Does others' health count for peanuts? Health, market returns, and pro-sociality*

Gashaw T. Abate[1], Tanguy Bernard[2], Joshua Deutschmann[3], and Fatou Fall[4]

[1] *IFPRI*

[2] *BSE, Université de Bordeaux*

[3] *University of Chicago*

[4] *LEDa-DIAL, Université Paris-Dauphine-PSL*

April 17, 2025

Abstract

Individuals often make decisions considering both private returns and welfare impacts on others. Food safety decisions by smallholder agricultural producers exemplify this choice, particularly in low-income countries where farmers often consume some of the food crops they produce and sell or donate the rest. We conduct a lab-in-the-field experiment with agricultural producers in Senegal to study the decision to invest in food safety information, exogenously varying the degree of private returns (monetary or health-wise) and welfare impacts on others. Producers are willing to pay real money for food safety information even absent the potential for private returns, but willingness to pay increases with the potential for private returns. A randomized information treatment significantly increases willingness to pay in all scenarios. Our results shed light on the complex interplay between altruism and economic decisions in the presence of externalities, and point to the potential of timely and targeted information to address food safety issues.

*Corresponding author: fatou.fall@dauphine.psl.eu. The authors thank Mariama Konte, Samba Mbaye, Medoune Sall, and the team at CRDES for their work implementing the project, and Noemi Berlin, Marie Boltz, Fabrice Etile, Claire Rimbaud, Olivier Renault and seminar and conference participants at AFE, the Behavioral Economy Working Group, DIL,DIAL, ESA, ICDE, Novafrica and PSE-Dauphine PSL "Behaviour, Health and Aging" Workshop for helpful comments and suggestions. This project received financial support from the CGIAR Research Program on Policies, Institutions, and Markets, the CGIAR Research Program on Agriculture for Nutrition and Health, and the Agricultural Technology Adoption Initiative. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: https://www.cgiar.org/funders/. Deutschmann acknowledges additional support from the Development Innovation Lab, Bernard from the Interdisciplinary Policy-Oriented Research in Africa platform (IPORA). This study received IRB approval from IFPRI (MTID-21-1037M) and is registered with the AEA RCT Registry (AEARCTR-0010218). Any errors in this draft are the sole responsibility of the authors.

Introduction

Foodborne disease-related deaths are estimated to be the highest per capita in Africa, causing 137,000 deaths and 91 million illnesses annually (Jaffe and Grace, 2020). Many food safety problems are visually undetectable, among which aflatoxins are a cause of particular concern. Aflatoxins are produced by the *Aspergillus flavus* fungus present in soils, which infects crops on farm and proliferates during storage with poor conditions. Aflatoxins affect crops that are important for both rural incomes and consumption in the region, including maize and groundnuts. Chronic exposure to aflatoxins increases liver cancer risk (particularly when Hepatitis B incidence is high), and has been associated with impaired growth in children and weakened immune function. At the extreme, acute exposure can be deadly (Gong et al., 2016; Liu and Wu, 2010; Marrone et al., 2016). Many countries in Sub-Saharan Africa have limited or no domestic regulations on aflatoxins, weak enforcement of regulations that do exist, and fragmented value chains with limited prospects for traceability, posing significant challenges to ensuring the safety of locally available food products.

Food production in many low-income countries relies on smallholder farmers in rural areas, endowing them with a pivotal role in determining food risk levels in local markets. Ensuring food safety and assessing regulatory compliance represent potentially significant costs for farmers and intermediaries. Additionally, there is often a lack of information on the consumer side regarding food quality, resulting in limited scope for product differentiation based on safety certification or signaling of quality investments by producers. Consequently, farmers may face limited economic incentives to address hazards, leading to a lack of investment in food safety and potentially explaining the prevalence of food hazards in products available for local consumption (Grace et al., 2020; Hoffmann et al., 2019; World Health Organization, 2015).

In this paper, we develop a lab-in-the-field experiment to explore whether alternative motivations for food safety can play complementary roles alongside economic incentives. Within a context lacking enforced regulations and economic incentives, the tendency of farmers to undervalue the provision of safe food seemingly results in limited investments in quality, perpetuating pervasive food safety issues. We ask whether farmers value access to information on food safety when the information is most relevant for their own health, for the health of others in the community, or for receiving an economic benefit.

First, we investigate whether farmers are willing to pay real money for food safety information when there are no private returns, either monetary or health-wise, and when there are private monetary and/or health returns. We find that farmers are willing to pay relatively more when there are private returns, but are nevertheless willing to pay an economically non-trivial amount of money even absent the possibility of private returns. On average, farmers are willing to pay about 550 CFA to reveal food safety information when there are no private returns, more than the expected market value of the food products or about 2.3% of average monthly gross income (DAPSA, 2022). When the potential for private monetary or health returns increases by 25%, farmers are willing to pay about 4% more for information about food safety.

Second, we test whether self-reported altruism and baseline awareness of aflatoxins are potential mechanisms for willingness to pay for food safety information, in situations with and without private returns. We find that farmers with higher self-reported altruism appear willing to pay slightly more in situations both with and without private returns relative to farmers with lower altruism, although this result is not statistically significant. Individuals with greater baseline awareness of aflatoxins are willing to pay significantly more in situations with lower private returns, in some cases entirely offsetting an average lower willingness to pay in these situations.

Third, we test the causal effect of providing detailed information about aflatoxins on farmers' willingness to pay. Before the experiment, all participating farmers were given a brief description of aflatoxins and their prevalence. After the first half of the experiment, farmers were then randomized to watch either an informative video about aflatoxins or a placebo video. The informative video provided detailed information about aflatoxins and harm to the human body resulting from exposure. We find that additional information about aflatoxins increases willingness to pay by 8.4% on average and increases the probability of being willing to pay for guaranteed information by 6.3%. This increase is relatively consistent regardless of the level of private returns in a given round.

A potential limitation of our design is that one's decision to pay to ensure the quality of one's output applies simultaneously to all usages. In some contexts, farmers can at least partially differentiate along food safety dimensions between production that they keep for their consumption and the production that they sell (Arslan and Taylor, 2009; Hoffmann and Gatobu, 2014; Kadjo et al., 2020). However, in the case of aflatoxin contamination which is visually undetectable and costly to test for, sorting of this kind is infeasible for a smallholder farmer.

To our knowledge, this paper is the first to introduce altruism as a mechanism influencing food safety within the local markets of low-income countries. The findings contribute to the literature on the willingness to pay (WTP) to mitigate health issues among rural African consumers. This contribution furnishes evidence of pro-social motivation in the realm of public health issues.

Previous studies conducted in African countries have highlighted that smallholder farmers, acting as consumers, demonstrate a willingness to pay for access to high-quality food (Chowdhury et al., 2011; De Groote et al., 2011, 2016; Meenakshi et al., 2012). Beyond financial and health motivations, our study recognizes pro-sociality as a factor that might drive farmers to value information about aflatoxin levels in their production. The experimental design allows us to explore the interactions between financial incentives, health concerns, and pro-social motivations, recognizing that these mechanisms are often interlinked in practice.

Farmers propelled by pro-social or altruistic motivations may invest in enhancing their groundnuts' quality despite the absence of direct financial gain. Their motivation lies in a desire to provide food that does not harm others. This aligns with observations in other domains, where farmers engage in pro-social activities related to their occupation, such as disseminating agricultural information (Behaghel et al., 2020) or endorsing sustainable agricultural practices (Bopp et al., 2019), even in the absence of financial incentives. Our results suggest that providing information serves as a means to encourage farmers to internalize the positive externality associated with supplying safe food. This, in turn, could lead to increased investments in technology and a safer food supply within the local markets of low-income countries.

The article first presents the institutional context of aflatoxins and groundnut production, along with the data used in the paper (Section 1). Section 2 provides a review of the research on the valuation of health and the impact of information provision and pro-sociality, which then motivates our conceptual framework. Section 3 describes our baseline survey, the experimental design, and presents results from pre-treatment rounds. Section 4 presents the design and causal effects of the information treatment. We present robustness checks in Section 5, and conclude by discussing implications for policy and future research in Section 6.

1 Institutional context and data

1.1 Aflatoxins in Senegalese groundnut production

Senegal ranks among the top ten groundnut exporters, with groundnut crops covering approximately 39.7% of cultivated land (and 81% of cash crops) in the country in 2022 (DAPSA, 2022). Consumed in various forms such as whole, powdered, and paste, groundnuts are integral to the country's dietary habits, particularly in zones dedicated to groundnut cultivation. Groundnut production is predominantly carried out by smallholder farmers organized within cooperative structures overseen and supported by state authorities. But aflatoxin contamination is a significant issue in Senegal. While not observable to the naked eye, a study by PACA (2017) reveals that approximately 36% of Senegalese groundnut production fails to meet European Union contamination standards, varying by region. This alarming statistic highlights that about one-third of groundnut production poses a significant health risk to consumers. Existing research indicates that adults in areas of Senegal with high per capita consumption of groundnuts and maize exhibit elevated aflatoxin biomarkers in their blood (Watson et al., 2015).

