# An Empirical Examination of Food-for-work Effects on Household Crop Choices using data from Ethiopia

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## Abstract

The effect of food-for-work (FFW) programs on crop choices for farm households in rural Ethiopia is analyzed. FFW compensation reduces the household's consumption risk in the face of adverse production shocks. I explore how this reduction in consumption risk conditions households to opt for high-yielding and high-return crops. Using panel data, we find that access to FFW two periods ago positively affects maize crop choices in the current period. This result is robust to other shocks and crops in the household's portfolio. We conclude that access to FFW programs has long-term effects on crop choice behavior hence FFW can be designed to improve adoption of high yielding crops and varieties.

## Introduction

**Food-for-work Programs:**

•The assumed disincentive effects of food aid and food-for-work (FFW) programs continue to be discussed in the food aid literature. The assertion is that food aid disturbs local markets of recipient countries by depressing food prices thereby creating disincentives for farm households to invest in agriculture. However, significant results on disincentive behavior have not been shown and reports that claim disincentive behavior among farm households are largely based on anecdotal evidence. Bezu and Holden (2008) note that since households are both producers and consumers, food aid might have factor market effects that overshadow product market distortions.

**Consumption risk reduction and crop choices:**

• Aid acts to mitigate consumption risk faced by households that have experienced adverse production shocks. FFW, in particular, consists of providing eligible households with food compensation in exchange for a supply of labor towards a public project. While other studies posit that FFW would result in fertilizer adoption, this is limited given the non-cash nature of FFW returns. FFW would however condition households to cultivate crops which have might be more risky but have higher market return.

**Purpose:**

This study evaluates the effect of FFW on household cultivation of maize (less drought-resistant but high return) crop.

## Empirical Framework

**Data:**

•Data comes from the Ethiopian Rural Household Survey (ERHS) which is a panel dataset of 1,477 households interviewed 6 times from 1994 to 2004 (1994a, 1994b, 1995, 1997, 1999 and 2004).

•The information covers household demographics, asset holdings, input uses, incomes earned and expenses incurred and crops cultivated. We focus on households in the Dry Weyna Dega ecological zone (moderate rainfall area) who have had access to FFW programs, thereby reducing the research sample to 430 households. Descriptive statistics for the

**The model:**

• We consider the following empirical model for household maize choice:

$$Y_{it} = \gamma_1 Y_{it-1} + \gamma_2 F_{it-1} + \gamma_3 F_{it-2} + x_{it}^{'}\beta + c_{it} + \epsilon_i \; for \; t = 1, \ldots, T$$

Maize cultivation in period $t$ is denoted at $Yit$ . The econometric specification also has lagged values of the dependent variable thereby accounting for state dependence in maize cultivation. The variable $F_{it}$ represents the participation in FFW programs by the *ith* household at time *t*. FFW is lagged to avoid simultaneity. Household and environmental factors are represented with the variable $x_{it}^{'}$. The unobserved heterogeneous effects are represented by $c_i$ and the error term is $\epsilon_i$.

**Estimation Procedure:**

• The equation of interest is estimated using a number of discrete choice panel methods. I present results using the linear probability model (LPM), logit model, probit model and correlated random effects (CRE) probit model. For the probit model and the CRE probit model, the average marginal effects are reported.

•In order to account for state dependence, Wooldridge's conditional maximum likelihood estimator is used. This estimator uses the random effects framework but allows correlation between the time-varying variables and the unobserved term.

**Table 1: Descriptive Statistics of Selected Households**

| Variable | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| Age of head (years) | 48.02 | 14.95 | 15 | 101 |
| Sex of head (=1 if male) | 0.66 | 0.47 | 0 | 1 |
| Education of head (=1 if have primary) | 0.15 | 0.36 | 0 | 1 |
| Household size | 5.51 | 2.55 | 1 | 17 |
| Consumption per capita | 449.09 | 380.60 | 10 | 3,984.34 |
| Livestock value (birr) | 1,651.26 | 2282.61 | 0 | 37,040 |
| Livestock units per household | 2.28 | 2.45 | 0 | 30.05 |
| Food-for-work ( = 1 if received) | 0.19 | 0.40 | 0 | 1 |
| Non-farm income (birr) | 56.01 | 207.28 | 0 | 4,982 |
| Barley (= 1 if cultivated) | 0.41 | 0.49 | 0 | 1 |
| Maize (=1 if cultivated) | 0.35 | 0.48 | 0 | 1 |
| Sorghum (=1 if cultivated) | 0.29 | 0.46 | 0 | 1 |
| Teff (=1 if cultivated) | 0.25 | 0.43 | 0 | 1 |
| Chat(=1 if cultivated) | 0.13 | 0.33 | 0 | 1 |
| Land per household (acres) | 1.48 | 1.39 | 0 | 16.25 |
| Poor (=1 if poor) | 0.39 | 0.49 | 0 | 1 |

