

# Analysis of Impact of Targeted NGO Interventions on Small-Scale Farm Families in Ecuador

By

Richard “Jake” Erickson, Utah State University and Royal Agricultural University;  
DeeVon Bailey, Utah State University;  
Ruby Ward, Utah State University; and  
Karin Allen, Utah State University

# Non-Governmental Organizations (NGOs)

- Number and role of NGOs in delivering international development programs has expanded steadily since 1970
- NGO activities aimed at mitigating or ameliorating conditions adversely affecting target populations are often referred to as “interventions”
- There are many different types of NGO interventions and target populations
  - Integrated (simultaneously address a spectrum of needs: nutrition, agricultural development, education, etc.)
  - Targeted (address a specific issues (vaccinations, promoting cropping methods)
  - Urban/rural
  - Individual, community, district, or national level

# Program Evaluation

- Given the resources and effort expended by the rich nations and private donors, surprisingly little work has been done evaluating the quality, effectiveness, and sustainability of NGO interventions.
- NGO incentives are to manage donor expectations and satisfactions first rather than from a “bottom-line” perspective of recipients (public relations) (Werker and Ahmed)
- Well-intended interventions may improve one aspect of the recipient’s life in the short-term but ignore broader impacts such as opportunity costs
  - Subsidized or free agricultural inputs
  - Sustainability (consistent with economic incentives): Will the intervention continue on its own after donor money stops?

# Case Study

- Study area: poor, rural community in northern Ecuador (Cochas L Merced located three hours north of Quito).
- Unit of study: Typical family living on a farm consisting of one hectare of land
- Approach: Examine range of possible interventions aimed at economic, agronomic, and nutritional sustainability of single and integrated development interventions

# Methodology

- Community survey (appx. 100 persons involved)
- Average family size was six (parents, three children, and a grandparent)
- Typical farmer engages in harvesting potatoes, corn (maize), wheat, quinoa, and barley
- Daily diet consists primarily of these same food stuffs with sporadic consumption of vegetables purchased from the local market (vegetables not routinely grown by the family)

# Data and Methods

- Developed 26 crops and livestock enterprises (summary information in the paper): barley, beets, broccoli, carrots, cauliflower, celery, chard, Choco, Maize, Green Cabbage, Green Onion, Lettuce, Oats, Potatoes, Quinoa, Radish, Red Cabbage, Spinach, Tomatoes, Chinese Turnip, Wheat, White Onion, Zucchini, Chickens, Heifer, Guinea Pigs (Cuy)
- “Field” crops costs and returns based on a hectare while “garden” vegetable crops based on a square meter ( $m^2$ )

# Data

- Vegetables available in local markets together with their costs also gathered
- Nutritional information gathered from USDA “Genesis” program
- Barley flour; Barley-hulled-dry; Cooked Beets; Fresh beets; Cooked broccoli; Fresh broccoli; Cooked carrots; Fresh carrots; Cooked cauliflower; Fresh cauliflower; Cooked celery; Fresh celery; Cooked Chinese turnip; Fresh Chinese turnip; Cooked corn; Fresh corn; Cooked green cabbage; Fresh green cabbage; Fresh green onion; Fresh lettuce; Oats; Cooked potato; Cooked quinoa; Fresh radishes; Cooked red cabbage; Fresh red cabbage; Cooked spinach; Fresh spinach; Fresh tomato; Wheat flour; Wheat-whole-grain; Fresh white onion; Cooked zucchini; Fresh zucchini; Chocho; Rice; Oil; Brown sugar; Cow milk; Goat milk; Chicken; Pork; Lamb; Cuy; Beef cuts; Beef ground; Eggs; Pineapple; Apple; Peach; Banana; Salt; Pepper; Water; Corn flour; Chard; Tostada; Cooked White onion; Dry quinoa; Bread.
- Information on other household expenses (utilities), medical expenses, and educational expenses also gathered
- Off-farm labor rate (net of expenses) was \$0.96/hour. On-farm labor rate was \$0.625/hour

# Data Continued

- Cropping calendar was broken down into half-month periods (24 total)
  - Planting, crop and livestock care and maintenance, harvesting
  - The HH father was assumed to have 100 hours of labor either on or off farm for each period
  - Total family labor assumed to be 240 hours per half-month period



# Model

- Linear program (LP)
- Maximized income calculated using and subject to:
  - Land constraint (one hectare)
  - Nutrition available from on and off-farm sources including costs (based on 31 nutrient measures)
  - Costs and returns for each crop and livestock enterprise
  - Nutrition requirements for the HH (nutrition coming either from on-farm crops/livestock or purchased food)
  - Labor requirements for plant, maintenance, and harvesting per half-month period
  - Family and Hired Labor availability by half-month period
  - Off-farm work opportunity per half month period
  - Required household, medical, and educational expenses

# RESULTS

<b>Scenario #</b>	<b>Nutrient Target</b>	<b>Family Self Sufficient</b>	<b>Off-Farm Employment</b>	<b>Allowed to Hire On-Farm Labor</b>
1	RDA	No	Yes	No
2	RDA	No	No	No
3	RDA	Yes	No	No
4	RDA	Yes	Yes	No
5	RDA	No	Yes	Yes
6	MyPlate	No	Yes	No
7	MyPlate	No	No	No
8	MyPlate	Yes	No	No

Scenario #	Net Income (Objective Function)	Income from Crops	Off-Farm Income	Food Purchases
1	\$2,783	\$2,550	\$1,924	\$262
2	\$964	\$2,714		\$258
3	\$499	\$2,228		\$83
4	\$2,275	\$1,872	\$1,924	\$83
5	\$3,249	\$3,797	\$2,304	\$257
6	\$2,216	\$2,323	\$1,918	\$275
7	\$408	\$2,498		\$275
8	-\$75	\$1,788		\$93

**Table 11. Land Used for Each Crop Produced on the Farm During the Year Reported in Square Meters for Each Scenario**

<b>Crop</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Maize	4,812	3,908	4,993	6,673	151	5,413	4,534	5,600
Potatoes	7,457	8,363	7,303	5,459	13,561	6,553	7,490	5,589
Wheat	1,283	1,283	980	988	1,286	1,210	1,210	1,210
Carrots			75	46				64
Caulif.								30
Broccoli			3	3	3			
Spinach			7	7				23
Celery								21
Red Cabbage			2	33	33			30
Tomatoes				6	6			19

# Results and Discussion

- Scenario 5 generates highest income (father works off the farm and family can hire on-farm labor)
- In general, the family chooses not to grow garden vegetables unless forced to do so
- Farm family has a positive net income if it focuses on basic nutritional needs (RDA) and grows most food on the farm (Scenarios 3 and 4)
- However, encouraging farm families to be self-sufficient would require interventions that heavily subsidized that behavior (Scenarios not emphasizing growing garden crops have higher incomes than those that do)
- Pursuing a MyPlate diet reduces the family's standard of living

# Results and Discussion

- The ability to hire farm labor leads to more intensive land use and higher income for the family
- Off-farm employment improves the family's standard of living. This implies that any intervention that is labor intensive, such as vegetables, are not sustainable under these assumptions
- The results appear to favor market-related interventions (support USAID approach)