Aflatoxin contamination can occur at several stages, as crops are susceptible to *A. flavus* development during both growth and storage. Environmental conditions also significantly influence the likelihood of aflatoxin contamination (Deutschmann et al., 2024). Farmers can invest in technologies to upgrade the safety of their groundnuts, ensuring low levels of aflatoxins in their produce. Post-harvest, proper drying and storage are effective at reducing the development and spread of aflatoxins. Groundnuts must be adequately dried to reduce moisture content, and storage conditions must prevent moisture absorption and mold exposure. A recent study among Senegalese farmers demonstrated that better storage practices with high-quality hermetic bags can reduce the likelihood of high aflatoxin levels in groundnuts by 30% (Bauchet et al., 2021). Pre-harvest, farmers can use bio-control products to limit the growth of toxigenic *A. flavus* strains and prevent aflatoxin contamination from reaching crops (Bandyopadhyay et al., 2019; Deutschmann et al., 2024; Senghor et al., 2020).[1]

[1] In Senegal, the bio-control product Aflasafe was approved for commercial sale in 2019, and is now readily available to Senegalese farmers as a pivotal technology in the fight against aflatoxin contamination. The cost of Aflasafe for one hectare is 10,000 CFA ($16). The cost of purchasing enough hermetic bags for one hectare is approximately 24,000 CFA ($40). To contextualize these figures, the average yield of groundnut production in Senegal was reported to be 2,149 kg per hectare in 2021, with an average plot size of 2.4 hectares (DAPSA, 2021).

Hence, farmer investments in implementing good agricultural practices during cultivation, coupled with appropriate post-harvest handling techniques and storage procedures, can play a pivotal role in mitigating aflatoxin contamination. These investments can also benefit farmers in several ways. First, reducing aflatoxin levels (through improved practices and investments in inputs such as Aflasafe) could benefit farmers through better market prices. But except for exporters, who face stringent aflatoxin standards in international markets necessitating certification, buyers generally show limited concern for aflatoxin content. While some countries have implemented regulations to curb aflatoxins in food available to domestic consumers (Meneely et al., 2022), Senegal, like many low-income nations, lacks enforced standards for food crops. Only agro-industrial producers are regulated concerning aflatoxin levels, specifically for crude groundnut oil and groundnut paste. However, food control enforcement is notably deficient. Agro-industrial producers supply only a minority of groundnut products consumed by families, who often obtain them through less-regulated channels (PACA, 2017).

Second, farmers may themselves benefit from improved health outcomes resulting from consuming higher-quality groundnuts. In 2021, 21.6% of groundnut production was consumed by farmers themselves. But the decision to invest in technologies to combat aflatoxins is contingent on farmers' awareness of aflatoxin-related issues. While national-level awareness figures are unavailable, various studies in Senegal have addressed this issue. For instance, Arias-Granada et al. (2021) found that 20% of farmers in their sample were aware of aflatoxin, compared to 28% in the study by Bauchet et al. (2021). In our sample, 22% of farmers had heard of aflatoxins as a disease affecting groundnut crops, with about 10% citing health problems as its impact (See Table 1).

Third, providing higher-quality groundnuts in the local market reduces others' exposure to aflatoxins, addressing public health concerns. Pro-social farmers may find motivation in altruistic actions, as indicated by 5.5% of groundnut production being distributed (donated) to other households (DAPSA, 2021). Here also, however, farmers' behavior will crucially depend on their awareness of the health hazard associated with aflatoxins in human consumption.

1.2 A sample of groundnut producers in Senegal

We study these issues with a sample of groundnut farmers in the Thies region, specifically within the Mbour department. Farmers in this department engage in the cultivation of various crops, including groundnuts, although the intensity of groundnut cultivation is lower compared to farmers located more inland in regions like Fatick or Kaolack. In partnership with a local agricultural cooperative we surveyed 439 local groundnut farmers in August and September 2022. Of these, 302 were cooperative members actively involved in groundnut cultivation, while the remaining 147 were non-members residing in the same villages who were also engaged in groundnut cultivation.

The first three columns of Table 1 below present the average characteristics of the surveyed farmers. Most of them are men, with an average age of 54 and relatively low education levels. All surveyed farmers grew groundnuts in 2022, and 91% cultivated them in 2021. However, the year 2021 posed challenges for groundnut farmers in the Thies region due to a delayed rainy season and a prolonged break between the first and second rains, leading to varying harvest outcomes (ANACIM, 2021). Consequently, 75% of farmers who planted groundnuts in 2021 managed to harvest some. Additionally, some of them obtained minimal yields relative to the seeds sown, as reflected in the high standard deviation of the 2021 harvest quantities. In 2021, nearly all farmers kept a portion for personal consumption and relatively few sold a portion of their production. Approximately half donated a portion to other households or individuals, which accounted for approximately 10% of their production. Our sample shows a relatively low level of awareness of aflatoxins at baseline, consistent with the existing literature. Approximately 22% of the respondents had heard about aflatoxins, and merely 11% could identify health impacts as one of the effects of aflatoxin exposure. We construct variables related to preferences for pro-sociality, altruism, and risk aversion. The pro-sociality index is derived from farmers' responses to questions about their happiness after giving advice or helping fellow villagers, as well as a reciprocity-related question from the Global Preferences Survey (Falk et al., 2018).[2] This index is computed as a weighted average of the standardized variables relative to the full sample, following Anderson (2008). The same method is used to create a risk aversion index.

[2] Described in Section B.2 in the appendix.

Table 1: Descriptive statistics of sample farmers

	Full sample			C vs T
	Mean	Sd	N	Diff
Age (in completed years)	54.62	13.46	439	0.16
Male (1=Yes)	0.83	0.38	439	0.05
Years of education (in completed years)	3.23	4.89	439	0.15
Can read (1=Yes)	0.38	0.49	439	0.04
Can write (1=Yes)	0.35	0.48	439	0.04
Cooperative member (1=Yes)	0.67	0.47	439	-0.00
Quantity of seeds 2022 (kg)	87.73	61.22	397	-9.24
Size of groundnut plot (ha)	1.14	0.94	439	-0.11
Grew groundnuts in 2021 (1=Yes)	0.91	0.29	421	0.08***
Harvested groundnuts in 2021 (1=Yes)	0.75	0.43	383	-0.08*
Quantity harvested in 2021 (kg)	207.90	290.42	383	-47.21
Consumed part of production 2021 (1=Yes)	0.98	0.13	287	-0.01
Donated part of production 2021 (1=Yes)	0.49	0.50	287	0.09
Sold part of production 2021 (1=Yes)	0.12	0.33	287	-0.02
Share of groundnuts consumed	0.75	0.27	287	-0.00
Share of groundnuts donated	0.10	0.14	287	0.02
Share of groundnuts sold	0.06	0.19	287	-0.02
Heard of aflatoxin (1=Yes)	0.22	0.42	439	-0.02
Knows health impact of aflatoxin (1=Yes)	0.11	0.31	439	-0.03
Index of pro-sociality (standardized)	0.00	1.00	439	0.05
Index of risk preferences (standardized)	0.00	1.00	439	0.08

2 Health, information and pro-social behavior

As farmers become more knowledgeable about the health risks associated with aflatoxins, they may change their decisions and motivations to invest in food safety measures. In addition to a potential financial motivation, we focus on health and pro-sociality as motivations that may play significant roles in farmers' decisions. In this section we review current evidence on related issues in low-income countries, and use this review to develop a simplified framework from which we derive a set of testable hypotheses.

2.1 Review of evidence

Preserving their own health is a significant motivation for farmers. Recent research has shed light on the divergent approaches farmers adopt toward the crops they sell compared to those they consume. Hoffmann et al. (2023) investigates the effect of a modest premium on farmers' investment in Aflasafe. The premium offer increases the adoption of Aflasafe, driven by farmers consuming their own maize. In the absence of a premium, some farmers still purchase Aflasafe, indicating a desire to ensure safe maize for their own consumption. Another study by Hoffmann and Jones (2021) with maize farmers in Kenya reveals that farmers make more substantial investments in food safety practices when the produce is assigned for their own consumption rather than for sale. In Benin, working with maize farmers, Kadjo et al. (2020) show that when farmers perceive a risk to food safety, they are less inclined to treat maize intended for personal consumption with insecticide, as opposed to maize intended for sale. Several studies also show that farmers, as consumers themselves, value the safety of food. An experiment conducted by De Groote et al. (2016) with Kenyan maize growers demonstrates their willingness to pay extra for maize without aflatoxin. The same results are derived from similar experiment made with rural consumers who most of the time are also producers, concerning maize in Zambia (Meenakshi et al., 2012), and staple crops in Uganda (Chowdhury et al., 2011). Together, these findings underscore that farmers indeed place a high value on access to safe food for personal consumption, exhibiting willingness across settings to incur costs to produce and consume safe food.

