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EXPLAINING CROPPING CHOICES UNDER EXTREME UNCERTAINTY

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In conflict-affected communities, households' farming preferences change as they revert to a cropping system that minimizes loss. Conflict resistant crops are usually low-value and difficult to cultivate, making theft and destruction less likely. Conflict incidences give rise to uncertainty in communities and influence cropping choices from traditional crops to those that are more likely to improve food security and profitability for households.

RESEARCH FOCUS

The Center on Conflict and Development at Texas A&M University launched a study to explore the conditions under which crop theft occurs and how farmers' choices of crops are influenced by conflict. Additionally, this study aimed to identify factors that could potentially mitigate the effects of conflict on crop choice. Using standard choice theory, a rational farmer will alter cropping preferences due to risks associated with violent conflict. As such, this research tests two main hypotheses:

- Conflict-affected farming households revert to conflict-resistant cropping systems
- Farmers who have better access to markets and technology will be more equipped to practice a conflict resistant cropping system

BACKGROUND

Cropping choices can be influenced by a myriad of factors, such as weather, price, and environment. Previous research has shown certain crops have the potential to be conflict-resistant, meaning that such cropping choices are less likely to be impacted as a consequences of conflict. Crops that are conflict resistant have characteristics which minimize the likelihood of loss from theft, destruction, lack of markets, and price instability. Moreover, these cropping choices tend to provide the best return under conflict conditions and usually meet the minimum level for food security in households. As such, this study investigates to what extent violent conflict influences cropping choices in DRC.

1. Improve access to markets & information

Access to technology provides farmers an advantage in producing more conflict resistant crops, while better market access makes households more inclined to produce crops that are conflict resistant. Informed decision making allows farmers to respond to conflict events by altering traditional cropping choices whereby maximizing profitably and food security. Policymakers and aid practitioners should support technology that improves information sharing across communities and regions.

2. Increase social cohesion

Social cohesion increases shock resiliency through adaptation towards more conflict resilient cropping systems. Building a strong support network in communities has been found to increase crop diversification and choice of cash crops, suggesting stronger levels of trust and mutual dependency. Donors should focus on programs and policies that support and foster community cohesion in conflict-affected regions.

There is considerable agroecological and sociopolitical heterogeneity across the province of North Kivu, though individual territories can be characterized as somewhat unique from each other. The three most commonly cultivated staple crops across the region include: beans, cassava, and maize. However, they are present in varying relative proportions across the territories.

DATA AND EMPIRICAL ANALYSIS

The study took place in North Kivu, DRC in August and September of 2014. Thirty-six randomly chosen villages from Beni, Lubero, and Rushuru regions were used in a grid-based interview process. Approximately 2,200 rural farming households were interviewed regarding household demography, input availability and usage, crop choices, market access, empowerment, social voice, and conflict within the society. Also surveyed as a dependent variable was the cropping system utilized by each farming household.

Household cropping systems were defined by the types of crops chosen by each household and their categorization as cash crops or for home consumption. Further data included information on which crops had ever been stolen, as well as crops which were never stolen from farmers' fields. Market access was determined by their access to credit and local trade. Social cohesion was determined through the household's connection to village leadership as well as interactions with local farmers.

The first analytical strategy included a qualitative analysis which correlated the incidences of conflict and crop theft in each region. This analysis illustrated that farmers shift away from high-conflict crops and toward more conflict resistant crops when local insecurity increases. Subsequently, a quantitative analysis using a short case study of a subset of the surveyed regions of North Kivu. Information on the agronomic and ecological attributes of specific crops and cropping patterns was assessed compared to choices adopted by farmers. Lastly, a regression analysis which quantifies the consequence of conflict on cropping system choice. To mitigate bias, ethnic and groupement fixed effects were included in the equation. Ordinary Least Squares and Propensity Score Matching between pairs of farming households estimated the impacts of conflict on crop choices.

RESULTS AND RECOMMENDATIONS

The Beni territory is low-altitude, less than 1200m, with localized rebel activity. Households grow more bananas than the other territories considered, along with cocoa, coffee, and oil palm as cash crops. The area is relatively ethnically homogenous, populated largely by the Nande ethnic group.

The Lubero territory is generally high-altitude, above 1200m, though the sparsely-populated western expanse of the territory is found at a lower altitude, and also has localized rebel activity, primarily in the southern region. In addition to the primary three staple crops, farmers grow rice, vegetables and a significant amount of potatoes. The area is ethnically homogenous, with the city of Butembo along the northern border being recognized as a traditional Nande stronghold.

The Rutshuru territory is a mix of middle and higher altitudes, and has much more widespread rebel activity than either of the northern territories, in large part due to an influx of refugees and armed groups following the genocide in Rwanda in 1994. In addition to the three staple crops, farmers grow soy, sorghum, fruits and vegetables. The territory is ethnically diverse, with a mix comprising primarily the Hutu, Nande and Tutsi ethnic groups.

Of the twenty-nine crops covered in the survey, only four registered consistently high rates of theft across all regions surveyed: maize, beans, cassava and bananas. Theft is substantially more common in Rutshuru territory as compared to Beni or Lubero territories, though maize theft is relatively high everywhere. Conflict at the community-level and by rebel groups across North Kivu as a whole is correlated with higher rates of crop theft.

The study notes evidence of changing preferences among farmers with regard to crop choice: across all three territories, maize, beans and cassava were the most commonly cultivated crops, while bananas consistently ranked as fourth choice. Farmers in areas exposed to higher-than-average rates of conflict act as rational actors choosing to switch away from conflict-prone staple crops, diversifying their portfolio with crops which are more conflict resistant.

Conflict incidence positively affected households' choice to plant conflict resistant food crops at the 99% confidence level. Households that had lower market access had a statistically significant negative association with producing less conflict resistant food crops. Contract levels of farmers were found to be negatively related to households' choice of conflict resistant crops with 1% statistical significance. Income, education, size, and co-operative memberships did not appear to be statistically significant with any of the conflict resistant food crops.

When confronted by increased levels of conflict, farmers made the rational choice to cultivate less of the common, easily-looted maize, beans, and sweet cassava; opting for more conflict resistant crops—characterized in this case by crops with a combination of a short, annual growth pattern, cultivated in gardens or fields close to the home and/or close to population centers, and having extensive processing requirements.

The policy implications that can be drawn from this study are that improving access to markets and information as well as increasing social cohesion can help farming households in conflict-prone agrarian societies such as North Kivu to adopt conflict resistant farming practices. This, in turn, might help them to cope better with the adverse effects of long-term conflict and social unrest that has become an integral part of their lives and livelihoods.