The Sustainable Choice: How Gendered Difference in the Importance of Ecological Benefits Affect Production Decisions of Smallholder Cacao Producing Households in Ecuador

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INTRODUCTION
Benefits other than just income influence the actions of economic actor (Useche & Blare 2013). Our work examines the adoption of cacao agroforestry production practices by smallholder producers in Ecuador to determine how ecological and subsistence non market benefits influence their adoption of cacao agroforests. In particular, we examine the differences that women and men place on these benefits.

METHODOLOGY

In 2012, we held focus group meetings near Santo Domingo de los Colorados to determine what nonmarket benefits are influential in smallholder farmers production decisions. We discovered that the soil quality, the inclusion of food crops in the farming system, and the presence of native plants and animals in addition to price influenced their decision to utilize agroforestry production methods.

We conducted choice experiments with 350 smallholder households near the busying stations for the largest Ecuadorian cacao exporter, Transmar, from March through July 2013. Each respondent was shown a series of six choices whereby she had to choose whether she preferred the monoculture or the agroforest parcel. Figure 1 provides an example of the profiles shown to the respondent. The attributes and price levels for the agroforestry option varied with each choice set presented to the respondent as shown in Figure 2.

EMPERICAL MODEL

A random effects logit model (RELM) was utilized to estimate the panel data for the effects of gender and each tested attribute on the respondent’s preference for agroforestry production. Since the coefficients are similar to those in the fixed effect model (FELM), this model provides the best unbiased estimators (Cameron & Trivedi 2010). The coefficients are presented in Figure 3.

\[
\text{pro}(WTP) = \alpha + \beta_1 \text{profit} + \beta_2 \text{org. mat.} + \beta_3 \text{sub. crops} + \beta_4 \text{biodiversity} + \beta_5 \text{gender} + \beta_6 \text{gender} \times \text{profit} + \beta_7 \text{gender} \times \text{org. mat.} + \beta_8 \text{gender} \times \text{sub. crops} + \beta_9 \text{gender} \times \text{biodiversity}
\]

The estimated coefficients from this model are translated into willingness to pay (WTP) estimates by dividing the coefficient of attribute or the attribute for gender by the coefficient for profit (Hanemann 1984). These values can be combined to determine the value of a cacao agroforest that contains any combination of the non market benefits and the value each gender on average place on each profile.

Figure 4 shows how much profit a male or female respondent would have to earn on a hectare of cacao agroforest to be different between the farming methods. A negative value indicates that the respondent would not need to receive any profit on the agroforest parcel and still prefer it to the monoculture parcel.

CONCLUSIONS

Two attributes of cacao agroforests, biodiversity and subsistence crops, were both found to significantly influence the smallholder farmers’ preference for agroforests.

Subsistence crops have a strongly positive margin effect on this choice while biodiversity has a small negative marginal effect as farmers are concerned that highly species diverse ecosystems includes undesirable species such as snakes and squirrels as well.

On average, women place a significantly stronger preference for agroforests than men do.

Providing women with voice in the production decision would likely encourage households to adopt cacao agroforests instead of monoculture production methods.

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