Pro-sociality may be another motivating factor for food safety investments. Some individuals are intrinsically motivated to act pro-socially, engaging in behaviors that benefit others. Pro-social individuals harbor an inherent desire to create positive externalities through their actions, propelled by altruistic motives without necessitating external incentives (Bénabou and Tirole, 2006). These individuals willingly invest resources to enhance the well-being of others, even in the absence of extrinsic rewards. The concept of altruism and its connection to the value individuals place on the safety of others have further been empirically examined by Jones-Lee (1991). This work emphasizes that people demonstrate altruistic behavior by valuing the well-being and security of others, even at a personal cost. Several studies have empirically explored whether individuals are willing to pay more to reduce risks for themselves and others (Araña and León, 2002; Gyrd-Hansen et al., 2016; Simonsen et al., 2021). In the field of agriculture, studies have investigated whether farmers' altruistic motivations and their influence on technology adoption decisions. In higher income countries, Sheeder and Lynne (2011) proposes that farmers integrate both self-interest and concern for others when deciding to adopt new technologies. Chouinard et al. (2008) find that farmers are even willing to forgo their own profits to favor conservation farm practices. Evidence further suggest these behavior also exist in poorer settings. In Uganda, Behaghel et al. (2020) find that farmers exhibiting higher level of pro-social motivation were more likely to diffuse information to others regarding improved feeding of their cows. In rural Mozambique, a qualitative survey-based study of farmers by Crudeli et al. (2022) finds that pro-sociality is a crucial quality to qualify a producer as a good farmer and is further positively correlated with the adoption of innovations.

2.2 Conceptual framework

On the basis of this evidence, we now propose a simple conceptual framework to study these issues in the context of aflatoxins in Senegal. Consider a groundnut producing farmer who derives her utility from a portfolio of additively separable components associated with the use of her production for her home consumption (u_c), for donation to others (u_d) or to obtain income from market sales (u_m):

$$U(u_c, u_d, u_m) = u_c(g^c) + u_d(g^d) + u_m(g^m)$$

where g^c is the part of her production she consumes, g^d the part she donates, and g^m the part she sells. We consider these shares to be fixed. We acknowledge that assuming fixed shares for consumption, donation, and sales simplifies the complexity of real-world decision-making. In practice, farmers may adjust these allocations in response to changing circumstances, such as unexpected market conditions or production increase/decrease. However, this simplification is still useful in our analysis as it reflects stable decision-making patterns likely driven by persistent factors such as consumption needs, local social norms, and liquidity needs. By using fixed shares, we focus on the central decision farmers face—whether to acquire information about aflatoxin contamination—without over-complicating the model.

Aflatoxins exist in the area and can contaminate the farmer's entire production with a probability π. Whether her production is affected cannot be assessed from the naked eye, and her only response to this issue is to choose whether to acquire information through an appropriate test applied to a representative sample of her production. Let $I(v)$ capture this information, with $I = 0$ if she does not have the information, $I = 1$ if she does, and v the cost of the test which is fixed for the farmer's entire production. Each component of her utility is defined as follows:

Home Consumption: $u_c(g^c) = \alpha(g^c - \pi A(1-I)g^c)$ — The utility she derives from the consumption of her production depends on her marginal utility of consumption

(α), and is depreciated by the probability π that it is contaminated by aflatoxins. This depreciation however depends on her degree of awareness regarding the health hazard of aflatoxins A, with $0 \leq A \leq 1$ and $A = 0$ if the farmer is not at all aware of the health consequences of aflatoxin, in which case she incurs no dis-utility from consuming aflatoxin contaminated groundnut. This is true whether the farmer decides to acquire information ($I = 1$) or not. The depreciation of her utility is however maximized if she is fully aware of the negative consequences of aflatoxins, knows that there is probability π that her production is affected, but did not acquire the necessary information I to find whether she should effectively be concerned.

Donation: $u_c(g^d) = \beta(g^d - \gamma\pi A(1-I)g^d)$ — The utility she derives from donating her production depends on her marginal utility of donation (β) and follows the same pattern as that of consuming it, albeit with one difference: the disutility component is also mediated by the extent to which she cares for others' health captured by an altruism parameter γ, with $0 \leq \gamma \leq 1$ and $\gamma = 0$ if she is not at all concerned by the health of others.

Market sales: $u_c(g^m) = \delta(g^m \cdot p + (1-\pi)Ik \cdot g^m - \pi Ip \cdot g^m)$ — The utility she derives from selling her production depends on her marginal utility (δ), and on the per-unit price-premium that she may get if she acquires the quality information ($I = 1$) which shows no-contamination with probability $(1 - \pi)$ or whether she incurs a loss in her overall sales if her production is shown to be contaminated with probability π.

Thus, the farmer's decision to invest v in acquiring information I depends on the comparison of her overall utility with and without this information. If she does not invest in obtaining information regarding the contamination of her production by aflatoxin, her overall utility is given by:

$$U(g_m, g_c, g_d|I = 0) = \alpha(g^c - \pi A g^c) + \beta(g^d - \gamma\pi A g^d) + \delta g^m \cdot p \tag{1}$$

In turn, if she decides to acquire the information regarding whether her production is contaminated or not, her overall utility is given by:

$$U(g_m, g_c, g_d|I = 1) = \alpha g^c + \beta g^d + \delta g^m \cdot p + \delta(1-\pi)k \cdot g^m - \delta\pi p \cdot g^m - v \tag{2}$$

Combining Equations 1 and 2, the farmer's maximum willingness to pay for obtaining information regarding the quality of her groundnut is given by:

$$v^* = \alpha\pi A \cdot g^c + \beta\gamma\pi A \cdot g^d + \delta((1-\pi)k - \pi p) \cdot g^m \tag{3}$$

This simplified framework leads to a series of testable predictions. First, the farmer's willingness to pay $v*$ to test for the quality of her production increases with the share of her production that she dedicates to home consumption: $\frac{\partial v*}{\partial g^c} = \alpha\pi A > 0$. The strength of this relationship positively depends on the marginal utility that she derives from consuming groundnuts (α), the probability that her production is contaminated with aflatoxins (π), and her level of awareness of the health hazard associated with the consumption of aflatoxin-contaminated groundnuts (A).

Second, the farmer's willingness to pay for the test also increases with the part of her production that she donates: $\frac{\partial v*}{\partial g^d} = \beta\gamma\pi A > 0$. As for donation, this relationship is strengthened by the probability that her production is contaminated and by her awareness of the negative consequences associated with donation of aflatoxin-contaminated products. Comparing the farmer's willingness to pay in relation to home-consumption and to donation further yields to $\frac{\partial v*}{\partial g^c} - \frac{\partial v*}{\partial g^d} = \alpha - \beta\gamma$. Assuming that one's marginal utility for home consumption is at least equal to that of donation ($\alpha \geq \beta$), and with one's valuation of others' health (γ) is at most equal to one, the farmer's willingness to pay for the test of production should more strongly respond to increases with the part she dedicates to home consumption (g^c) than with the part she intends to donate (g^d).

Third, with respect to the groundnuts she sells on the market, the farmer's willingness to pay for a test of her production no longer depends on her awareness of the health hazard (A): $\frac{\partial v*}{\partial g^m} = \delta((1-\pi)k - \pi p)$. Instead, it is driven by the combined effects of the probability that her production is contaminated and the prices she can expect from selling non-tested groundnuts (p) or selling groundnuts that have been certified to be free of aflatoxins ($p + k$). Accordingly, her willingness to pay increases with the part she dedicates to market sales only if the price premium associated with safe groundnuts is greater than the likelihood that her groundnut is contaminated, valued at the market price for non-tested groundnuts: $\frac{\partial v*}{\partial g^m} > 0$ if $k > \frac{\pi p}{1-\pi}$.

3 WTP for food-safety information among Senegalese farmers

Building on the above conceptual framework, we designed and implemented a willingness to pay experiment to assess the relationship between farmers' awareness of aflatoxin issues (A) and/or their pro-social attitudes (γ) on the one hand, and their willingness to invest the acquisition of information regarding the contamination of their product on the other hand. Our experiment further differentiates these behaviors across the different possible uses of groundnuts: consumption (g^c), donation (g^d), and sales (g^m).

