulses would reduce by 4.5% with a 10% reduction in rice price (Table 9). Here the fall in rice price increases consumers' real income, which decreases demand for pulse (3.9%). The only price effect of decreasing demand for pulses (4.5%) is due to the falling price of rice. The impact of change in real income on demand for pulses is 0.49%, which is negated by deducting the two demand changes and summing income elasticity (i.e., 3.9 − 4.5 + 1.09 = 0.49%; Table 7). Therefore, pulses and rice here are complementary goods. Oil, fish, meat, milk, and milk products cross-price elasticity was also positive, indicating that these goods are complementary to rice.

The cross-price elasticity of demand (uncompensated) of other food items showed a negative value, which indicates that these are competitive with each other. The result also showed that a 10% increase in rice price would reduce the demand for fruit and vegetables by 0.9%.

The uncompensated measure of cross-price elasticity was less clear. However, resilient expenditure effects play a role. The compensated measure of cross-price elasticity is the most suitable if one requires information on substitution potentials.

4. CONCLUSION

The present study examined consumer expenditure patterns and demand for rice, including other food items, employing the LS/AIDS model. The greater proportion of rice in rural and urban areas showed the marked predominance of rice in overall family expenditure. This indicates that a rise in absolute income per capita could result in an upward move in the rice demand curve, which usually suggests a rise in the price of rice.

Expenditure elasticity for all food items except rice was found to be markedly elastic, while that for fruit and vegetables and fish meat appeared highly elastic in rural areas compared to urban. The income elasticity of rice emerged as normal and necessary goods. Compensated and uncompensated measures of own-price elasticity showed that all foodstuffs are price inelastic, suggesting that households were not particularly responsive to price changes in those commodities. The estimated elasticity of other food items in rural areas was greater than for urban areas, showing that the demand for these items is market oriented. The cross-price elasticity of other foodstuffs also showed that the substitute effects of price are not particularly stable. Thus, the government's price regulation strategy may not be a clue to major price effects in the economy.

Because rice is the main food of Bangladesh, an increase in price is not desirable because the majority of the population is on a low income and is reliant on the market. Thus, any policy aimed at aggregating the income or household total income of a specific group essentially either has consumer support or is supported by a buffer stock of food, mainly to defend the low-income population from higher prices.

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