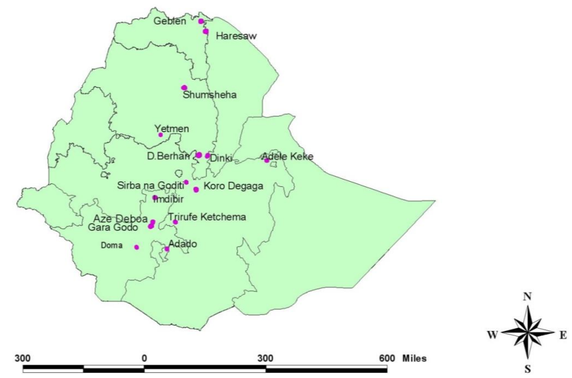
Author's calculations from survey data.

**Table 2: Maize Crop Choice Models using Discrete Choice Panel Data Models**

| Maize | LPM Model FE | Logit Model FE | Probit Model RE | Correlated RE Probit Model |
|---|---|---|---|---|
| Food-for-work (t-1) | -0.016 | -0.229 | -0.235*** | -0.079* |
| | (0.033) | (0.432) | (0.057) | (0.047) |
| Food-for-work (t-2) | 0.072** | 0.756* | 0.053 | 0.138*** |
| | (0.034) | (0.401) | (0.050) | (0.043) |
| Land (acres) | 0.020 | -0.012 | 0.134*** | 0.032* |
| | (0.013) | (0.079) | (0.013) | (0.017) |
| Household size | 0.002 | 0.040 | 0.021** | -0.002 |
| | (0.007) | (0.178) | (0.009) | (0.009) |
| *Ln* Consumption per capita | 0.000 | 0.128 | -0.014 | 0.003 |
| | (0.016) | (0.061) | (0.023) | (0.019) |
| *Ln* Livestock value | 0.010** | -0.602* | 0.018** | 0.015** |
| | (0.005) | (0.257) | (0.008) | (0.007) |
| Rainfall during season (t-1, =1 if little rain received) | -0.069*** | -0.229** | 0.051 | 0.022 |
| | (0.022) | (0.432) | (0.033) | (0.027) |
| Constant | 0.254 | - | - | - |
| | (0.193) | | | |
| Maize choice with state dependence | | | Dynamic Probit Model | Dynamic Correlated RE |
| Maize (t-1) | | | 0.145*** | 0.059** |
| | | | (0.039) | (0.026) |
| Food-for-work (t-1) | | | -0.217*** | -0.047 |
| | | | (0.054) | (0.036) |
| Food-for-work (t-2) | | | 0.084* | 0.108*** |
| | | | (0.047) | 0.034 |
| Observations | 1308 | 383 | 1305 | 1305 |

***,**,* refer to significance at 1%, 5% and 10%, respectively. Standard errors are in parentheses.

**Ethiopian Rural Household Survey Villages**




## Results

• FFW in the last period negatively (not significant) affects maize cultivation in the current period. However, access to FFW in the last two periods positively and significantly affects the maize choice. The results further indicate that the RE model specifications are restrictive and can lead to erroneous conclusions.

• Comparing the results in the panels in Table 2 shows that failure to account for state dependence in estimating crop choice underestimates the effects of FFW programs.

## Conclusions

- Access to FFW does not negatively impact farm decisions, particularly adoption of high-return crops and supports the stance of Bezu and Holden (2008) and Abdulai et al. (2005).
- This study also supports the notion that FFW and other safety net packages should be optimally designed in order to incentivize households to grow more high-return crops thereby facilitating a pathway out of poverty.

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