In the following paragraphs we first describe the willingness to pay experiment and its implementation, then briefly discuss our estimation strategy, and finally present the results of the experiment. The results presented in this section are limited to the first six rounds of our experiment, after which we randomly introduced an additional information treatment which we describe and analyze in Section 4.

3.1 Baseline survey and enrollment in the experiment

Each farmer selected within our sample was first administered a short survey collecting socio-demographic information, details on their crops, information about the last commercialization and the current growing seasons for groundnuts, and their awareness of aflatoxin. For the latter, we asked whether respondents had ever heard of aflatoxins and, if they did, what they knew about their consequences. We also elicited farmers preferences and behaviors related to donation,[3] risk aversion and pro-sociality, adapted from surveys conducted in similar settings such as Behaghel et al. (2020). Appendix B.2 provides additional details regarding the elicitation/measurement of these attitudinal variables.

Once the questionnaire was completed, farmers were read the following short statement: *"Aflatoxins are a type of toxin present in some groundnuts and have a long-term impact on health. They can cause liver cancer if consumed over a long period. Aflatoxins are present in 1/3 of the groundnut production in Senegal according to a recent study."* With this information – which corresponds to the parameter

[3] Enumerators emphasized that these donations did not include those made out of obligation or expectation, and instead included those that were entirely voluntary and meant to reflect genuine acts of altruism without any personal gain in return.

π in our conceptual framework – we aimed to help farmers better understand the potential benefits and risks associated with paying to reveal the level of aflatoxins in the groundnuts presented, albeit with the type of minimal information that one may be exposed to in a standard real life setting. We emphasized the liver-related effects of aflatoxin exposure to highlight the personal health risks individuals face and thus center the analysis on individual health risk perception. This statement also served to anchor participants on a common belief about the value of π.

As compensation for survey participation, farmers were offered 1,000 CFA (approximately $1.5), presented as a token of appreciation for their time. Farmers were then given the option to participate in a decision game involving groundnut powder. Beyond compensating farmers for their participation in the survey, this show-up fee provided the initial endowments needed for participants to engage some of their own resources in the following sequence of experiments. To mitigate potential house money effect distortions resulting from this endowment (Corrigan and Rousu, 2006), we present it as a show-up fee distributed at the end of the short survey prior to the experiment.

3.2 WTP experiment

We then implemented a willingness-to-pay experiment to assess how much farmers in our sample were willing to pay to access information about aflatoxin contamination of groundnuts in their possession, and measure how this willingness to pay varied across their intended use of these – own consumption, donation or market sales. We use a Becker-Degroot-Marschak (BDM) auction mechanism (Becker et al., 1964) that we adapt to our context and analytical needs.[4] In particular, we designed our experiment to assess how farmers' WTP is affected by the intended use of their groundnuts, through exogenous changes in their consumption, donation, and sales: g^c, g^d, g^m.

Consumption, donation and sales allocations: g^c, g^d, g^m — We presented farmers with four 125 grams bags of groundnut powder, totaling 500 grams. We explained that these four bags could be used for three different purposes: personal

[4] In generic terms, BDM auctions are implemented as follows: a player is are asked to submit a bid for the purchase of a good, which is then compared to a randomly generated number. If the bid is higher than the random number, the player keeps the good and only pays the value of the random number. If the bid is lower the player cannot purchase the good. This approach is deemed incentive-compatible as it introduces real economic consequences to stated preferences, thereby enhancing the reliability of responses (Lusk and Shogren, 2007).

consumption, donation to local Talibes,[5] or sale at the local market price ($p =$ CFA 125 per bag) with a potential quality premium if the groundnut powder is safe for consumption ($k =$ CFA 75 per bag). Importantly, in a given round, farmers themselves were not able to decide on the allocation of bags across the three different purposes. Instead, they were informed about the allocations to consumption (g^c), donation (g^d), and market sales (g^m) using an allocation card which was randomly drawn without replacement among 15 possible allocations – each card representing one allocation of four groundnut bags between consumption, donation and sale.[6]

Farmers' investment behavior: $v*, I, p, k$ — Once given a card, farmers were asked to state their willingness to pay to learn whether the aflatoxin content of the four groundnut bags was high or low. Farmers were able to choose any amount between a minimum of CFA 0 and a maximum of CFA 1000. They were informed that one round would be selected randomly with a corresponding price V drawn. If their proposed offer was greater than the randomly drawn price (V), the farmer paid the price and was informed whether the groundnut powder was safe for consumption.[7] As a result, farmers found themselves in either one of the following four cases:

1. The farmer has chosen not to pay for the food safety information ($v* = 0$) and is guaranteed to receive the allocated bags without knowing the aflatoxin content. She keeps any bags allocated for personal consumption, donates any bags intended for donation via the research team, and receives payment for selling any bags intended for sale to research team at the market price of CFA 125 per 125 gram bag. To avoid any logistical complications, the research team managed donation to local schools and paid farmers for market sales directly.

2. The farmer is willing to pay a price greater than zero, but the proposed amount is lower than the randomly drawn price ($v* < V$): the farmer is not willing to pay a price as high as the one randomly chosen, and the same outcomes as the first case apply.

3. The farmer is willing to pay a price greater than zero, and the proposed amount is equal to or higher than the randomly drawn price ($v* \geq V$): she pays price V

[5] In Senegal, Talibes are young boys studying at a Koranic school who typically beg for food and money.

[6] See card in Figure 1 in the appendix.

[7] In practice, only groundnuts fit for consumption were offered, though the farmers were unaware of this.

and obtains information on the food safety of the groundnut powder that was given to him. If the information reveals that the aflatoxin content is low, she keeps any bags for personal consumption, donates to Talibes via the research team, and sells any bags intended for sale to the research team at a market premium of $p + k = 200$ CFA per 125 gram bag (instead of $p = 125$ CFA if she had not obtained the information). However, if information reveals that the aflatoxin content is high, i.e. that the groundnuts are unsafe for consumption, the research team keeps all bags to destroy them.

4. The farmer is willing to pay $v* = 1000$ CFA, the maximum price, to guarantee she will receive food safety information. The same outcomes as the third case apply.

Prior to the real experiment, enumerators conducted two initial rounds using biscuits instead of groundnuts to familiarize participants with the game's mechanics. The actual WTP experiment was then repeated 12 times, with random changes (without replacement) in the allocation parameters g^c, g^d, g^m across each round. Participants were informed that only 1 out of their 12 decisions would be randomly chosen for effective monetary and in-kind payoffs at the end of the game, as summarized in Figure 2. Appendix B.1 provides the full script of the experiment.

3.3 Estimation strategy

Using data from the experiment we investigate farmers' WTP for information regarding the safety of the groundnut powder and, in line with our conceptual framework, whether their WTP responded to exogenous changes in the allocation of the groundnut powder. In this section we focus on the first six rounds of the game with six observations per farmer who participated in the experiment (analysis for the following six rounds, after the information experiment, is presented in Section 4). For each round j, our main outcome variable is farmer i's WTP to obtain information regarding the safety of the groundnut powder she was provided: v^*_{ij}. The key independent variables of interest are the shares of bags exogenously allocated to the farmer's own consumption ($\bar{g}^c = \{0, 1/4, 1/2, 3/4, 1\}$), to donation ($\bar{g}^d = \{0, 1/4, 1/2, 3/4, 1\}$), or to market sales ($\bar{g}^m = \{0, 1/4, 1/2, 3/4, 1\}$), with ($\bar{g}^c + \bar{g}^d + \bar{g}^m = 1$). The upper bar (–) indicates that the value of these variables are controlled by the experimenter, and not reflect farmers characteristics or choices.

