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ANALYSIS OF RURAL HOUSEHOLD CONSUMPTION EXPENDITURE IN SOUTH AFRICA: THE CASE OF FOOD PLOT HOLDERS IN TYEFU IRRIGATION SCHEME IN THE EASTERN CAPE PROVINCE

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Policy formulation in relation to rural development requires research on rural household consumption behaviour and patterns. In this paper research implications of consumption function theory in relation to rural household expenditures are briefly outlined and results of a cross-section analysis of seven expenditure categories of food plot holders at Tyefu Irrigation Scheme are reported. Consumption function parameters are estimated by ordinary least square method of regression of farm account data. The analysis reveals that the sampled food plot holders have a marginal propensity to consume of (0.349) as well as average propensity to consume of (0.652). Family characteristics (used as explanatory variables) such as age distribution and family size vary in their ability to explain expenditure patterns depending upon types of commodity. Further research will help to rigorously assess the impact of additional forces such as education, location, farm assets, etc. upon the standard of living of farm people.

ANALISE VAN VERBRUIKSBESTEDING VAN LANDELIKE HUISHOUDINGS IN SUID-AFRIKA: 'N GEVALLESTUDIE VAN KLEINBOERE IN TYEFU BESPROEIINGSKEMA IN DIE OOSKAAP PROVINSIE

Beleidsformulering vir landelike ontwikkeling, benodig navorsing in die verbruikersgedrag en -patrone van landelike huishouding. In hierdie artikel, word navorsingsimplikasies van verbruiksfunksieteorieë in verband met landelike huishoudelike uitgawes, kortliks geskets en uitslae van 'n deursnee analise van sewe uitgawe kategorieë van kleinboere by Tyefu Besproeiingskema gegee. Parameters van 'n verbruikerfunksie is beraam deur middel van 'n gewone kleinste kwadraat regressie van plaasrekening data. Die analise bevind dat die respondente 'n marginale neiging om te verbruik van 0.349 as ook 'n gemiddelde neiging van verbruik van 0.652 het. Familie eienskappe (gebruik as 'n verklarende veranderlike) soos ouderdomsverspreiding en familie grotes varieer in hulle vermoë om verduidelike uitgawe-

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patrone, afhanginge van tipe handelsartikels. Vedere navorsing sal help om strenge belasting, die slag van addisionele kragte soos opvoedkunde, lokasie, plaas bates, ens, op die lewensstandaard van boere.

1. INTRODUCTION

According to Keynesian theory, current consumption is determined by current disposable income. This representation of consumer behaviour, however, ignores the influence on individual expenditure categories of factors such as attitudes, savings behaviour, permanent and transitory income, and family characteristics. Thus the Keynesian theory in its original form is of limited applicability in empirical analysis of consumption. Over the years consumer theory has been developed and tested by economists including Duesenbery (1949), Friedman (1957), Burke (1968), Pollak & Wales (1978), Ray (1980), Strauss (1982) and Majumder (1986). Despite all these efforts, there has been lack of applied regional research and the absence of such applied research is particularly evident for rural consumption expenditures.

Many rural development research and policy issues require a quantitative analysis of rural household expenditures. Firstly, such analysis is a vital component of the analysis of farm firm growth, because, the characteristics of farm consumption are important factors in determining farm firm growth (Majumder, 1986). Most studies of farm firm growth use multi-period programming models to maximise the present value of future income. In the absence of empirical data on rural household expenditures, such models often make use of a constant level of consumption as a constraint. In such cases, multi-period programming models tend to exaggerate farm firm growth rate when the marginal propensity to consume is positive and changing. On the other hand, an average marginal propensity to consume applied to low income farms would overstate while the same applied to high income farms would understate the estimated firm growth rate. Secondly, provincial planning models for provinces with a large rural population is another area where there is a need to identify structural relationships concerning rural household expenditure patterns. In other words, provincial inter-industry planning models can be improved by considering the implications of sectoral product demand of changes in consumer budget allocations (Kokoski, 1986). Thirdly, poverty measures are important policy criteria as far as development of the rural areas are concerned. In most literature on poverty, emphasis is usually placed on specification of minimum levels of disposable family income or household expenditures. In most cases

