Determinants of wild fruit collection and its impact on food security in rural Zambia

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1. Introduction

- High rates of poverty, food insecurity and malnutrition
- Staple-based diets with lack of micronutrients
- Wild fruits as supplementing food
- Free access, great content of vitamins and minerals
- Insufficient understanding of collection reasons and effect on food security

Research Questions:
1) What are the determinants of wild fruit collection?
2) What impact do wild fruits have on food security?

2. Data

- Data provided by FoSeZa (Food Security in Rural Zambia) project
- Socio-economic census: 215 households from Mantapala region
- Year: 2018
- Wild fruit context: cultivation and analysis of nutritional value to improve food and nutrition security

3. Methodology

Food Security Indicators
- Food Consumption Score (FCS): prevalence of consumption of different food groups
- Reduced Coping Strategy Index (rCSI): households’ coping behaviour during food shortages

Descriptive Results

<table>
<thead>
<tr>
<th>Percentage of Households</th>
<th>Collectors</th>
<th>Non-collectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting wild fruits</td>
<td>21%</td>
<td>79%</td>
</tr>
</tbody>
</table>

Figure 1: Percentage share of households collecting wild fruits.

Econometric Models

1) Multiple Linear Regression Model
\[ 
\ln(Y_i) = \beta_0 + \beta_1 X_i + \beta_2 R_i + \epsilon
\]
where:
- \(Y_i\): Collected quantity (kg) of wild fruits
- \(X_i\): (Uapaca kirkiana / Anisophylea boehmi)
- \(R_i\): Dummy of wild fruit characteristics

2) Ordered Logit Model
\[ 
Pr(Y_i = j) = F(a_j - X_i \beta_i + Q \beta_j) - F(a_j - X_i \beta_i + Q \beta_j)
\]
where:
- \(j\): Categories of food security (FCS / rCSI)
- \(Q\): Wild fruit category
- \(X_i\): Vector of household characteristics
- \(a_j\): Cut-offs of categories

4. Results

1) Determinants of wild fruit collection

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Marginal effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Size</td>
<td>0.162*** (0.0574)</td>
<td>0.295***</td>
</tr>
<tr>
<td>Area Size</td>
<td>0.0273** (0.0120)</td>
<td>0.0273**</td>
</tr>
<tr>
<td>Distance Dummy</td>
<td>-0.404 (0.256)</td>
<td>-0.404</td>
</tr>
<tr>
<td>Availability Dummy</td>
<td>-0.548** (0.275)</td>
<td>-0.548**</td>
</tr>
<tr>
<td>Constant</td>
<td>2.685** (0.886)</td>
<td>2.685**</td>
</tr>
<tr>
<td>Observations</td>
<td>129</td>
<td>129</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.230</td>
<td>0.230</td>
</tr>
</tbody>
</table>

Note: Robust standard errors in parentheses. Only significant results reported.

Figure 2: Mean annual quantity (kg) of wild fruits collected per household in dependency of food security categories (n=213).

2) Impact of wild fruits on food security

<table>
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<tr>
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<th>Marginal effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of wild fruits</td>
<td>-0.00304* (0.00156)</td>
<td>-0.00608***</td>
</tr>
<tr>
<td>Observations</td>
<td>213</td>
<td>213</td>
</tr>
</tbody>
</table>

Note: Robust standard errors in parentheses. Other regressors not shown.

Table 3: Regression results: Impact of collected quantity of wild fruits (kg) on rCSI

<table>
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<tr>
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<th>Marginal effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of wild fruits</td>
<td>0.00115 (0.00016)</td>
<td>0.00230***</td>
</tr>
<tr>
<td>Observations</td>
<td>213</td>
<td>213</td>
</tr>
</tbody>
</table>

Note: Robust standard errors in parentheses. Other regressors not shown.

Table 2: Regression results: Impact of collected quantity of wild fruits (kg) on FCS

5. Conclusion

Policy Recommendations
- Further research on wild fruits and impact on food security
- Education programmes to raise awareness
- Analysis of nutritional value
- Promotion of cultivating, processing and trading
- Sustainable land use and forest management
- Marketing and advertising

References
1. Food Consumption Score (FCS) and Reduced Coping Strategy Index (rCSI): Importance of fruit and vegetable diversity for food security and nutrition in rural Ethiopia. Food Security 19(4):34.

Note: Robust standard errors in parentheses. Other regressors not shown.

Includes quantity collected of all wild fruit species.

*** p<0.01, ** p<0.05, * p<0.1.