Importantly, as we chose to limit the number of parameter variations that farmers had to deal with during the experiment, we kept constant the expected share of unsafe groundnut ($\bar{\pi} = 1/3$), the benchmark market price for each bag ($\bar{p} = 125$), and the price premium if the groundnut was revealed to be safe ($\bar{k} = 75$). Each of these parameters are fixed at realistic levels given the local context. As a result of fixing these parameters, we are unable to empirically identify several of our framework parameters of interest summarized in Equation 3. First, without variations in $\bar{\pi}$, $\bar{k}$ and $\bar{p}$, the market sales-related term of Equation 3 is empirically reduced to differences across farmers in their marginal utility derived from these sales δ. Similarly, with the value of $\bar{\pi}$ fixed across farmers, we are unable to estimate the effect of its variation on farmers' WTP when bags are to be consumed or donated for instance. Accordingly, the empirical translation of Equation 3 in our conceptual framework is limited to the following simplified version:

$$v^* = \alpha A\bar{g}^c + \beta\gamma A\bar{g}^d + \delta\bar{g}^m \tag{4}$$

The values of the parameter estimates are then to be interpreted conditional on the parameter values $\bar{\pi} = 1/3$, $\bar{p} = 125$ and $\bar{k} = 75$. Our main interest is to assess whether farmers are willing to pay real money for food safety information when there are no private returns as driven by the composite $\beta\gamma A$ parameter. To this end, we rely on a gradual approach starting with the benchmark model describe in Equation 5:

$$v^*_{ij} = c + \beta\bar{g}^d_{ij} + \mu_j + \tau i + \varepsilon ij \tag{5}$$

where μ_j is a set of round-order fixed effects accounting for farmers' eventual learning or fatigue as they play more rounds. We further account for individual round-invariant characteristics through a set of individual-level fixed effects τ_i which notably account for differences in awareness (A) and pro-sociality (γ) across individuals as reported in Table 1.[8] In turn, the constant parameter c captures the effect of allocating groundnut powder to the other two possible usages ($\bar{g}^c$ and $\bar{g}^m$), and thus corresponds to the combination of the reference parameters α and γ.

In Equation 6 we further decompose the effect of the groundnut usage allocation across the three possible alternatives, through the introduction of the share allocated to farmers' own consumption $\bar{g}^c_{ij}$, such that the constant term only includes the effect

[8] We further account for the non-independence of observations across rounds for a given farmer through a composite error term $\varepsilon ij = \vartheta_i + \xi_{ij}$ where ϑ_i is an individual-level clustered component. All our results rely on cluster-robust standard errors estimates.

of the remaining alternative: $\bar{g}^m_{ij}$. Accordingly, parameters α and β are now more closely aligned with that of Equation 4, measuring the effect of respectively allocating groundnut powder to consumption (α) or donation (β) as compared to allocating it to market sales ($c = \gamma$).

$$v^*_{ij} = c + \alpha\bar{g}^c_{ij} + \beta\bar{g}^d_{ij} + \mu_j + \tau_i + \varepsilon_{ij} \tag{6}$$

Last, we leverage data from our baseline survey to assess how awareness of aflatoxins and pro-social preference contribute to farmers' marginal utility of donation, as per our conceptual framework's $\beta\gamma A$. We measure awareness of aflatoxins (A) through farmers' answers to two separate questions asking whether they had ever heard of aflatoxins before (22%) and whether they listed health issues as possible consequences (11%). We also use two separate measures of pro-sociality. First, we use the pro-sociality index based on farmers' responses to questions related to their feeling of happiness after giving advice or helping fellow villagers as described in section 1.2. Second, we use the collected values of farmers' WTP for the safety of their groundnuts in the rounds where the groundnut powder was exclusively allocated to donation ($\bar{g}^d = 4$).[9] The corresponding model is specified in Equation 7, where we separately estimate the marginal contribution of awareness (β^1) and pro-sociality (β^2) on farmers' WTP for information when the number of bags allocated to donation is increased:

$$\begin{aligned} v^*_{ij} = c &+ \alpha^0\bar{g}^c_{ij} + \alpha^1(A_i \times \bar{g}^c_{ij}) + \alpha^2(\gamma_i \times \bar{g}^c_{ij}) \\ &+ \beta^0\bar{g}^d_{ij} + \beta^1(A_i \times \bar{g}^d_{ij}) + \beta^2(\gamma_i \times \bar{g}^d_{ij}) + \mu_j + \tau_i + \varepsilon_{ij} \end{aligned} \tag{7}$$

We estimate Equations 5, 6 and 7 with a standard OLS estimator for ease of results' interpretation and possible comparison with other related studies. In Section 5 we discuss the robustness of this approach as compared to a Poisson Pseudo Maximum Likelihood estimator.

3.4 Results: WTP for others' health

We show parameter estimates from Equations (5) and (6) in Table 2. Columns (1) and (3) examine the impact of a decrease in private returns, represented by an increase in the donation component of the allocation (Equation 5, while columns (2) and (4)

[9] This last measure is only available for about half of the farmers in our sample: those for whom this specific allocation (randomly) fell within the first six rounds of the game.

further account for the composition of the private returns, controlling for the amount allocated to consumption.

Our results support the idea that farmers value their private returns more than that of others. In columns (3) for instance, we find that farmers are willing to pay CFA 22 less for allocations that include at least one bag donated, as compared to allocations where no bag is to be donated. Results from columns (2) and (4) help refine these interpretations. We find no clear effect of the share of bags to be donated when the comparison group is the share to be sold on markets (Column 2), suggestive of a stronger preference for one's own health than for the market premium one may obtain from selling safe groundnuts ($k = 75$). Our results are however unchanged between Columns (3) and (4) where the independent variables are binary indication of "at least one bag" being used for a given purpose. Overall, and in line with our conceptual framework, we interpret these results as indicative of $\beta\gamma A < \alpha A$ and $\beta\gamma A \leq \delta((1-\pi)k - \pi p)$ when $\bar{\pi} = 1/3$, $\bar{p} = 125$ and $\bar{k} = 75$.

Table 2: WTP to access food-safety information

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-21.723**	-13.260	-21.504***	-21.281***
	(10.728)	(12.140)	(7.107)	(7.325)
Consumption		16.422		0.986
		(12.233)		(6.847)
Mean WTP	523	523	523	523
D.=C.		0.02		0.01
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. In the second part of the table, the first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of $D = C$. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We next decompose our estimates of the conceptual framework parameter in Table 3, where we allow the effect of bags allocated to donation to vary across farmers with lower or higher baseline knowledge of aflatoxins (which indicate by A^- and A^+, respectively), and across farmers with lower/higher levels of pro-sociality (γ^- and γ^+), as per Equation (7). Considering aflatoxins awareness, we distinguish between farmers who are genuinely knowledgeable about the harmful effects of aflatoxins and those who are less aware by incorporating their survey responses regarding their awareness of aflatoxins and specific awareness of its health effects. For pro-sociality, we construct an index based on three elicitation questions, as described in Section 1.2. Following Anderson (2008), this index is computed as a weighted measure of multiple standardized variables relative to the full sample.

Results from Columns (1) and (2) of Table 3 indicate that farmers who are aware of or who understand the effects of aflatoxins (A^+) exhibit a significantly higher WTP when there is an increase in the share of bags for donation: $\beta A^+ > \beta A^-$. This increase in WTP is large and surpasses the decrease observed when the share of bags for donation increases. These results suggest that awareness of aflatoxins' effects mitigates the disparity between own consumption and others' consumption. In other words, farmers who are more knowledgeable about aflatoxins' health impacts seem to value private returns and returns to others relatively more equally. Interestingly, they do not have a significantly higher WTP when there is an increase in consumption ($\alpha A^+ = \alpha A^-$).

These awareness-related results contrast with our results related to pro-sociality, at least as per our elicited measure of pro-sociality. We find no evidence of any significant differences across farmers with lower/higher baseline pro-sociality: $\beta\gamma^+ = \beta\gamma^-$ and $\alpha\gamma^+ = \alpha\gamma^-$.

It is plausible that our elicitation questions may not effectively capture pro-sociality or, more importantly, altruism, which should manifest in the experiment through donation behavior. To isolate altruism rather than broader pro-sociality, we then focus on the rounds dedicated solely to pure donation. This is somewhat akin to a standard dictator game, in which one participant (the "dictator") decides how to divide a sum of money between themselves and another participant (the "recipient"), who has no influence on the decision. This game is commonly used to study altruism, as it highlights the tension between selfishness and generosity in decision-making. In our case, when farmers face a situation where all bags are donated to others, the farmer decides whether and how much money to allocate to ensure food safety for others. None of the actions benefit the farmer directly. To rank farmers based on their level of altruism, we calculate the average amount paid during this round and create a binary variable. This variable equals 1 if the farmer's WTP (willingness to pay) during this round exceeds the average, and 0 otherwise. Table A2 in Appendix reports estimates analogous to 3, this time using this dictator game measure albeit limited to the subset of farmers for which it is available in the first six rounds. We find significant positive evidence that farmers with greater willingness to pay (WTP) in the full donation round exhibit higher WTP for food safety when the donation is increased in other rounds. This increase offsets the initial decrease induced by the donation component.