definition is made of individuals and families as poor when a relatively large percentage of their income is spent on food, clothing and shelter. Also calculations are made of the number of poor without considering farm family household expenditures. In summary, poverty measures based upon arbitrarily selected income or expenditure levels can be improved with analysis of household expenditure patterns. Fourthly, changes in consumer prices over time and relative costs of living in regions of a given country are measured on the basis of the consumer price index. This index is based on weights obtained from urban household budget expenditure surveys and that rural-urban differences in consumption patterns are ignored. Thus, information on farm consumption patterns can be utilised to update and refine consumer price indices. Fifthly, urban area inter-industry models utilise estimates from household consumption function analysis in planning applications. The large number of rural households, and the importance of household consumption expenditures in measures of gross regional product make it essential to estimate the levels of rural household expenditure.

There seems to exist an information gap in South Africa in these areas. In this paper, an attempt is made to analyse food plot holders¹⁾ expenditure behaviour and patterns at Tyefu irrigation scheme.

2. STUDY AREA AND DATA SOURCE

The study area is Tyefu Irrigation Scheme. This scheme is located in the Lower Fish River of the Eastern Cape Province of South Africa. It has a river basin topography with a climate that can be generally described as warm and dry. The summers in the area are usually very hot while winter temperatures are mild. The mean annual rainfall in the area is less than 400 mm. The scheme comprises of five units. On unit 1 are 32 commercial farms with 4 ha each, unit 2 has 223 food plot holders occupying 0.25 ha each, unit 3 has 547 small plot holders with 0.20 ha each, unit 4 has 717 allotment holders occupying 0.16 ha and unit 5 has an estate land of 228 ha (Van Averbek *et al.*, 1998). However, units 2, 3 and 4 were of interest and concern in a larger study.

Access to the field data collected by the irrigation research group at the Faculty of Agriculture and ARDRI (1998) for a study entitled “ An Investigation into Food Plot Production on Irrigation Schemes in the Central Region of the Eastern Cape Province” permitted an analysis of individual food plot holder expenditure records. The field data provides a detailed and relatively accurate accounting of

household expenditures. Income data for both farm and non-farm sources were extracted from the questionnaire of 156 respondents sampled from units 2, 3, and 4 of the scheme. Similarly, expenditure data on food and groceries, clothing, health, furniture, social travel and education were extracted from the questionnaire of the same respondents.

3. MODEL SPECIFICATION

A model is specified for cross-sectional analysis of food plot account household expenditure categories. Hypothesis is formulated to incorporate some of the consumption function characteristics based on life cycle concept (Friedman, 1957). However, the permanent income concept that reflects part of the consumption function is not dealt with due to the absence of data on farm assets of food plot holders. It was hypothesised, therefore, that current expenditures primarily depend on current income flows. Total farm and non-farm income is used as a measure of current income level. In addition, demographic variables such as family size and age distribution are specified as determinants of family expenditure pattern (Burk, 1968; Ray, 1980 and Strauss, 1982).

The general form of the hypothesised food plot holders expenditure relationship is

$$C_k = b_{k0} + b_{1k1} X_1 + b_{2k2} X_2 + b_{3k3} X_3 + e_k$$

Where:

- C_k = food plot holder expenditure for the kth budget category in 1995 Rand,
- k = 1,2,...,7,
- X_1 = total current food plot holder income from farm and non-farm sources, in 1995 Rand,
- X_2 = age of the head of the household in years,
- X_3 = number of persons in the food plot household consumption unit
- b_0 to b_3 = the k set of regression parameters estimated by least squares analysis, and
- e_k = a stochastic element accounting for unexplained variation due to such factors as education, location, random behaviour and reporting error.

4. EMPIRICAL RESULTS

The model coefficients are estimated from 156 observations on household expenditures. Regression results (Table 1) and expenditure elasticity's (Table 2) by expenditure category are briefly discussed in this section.

Table 1: Food plot holders expenditure functions

Dependent ^a variable		Consta nt	Total income	Consumption expenditure	Age of HH	Family size	R ²
		b ₀	b ₁	b ₂	b ₃	b ₄	
1.	Total cons. Expenditure	2218.50	0.349 (0.0445) ^b 7.68**		-1.6169 (6.7050) -0.24	114.78 (55.20) 2.08*	0.60
2.	Food expenditure	849.37		0.4055 (0.054) 7.51**	-2.0457 (8.0409) -0.25	34.739 (12.906) 2.69*	0.67
3.	Personal	-59.98		0.0372 (0.0121) 3.07**	1.383 (1.6984) 13.06**	-7.199 (19.024) 4.90**	0.38
4.	Clothing	-1138.90		0.4105 (10.148) 2.77**	10.278 (0.787) 13.06**	51.95 (10.597) 4.90**	0.78
5.	Health	132.57		0.982 (0.464) 2.11*	2.627 0.322 8.16**	1.86 (0.32) 5.81**	0.65
6.	Furniture	752.04		0.134 (0.051) 2.05*	-0.9830 (0.689) -1.43	-12.848 (10.106) 1.27	0.48
7.	Education	185.00		0.0462 (0.0225) 2.05*	-5.5399 (2.2678) -2.44*	22.459 (10.521) 2.13*	0.54

^a The budget categories are comprised of: 1) food: groceries, meat, fruit, etc., 2) personal: social travel, 3) clothing: purchases of cloths, payments to clothes, etc., 4) health: medical drugs, clinic or OPD visitation, 5) furniture: purchase of appliances and household items, 6) education: tuition fees, allowances, books, etc. b₀ to b₄ are regression parameters estimated by least squares analysis.

^b Values in parentheses are standard errors of regression coefficients.

R² Coefficient of determination (adjusted for degrees of freedom).

** The regression coefficients are statistically significant at the 1% level for the one tailed 't' test.

* The regression coefficients are statistically significant at the 5% level for the on tailed 't' test.

Table 2: Elasticity coefficients at mean values

	Model	Total consumption expenditure	Total income	Age of HH	Family size
Total consumption expenditure	II		0.524	-0.017	0.21
Food	I ^a	0.685		-0.022	0.033
	II ^b		0.420	0.038	0.086
Personal	I	0.002		0.014	-0.06
	II		0.491	0.415	0.064
Clothing	I	0.047		0.089	0.041
	II		0.934	0.229	0.212
Health	I	0.017		0.028	0.002
	II		0.366	0.125	0.124
Furniture	I	0.606		-0.011	0.021
	II		0.177	0.546	0.238
Education	I	0.606		-0.059	0.021
	II		0.631	0.311	0.153

^a Values corresponding to Model I are elasticity's for total consumption expenditure.

^b Values corresponding to Model II are elasticity's for total income.

In both Tables 1 and 2 excluding the first row in each table the equations are for expenditures by budget category regressed on total expenditures rather than incomes².

Consequently, the estimate b_{k1} is interpreted as the incremental change for the k th category per unit change in total household expenditures rather than the income slope usually associated with Engel curves, and elasticity coefficients are expenditure rather than income elasticity.

The signs of the coefficients in Equation 1, (Table 1) for total income and family size are both positive and significant. In other words as total income and family size increase total consumption expenditure also increases. Although not significant, the coefficient for the age of the head of the household is negatively related with total consumption expenditure. The value of marginal propensity to consume (0.349) indicates that small holders at Tyefu irrigation scheme spends R0.35 for every R 1 rise in disposable income.

The remaining equations in Table 1 relate expenditures by budget category to total consumption expenditures and family characteristics. In all categories the coefficients for total consumption expenditures are positive and statistically significant.