Table 3: WTP to access food-safety information: Awareness and pro-sociality

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-26.280*	-24.246*	-23.588***	-22.676***
	(13.877)	(13.090)	(8.567)	(7.841)
Consumption	6.459	15.687	-0.149	3.925
	(13.597)	(12.905)	(7.568)	(7.118)
Donation × Heard of aflatoxins	60.365**		10.617	
	(26.960)		(15.946)	
Consumption × Heard of aflatoxins	47.196		4.258	
	(31.134)		(17.371)	
Donation × Knows of aflatoxins		108.484***		10.629
		(30.360)		(21.454)
Consumption × Knows of aflatoxins		17.694		-32.057
		(39.928)		(25.759)
Donation × Index Pro-sociality	3.327	5.009	2.782	3.106
	(11.873)	(11.926)	(8.237)	(8.173)
Consumption × Index Pro-sociality	5.151	7.510	7.518	7.797
	(12.619)	(12.539)	(6.848)	(6.793)
Mean WTP	523	523	523	523
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A + D × γ=0	0.15	0.00	0.49	0.68
C+ C × A + C × γ=0	0.05	0.29	0.48	0.42
D+ D × A + D × γ =C+ C × A + C × γ	0.49	0.28	0.29	0.69
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *Index pro-sociality* is a standardized weighted index of 3 variables on the elicitation of pro-sociality, following a GLS weighting procedure as described in Anderson (2008). Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, and the eighth row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Overall, results presented so far provide broad support for our conceptual framework's main predictions: farmers are more willing to invest in food safety when they can extract private returns from these investments, and particularly when there are private health returns. This is not necessarily indicative of lack of care for others' health as, at the extensive margin, most would nevertheless invest some amount to test for the safety of their groundnuts, even when the full four bags are to be donated. Further, farmers' awareness of aflatoxins (and particularly for those who have not just heard of it but also know the health consequences of it) is a strong mediator of these effects: among farmers with a higher baseline awareness level, one no longer finds evidence of lower WTP for food safety information when the share to be donated is increased.

In Section 5 below, we consider several robustness issues. First, the extent to which farmers truly believed the goods provided were harmful may have influenced their behavior. The fact that most farmers were willing to pay a non-zero amount, even absent any private returns, indicates this belief may not have been widespread. Second, while our analysis controls for other factors, we acknowledge the possibility that attitudinal traits such as risk aversion could play a role. Third, we address concerns regarding the choice of estimation method, comparing the current OLS approach to other estimators.

Last, we acknowledge that our estimates of the effects of farmers' awareness may be confounded by other unobserved factors that are correlated but meaningfully different from awareness itself. We address this issue in the following section where we investigate farmers WTP in the following six rounds, after additional information on aflatoxin-related health hazard was provided to a random subset of participants.

4 Impact of increased awareness on WTP for food safety information

This section presents results obtained from the following six rounds of our experiment, where we exposed a randomly chosen subset of farmers to an awareness treatment intervention designed to significantly increase their awareness of the health hazards associated with the consumption of aflatoxin-contaminated products. By studying the effects of this treatment, we further aim to inform of the effects of large-scale information campaigns in real-life settings.

4.1 Experimental design

We introduced the awareness treatment midway through the experiment, after farmers had completed their 6th round in the WTP experiment. At this time, farmers were informed that they would be given a short break during which they would watch an 8-minute video. Half of the farmers (Control group) were randomly selected to watch a comedy video unrelated to aflatoxins. The other half (Treatment group) were shown an informative video on aflatoxins, presented in Wolof by a leading Senegalese scientist working on aflatoxins in Senegal. The aflatoxins video provided comprehensive information on the health effects, the causes and the reasons for the high prevalence of aflatoxins found in Senegalese groundnut production.[10] After the video break, farmers were invited to resume the WTP experiment for another 6 rounds, following the exact same procedure as the first six rounds. From the standpoint of our conceptual framework, the effect of the video treatment can only affect farmers' awareness level (A), and is limited to the random subset that were selected to watch the informative video.

The randomly assigned video treatment led to two groups of similar size (214 farmers in the Control group, 225 in the Treatment one) and average characteristics. As reported in Table 1 above, group-level means are statistically indistinguishable from one another for most of the variables collected at baseline. By chance, we find that farmers in the treatment group were 8 percentage point more likely to have experienced a positive groundnut harvest in 2021. Descriptive statistics on farmers' willingness to pay (WTP) are presented in Table A1 in the appendix showing that there are no significant differences in WTP between the treatment and control groups during the first six rounds (before the videos were shown).

4.2 Impact of increased awareness on farmers' overall WTP for food-safety information

Figures 3 and 4 in the Appendix provide a first set of evidence regarding the impact of the Treatment video. Figure 3 displays the evolution of round-level average WTP in Treatment (red) and Control (blue) groups, throughout the 12 rounds of the experiment. We find no differences in the first 6 rounds, where the average WTP in both groups hovers between CFA 500 and CFA 550. In the Control group, round-level

[10] The complete script is presented in Appendix C.

average WTP remains stable in rounds 7 to 12 compared to the first six rounds. In contrast, the Treatment group average WTP increases by about CFA 50 in round 7, and remains stable at about CFA 600 until round 12 when the experiment was over.

Beyond the evolution of the average WTP, Figure 4 presents the changes in distribution of WTP before and after the video break, and separately for Treatment and Control groups. We find no clear evidence of differences in the distribution of WTP across Treatment and Control groups before farmers were given the 8mn video break. Remarkably, nearly all (98%) farmers in both the control and treatment groups chose to pay a positive amount in all rounds of the game, and approximately 15% of farmers consistently offered the maximum amount (Table A1). Comparing the upper (pre-video) and lower (post-video) panels of Figure 4 reveals a discernible shift in the distribution of WTP after the video, although limited to the Treatment group. There, one finds more individuals willing to pay the maximum amount (red-shaded cells), smaller number of individuals willing to pay the minimum amounts (blue- to purple-shaded cells), and no clear differences appear for the intermediate segments (yellow- to beige-shaded cells).

Insights from Figures 3 and 4 are further supported by estimates of the video's impact on farmers' WTP, through a Difference-in-Difference approach described by:

$$v^*_{ij} = \delta^0 + \delta^1(\bar{A}_i \times L_{ij}) + \mu_j + \tau_i + \epsilon_{ij} \quad (8)$$

where $\bar{A}_i$ equals 1 if individual i was exposed to the informative video (Treatment group) and zero otherwise, and L_{ij} equals 1 if the observation pertains to a round j that was played after the video break (i.e. after round 6) and zero otherwise. We estimate the overall treatment effects on willingness to pay (WTP), through three separate measures of the outcome variable : WTP in levels, a binary variable equal to one if the participant was willing to pay for certainty ($v* = 1000$), and a binary variable indicating whether one's WTP is higher or lower than the median WTP.

We present the results of this analysis in Table 4. These results confirm the graphical evidence: the video increases WTP among treated farmers. Treated farmers are willing to pay about 8% more on average after seeing the video (column 1). Treated farmers are more willing to pay for certainty about food safety (column 2) and more willing to pay above the median control-group farmer in the pre-period (column 3).

Our results align with the literature showing the positive impact of food safety and/or food quality information campaigns on consumers' WTP in low-income countries. Using BDM mechanisms and hedonic testing in rural Nigeria, Oparinde et al. (2016) show that information provision increased consumers' WTP for bio-fortified cassava. With a similar approach, Banerji et al. (2016) find that providing consumers with information on the benefits of high-iron pearl millet in rural India led to an increase in their WTP. Meenakshi et al. (2012) combine stated and revealed preference methods with an initial endowment and show that an information campaign on the nutritional value of bio-fortified maize significantly increases farmers' WTP. Closer to our setting, Magnan et al. (2021) find that providing information on aflatoxins and its prevention in Ghana significantly increased food safety practices in a sample of groundnut farmers.

Table 4: Impact of increased awareness on farmers WTP to access food-safety information: DID

	OLS	LPM	
	(1) WTP	(2) WTP=1 000 FCFA	(3) Above median WTP
Post video	15.225	0.009	0.008
	(15.319)	(0.021)	(0.031)
Treatment × Post	44.183***	0.063***	0.077***
	(16.198)	(0.023)	(0.028)
Mean WTP outcome	526.53	0.22	0.31
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.
Observations	5268	5268	5268

Note: Column (1) presents results obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. Column (2) and (3) present the result of a linear probability model on the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In the second part of the table, the first row presents the mean of the outcome of the column. The second row presents the level of fixed effects (Individual and round). The third row presents the level of the clustered standard errors, and the last row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.3 Increased awareness and farmers' WTP: Mechanisms

In this subsection we leverage our conceptual framework to delve one step deeper in the underlying mechanisms driving these results. We build on our analytical framework and on the results presented in Section 3 to investigate how an increased awareness of aflatoxins issues ($\bar{A}$) affects farmers' WTP when their groundnuts are dedicated to home consumption (g^c), donation (g^d), or market sales (g^m). We further investigate how farmers' pro-sociality and prior awareness affect their choices in these different situations.

We first assess the effect of the randomized increase in farmers' awareness through the approach described in Equation 6, except that we now introduce exogenous variation in farmers' awareness through exposure to the informative video: $A = \bar{A}$. In Equation 9 below, parameter estimates $\hat{\alpha}^1$ and $\hat{\beta}^1$ indicate how this awareness treatment differentially affected farmers' WTP depending on the extent to which farmers' groundnuts were to be used for consumption or donation.

$$v_{ij}^* = c + \beta^0 \bar{g}_{ij}^d + \beta^1 (\bar{A}_i \times \bar{g}_{ij}^d) + \mu_j + \tau_i + \varepsilon_{ij} \tag{9}$$

$$v_{ij}^* = c + \alpha^0 \bar{g}_{ij}^c + \alpha^1 (\bar{A}_i \times \bar{g}_{ij}^c) + \beta^0 \bar{g}_{ij}^d + \beta^1 (\bar{A}_i \times \bar{g}_{ij}^d) + \mu_j + \tau_i + \varepsilon_{ij} \tag{10}$$

Finally, we explore in Equation 11 how the effect of the awareness treatment was in part mediated by farmers' baseline awareness level (A_i) as well as their level pro-sociality (γ):

$$\begin{aligned} v_{ij}^* = c &+ \alpha^0 \bar{g}_{ij}^c + \alpha^1 (\bar{A}_i \times \bar{g}_{ij}^c) + \alpha^2 (\bar{g}_{ij}^c \times \gamma_i) + \alpha^3 (\bar{A}_i \times \bar{g}_{ij}^c \times A_i) + \alpha^4 (\bar{A}_i \times \bar{g}_{ij}^c \times \gamma_i) \\ &+ \beta^0 \bar{g}_{ij}^d + \beta^1 (\bar{A}_i \times \bar{g}_{ij}^d) + \beta^2 (\bar{g}_{ij}^d \times \gamma_i) + \beta^3 (\bar{A}_i \times \bar{g}_{ij}^d \times A_i) + \beta^4 (\bar{A}_i \times \bar{g}_{ij}^d \times \gamma_i) \\ &+ \mu_j + \tau_i + \varepsilon_{ij} \end{aligned} \tag{11}$$

For ease of interpretation of parameter estimates associated with interacted variables we limit ourselves to observation collected in rounds 7 to 12 for this specification.[11]

Results from the estimation of Equations 9 and 10 are presented in Table 5 below, where we leverage all 12 rounds of data to estimate our parameter of interest through a DID estimator.[12] The results suggest that the average effect of information fully compensates the negative coefficient associated with the share of bags for donation. We do not however find evidence of heterogeneous treatment effects in response to the share of bags to be donated: the treatment seems to have strongly and positively

[11] Relying on the DID framework used in Section 4.2 to estimate predictions from our analytical framework on all 12 rounds of data would lead to uninterpretable estimates associated with quadruple interactions of variables.

[12] Qualitatively similar results are found when restricting the sample to the last six rounds only to estimate parameters values of Equations 9 and 10 – see Table 5 in the appendix.

Table 5: Impact of increased awareness on farmers WTP to access food-safety information

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Post video	21.802	23.166	17.632	31.053
	(16.367)	(19.374)	(16.686)	(19.607)
Treatment × Post	46.081***	38.785*	45.149**	30.786
	(17.626)	(21.258)	(17.476)	(20.699)
Donation	-20.687*	-11.903	-19.740***	-20.222***
	(11.045)	(12.292)	(7.628)	(7.760)
Donation × Post	-19.335	-20.921	-3.360	-6.202
	(18.618)	(21.530)	(11.716)	(11.683)
Donation × Treatment × Post	-4.393	2.898	-0.752	2.314
	(20.607)	(24.301)	(13.302)	(13.476)
Consumption		17.459		-2.653
		(12.648)		(6.920)
Consumption × Post		-2.736		-16.835
		(22.798)		(13.025)
Consumption × Treatment × Post		14.589		18.137
		(26.858)		(14.786)
Mean WTP Control group	527	527	527	527
D+ P + T × P+ D × T × P=0	0.13	0.09	0.07	0.07
C + P + T × P+ C × T × P=0		0.00		0.00
C+ P + T × P+ C × T × P = D + P + T × P+ D × T × P		0.15		0.10
FE	Id. & Rd.	Id. & Rd.	Id. & Rd	Id. & Rd.
Clustered SE	Id.	Id.	Id.	Id.
Observations	5268	5268	5268	5268

Note: All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. In the second part of the table, the first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second, third and fourth rows present the p-values for F-tests of joint significance. The fifth row presents the level of fixed effects (Individual and round). The sixth row presents the level of the clustered standard errors, and the last row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

affected treated farmers' WTP in all scenarios, regardless of the groundnut allocation in a given round.

Finally, we present in Table 6 the parameter estimates of Equation 11, where we restrict the sample to the last six rounds only to avoid quadruple interactions and facilitate interpretation. We do not find evidence of significant differences in treatment effects of the information campaign on one's WTP to pay for food safety when groundnuts are to be donated, across those with lower/higher initial knowledge or pro-social orientation. If anything, the point estimates associated to the triple interaction parameter associated to donation are negative, suggesting that the information campaign had a relatively smaller effect on the WTP of farmers who had higher knowledge of aflatoxins and/or higher pro-social orientation at baseline. These parameter estimates are however very imprecisely estimated and statistically not distinguishable from zero within standard margins of errors.[13]

Overall, results from the randomized exposure to the informative video align with the evidence obtained from the first six rounds when considering baseline awareness, highlighting the important effect of information on farmers' WTP for food safety information, and particularly so when it concerns the health of others. This effect may be more pronounced for farmers with low initial level of awareness. We do not find evidence that pro-sociality is an important mediator of these effects. Alternatively, the lack of significant heterogeneity regarding pro-sociality may reflect an empirical issue, if the indicators used only weakly (or very noisily) relate to the true underlying altruistic attitudes of the farmers for instance. However, we find similar results when we use a survey-based index or a behavior actually observed in one specific round of the game (the full donation round), such that insignificant results may indeed reflect an absence of pro-social motivation mechanism. A third possible explanation is the general limited variation in pro-sociality levels across the farmers in our sample. In particular, if farmers have high pro-social attitudes to start with, an information campaign may be particularly effective at changing farmers' behavior. The fact that nearly all farmers do exert positive WTP for food safety information in the full donation (dictator game) round, along with the large and continued effect of an 8 minute video on farmers' WTP for others' health together suggest that farmers do care about others' health when they are made aware that their behavior can affect it. The effect seems somewhat different for home consumption: even with limited levels of information, farmers' WTP for food safety information increases more with consumption than for other needs, which is more aligned with a risk aversion issue in the face of a very imprecisely-defined health hazard.

[13] We find similar results upon relying on our alternative dictator game measure of pro-sociality – see Appendix Table A3.

Table 6: Impact of increased awareness on farmers WTP to access food-safety information: Awareness and pro-sociality (observations restricted to the last 6 rounds)

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-36.021***	-33.469***	-32.551***	-26.667***
	(13.301)	(12.327)	(7.288)	(6.662)
Consumption	21.877	20.776	-5.617	-6.212
	(14.243)	(13.785)	(7.977)	(7.648)
Donation × Heard of aflatoxins	24.315		34.799*	
	(40.334)		(19.266)	
Consumption × Heard of aflatoxins	21.502		-15.427	
	(47.199)		(28.219)	
Don. × Heard of aflatoxins × Treat.	-23.775		-11.580	
	(47.594)		(23.733)	
Cons. × Heard of aflatoxins × Treat.	-60.420		12.609	
	(57.799)		(32.856)	
Donation × Knows of aflatoxins		39.960		11.219
		(53.368)		(26.909)
Consumption × Knows of aflatoxins		23.064		-22.000
		(35.570)		(25.629)
Don. × Knows of aflatoxins × Treat.		-76.335		-7.861
		(72.915)		(37.416)
Cons. × Knows of aflatoxins × Treat.		-68.818		24.480
		(75.880)		(42.403)
Donation × Index Pro-sociality	23.853	24.376	9.592	12.729
	(17.057)	(17.042)	(7.929)	(8.101)
Consumption × Index Pro-sociality	10.415	11.748	7.693	7.216
	(13.632)	(14.582)	(9.590)	(9.674)
Don. × Index Pro-sociality × Treat.	-16.793	-17.219	-8.905	-12.142
	(22.675)	(22.795)	(11.399)	(11.606)
Cons. × Index Pro-sociality × Treat.	-22.057	-23.161	-20.170*	-19.807
	(20.200)	(20.914)	(12.124)	(12.271)
Mean WTP	564	564	564	564
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A + D × A × T + D × γ + D × γ × T=0	0.39	0.27	0.64	0.45
C+ C × A + C × A × T + C × γ + C × γ × T =0	0.51	0.62	0.34	0.66
D+ D × A + D × A × T + D × γ + D × γ × T= C+ C × A + C × A × T + C × γ + C × γ × T	0.99	0.65	0.60	0.87
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the last 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *Index pro-sociality* is a standardized weighted index of 3 variables on the elicitation of pro-sociality, following a GLS weighting procedure as described in Anderson (2008). In the second part of the table, the first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, and the eighth row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This implication resonates with the work of Jones-Lee (1991), who observe that individuals strike a balance between their own well-being and the well-being of others when making safety-related decisions, expressing altruism in the context of safety concerns. Overall, our research emphasizes the complementary relationship between information provision and altruistic behavior, underscoring the importance of well-informed individuals contributing to safety initiatives for the greater good. This highlights the critical role of awareness and education in influencing farmers' economic decisions and suggests that increasing awareness about aflatoxins could enhance the effectiveness of interventions in promoting safer agricultural practices.