On one hand, of the seven expenditure categories, only four - personal, clothing, health and education are significantly related with the age of the head of the household. However, negative relationships between food expenditure and age of household and between education and age of household are observed. The probable reason for the negative relationship between education and age of the head of household is that households headed by older people do not tend to spend much on education. On the other hand, personal and health expenditures are positively and significantly related with the age of the head of the household. Although not significant, furniture expenditure is positively related with the age of the head of the household.

The positive and statistically significant coefficients on family size as related to total consumption, food, clothing, health and education expenditures are as expected. In other words, an increase in the proportion of dependants in a household is likely to be associated with an increase in consumption as a proportion of disposable income. This also implies that the budget share for basic expenditure categories such as food, clothing, health and education would increase. The relationships between personal and family size and furniture and family size are negative and significant and this probably suggests that as family size increases the budget share for basics such as food, clothing health and education increases and that of personal (social travel) and furniture decrease.

Elasticities of expenditure with respect to the explanatory variables were calculated for the means of each variable (Table 2). In this table, expenditure elasticities were presented for total expenditures (Model I) and total income (Model II) and for the two family characteristics. The total consumption expenditures category (Model I), is inelastic with respect to each of the expenditure categories and highly inelastic (probably close to zero) for changes in age of the head of the household and family size. Elasticity at various expenditure categories appear to be extremely inelastic and variable for both family characteristics but the magnitude of the inelasticity and variability has no definite pattern most probably because of influence of non-family characteristics on consumption levels.

In general the elasticity coefficients showed the presence of inelastic relationships between expenditure categories and total consumption expenditure. The coefficients for food, furniture and education indicated that as total expenditure and age increase, the allocation of budget to food, furniture and education expenditures decreases. Similarly, the coefficients for personal and furniture expenditures indicate that as total expenditure and family size increase, the allocation of expenditure changes to personal travel and furniture will decrease.

5. CONCLUDING REMARKS

This study has attempted to analyse food plot holders expenditure behaviour and patterns at Tyefu Irrigation Scheme. While the data used in this analysis failed to capture all sources of income in each of the households interviewed, the results are generally plausible and consistent with observed or expected trends. The derived consumption relationships may be viewed as being useful as descriptive tools, and as a preliminary base for household expenditure projections. However, the relatively high inelasticity (both positive and negative) of food, clothing, health and education with respect to the two family characteristics (age and family size) is very strange and contrary to expectation. Poor farm households like the ones at Tyefu would be expected to spend the greater portion of their income on basics such as food, clothing, health and education. Possible implications for rural development are as follows. As Mamdani (1996) has noted, beyond the need for equitable development, policy reform, regulatory enforcement and punishment for corruption, there is also need for reform of institution which address the needs of rural majority marginalised by chronic poverty in South Africa. For as long as food plot holders in the poverty stricken rural environment such as Tyefu continue to spend all of their meagre resources on food and other very basic necessities, rural development cannot be expected to yield results that will be beneficial to rural population. Government policies towards rural reform and change in the rural areas such as Tyefu must bring about consolidated effects that will lead to changes in consumption patterns from incomes that is mainly derived from very small farm plot sizes. When this happens, it will empower rural people and assist in growth and development of the sector. Future areas of research include, farm asset effects on household expenditure behaviour and the impact of inflation on rural household consumption behaviour.

NOTES

1. *The basic concept of an irrigated food plot is a small area of irrigated land that provides the food plot holder with an opportunity to grow food for subsistence and a small cash profit (Loxton, Ven & Associates, 1983). The concept implies that the food plot holder will be involved in the production of crops that will feed his household at least in part and of crops that will generate cash in sufficient amounts to pay for all production costs, in addition, generate a small profit.*
2. *Coefficients estimated for the expenditure form were generally more consistent with hypothesised signs, provided smaller sampling variances, and the coefficients of determination, R^2 , were larger relative to equations using the household income variables*

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