5 Robustness

In this section we discuss several possible caveats limiting the interpretation of results presented in Sections 3 and 4 and, where relevant, discuss additional sets of results. We group these into the following three categories: those related to the design of the experiment, those related to the mechanisms identified, and those related to the econometric estimators used.

5.1 Experimental design

We discuss two possible sources of biases that may derive from the experiment itself.

First, one may question whether farmers truly believed that the research team would give them contaminated groundnuts or donate contaminated groundnuts to children. In fact, only groundnuts fit for consumption were offered in our experiment, although the farmers were unaware of this.[14] While we cannot measure farmers' beliefs in the experimental setting we placed them into, their willingness to pay real money does suggest that they generally believed there was some positive probability of contamination. Further, the fact that their WTP is affected by the different uses of the groundnuts they were allocated is incompatible with a belief that all groundnuts were free of contamination. Last, upon being exposed to the information campaign, farmers did increase their WTP, a result that is also incompatible with a belief that all groundnuts were suitable for consumption. Thus, it is unlikely that farmers in

[14] For evident ethical reasons, all groundnut powder bags were previously tested for their level of aflatoxin content and only those that satisfied the European norm of 2 ppb (the strictest in the world) were effectively kept for the experiment.

general did not believe that paying for information on the safety of the groundnut powder was not worth any money. If anything, if some farmers did not believe that some of the groundnuts would be unsuitable for consumption, their WTP should be lowered and our results should be interpreted as lower bounds of their true WTP.

Second, we acknowledge the potential for anchoring bias in our experimental setting. Anchoring refers to a cognitive bias where individuals rely too heavily on the first piece of information they encounter when making decisions (Brewer and Chapman, 2002; Li et al., 2021). In our context, participants may have been influenced by initial allocations or card presentations, potentially skewing their subsequent choices. We conduct two robustness tests to assess the extent to which anchoring effects may bias our results. First, we test for the stability of our main parameter estimates upon introducing the groundnut usage allocations that farmers were given in the previous round. Second, we test for the stability of our estimates upon controlling for the round order instead of the unordered round fixed effects we use in our preferred specifications. Results are presented in Tables A4 to A9 in the appendix, showing that our main results remain unchanged upon introducing these controls.

5.2 Mechanisms

We highlight pro-sociality as a key mechanism driving the observed increase in willingness to pay when groundnuts are allocated to others. Our experimental design provides a robust framework to examine this phenomenon. To explore the reliability of our findings, we also investigate whether non-altruistic preferences, such as stated risk aversion, impact willingness to pay for donation. To assess this, we create an index of risk aversion based on survey data, specifically using questions on risk perception in life and agriculture drawn from the Global Preferences Survey (Falk et al., 2018). We replicate Table 2 interacting the variables with a risk aversion index. Table A10 demonstrate that being risk averse does not appear to significantly influence willingness to pay when groundnuts are allocated for donation, nor when we additionally control for consumption share.

5.3 Estimators

Throughout our analysis we rely on Fixed Effects OLS estimators. We check for the robustness of these results using Poisson Pseudo Maximum Likelihood (PPML).

This approach enables non-linear specification and further handle zeros values of the dependent variables, which is suited given the distribution of our outcome. In particular, this estimator handles nonnegative outcomes and frequent zeros, which aligns with the nature of our outcome variable. This model allows us to control for fixed effects and is robust to assumptions about the underlying data distribution, making it a reliable choice even if our data follows a bimodal distribution (Hoang and Wooldridge, 2024). It also helps mitigate potential biases that could result from the combination of log-linearization and heteroscedasticity (Chen and Roth, 2024; Silva and Tenreyro, 2006).

We present the PPML-estimated results in Tables A15, A16, and A17 in the appendix, where we do not find any meaningful changes with respect to the results obtained from the OLS estimator.

6 Conclusion

Health risks associated with aflatoxins have long been documented in the scientific literature, yet the awareness of these risks remains inadequate among producers and consumers in low-income countries. Local authorities and governments have implemented limited and ineffective policies to address this issue.

In light of this context, the main objective of our research is to explore strategies that could incentivize producers to invest in higher safety standards for their products, particularly in local markets where regulatory and enforcement capacities may be lacking. We interpret producers willingness to pay to access food-safety information of their production as an expression of altruism driven by the desire to protect consumers without immediate monetary expectations from the local market. Our findings provide evidence that farmers are willing to pay a premium for groundnuts with low levels of aflatoxins when they are fully aware of its harmful effects. Providing comprehensive information about aflatoxins significantly increases farmers' willingness to pay for accessing food-safety information, regardless of whether they are intended for personal use or sale.

One potential limitation of our research design is that the decision to invest in information about food-safety applies jointly to all uses. In some contexts, farmers may be able to sort based on observable signals of food safety, meaning decisions are not fully joint. However, in contexts like the case of aflatoxins, sorting on observable signals is relatively infeasible. Our findings provide valuable insights into food safety and quality upgrading in the context of missing markets. Senegalese farmers may hesitate to invest in quality upgrading due to the lack of financial incentives in the local market. However, when considering aflatoxin contamination as not merely an economic concern but a public health problem, farmers may find additional motivation to take action. Informing farmers about the adverse effects of aflatoxins could serve as a catalyst for investment in quality upgrading, driven by farmers' concern for their own health and the well-being of consumers, some of whom may be their neighbors.

In light of these research findings, policymakers could capitalize on this knowledge to develop interventions that promote food-safety and encourage producers to adopt higher safety standards for the greater good of society. Ensuring access to comprehensive information can be a crucial step towards fostering a culture of safety-based altruism, where producers prioritize consumer welfare and actively contribute to safer food production practices.

References

ANACIM, A. n. d. l. c. e. d. l. m. (2021). Rapport annuel du groupe de travail pluridisciplinaire pour le suivi de la campagne agricole 2021. Report.

Anderson, M. L. (2008). Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects. Journal of the American Statistical Association, 103(484):1481–1495. Publisher: Taylor & Francis _eprint: https://doi.org/10.1198/016214508000000841.

Araña, J. E. and León, C. J. (2002). Willingness to pay for health risk reduction in the context of altruism. Health Economics, 11(7):623–635. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/hec.687.

Arias-Granada, Y., Bauchet, J., and Ricker-Gilbert, J. (2021). Measuring demand and network effects for a new technology to improve food safety among smallholder farmers in Sub-Saharan Africa.

Arslan, A. and Taylor, J. E. (2009). Farmers' Subjective Valuation of Subsistence Crops: The Case of Traditional Maize in Mexico. American Journal of Agricultural Economics, 91(4):956–972.

Bandyopadhyay, R., Atehnkeng, J., Ortega-Beltran, A., Akande, A., Falade, T. D. O., and Cotty, P. J. (2019). "Ground-Truthing" Efficacy of Biological Control for Aflatoxin Mitigation in Farmers' Fields in Nigeria: From Field Trials to Commercial Usage, a 10-Year Study. Frontiers in Microbiology, 10. Publisher: Frontiers.

Banerji, A., Birol, E., Karandikar, B., and Rampal, J. (2016). Information, branding, certification, and consumer willingness to pay for high-iron pearl millet: Evidence from experimental auctions in Maharashtra, India. Food Policy, 62:133–141.

Bauchet, J., Prieto, S., and Ricker-Gilbert, J. (2021). Improved Drying and Storage Practices that Reduce Aflatoxins in Stored Maize: Experimental Evidence from Smallholders in Senegal. American Journal of Agricultural Economics, 103(1):296–316.

Becker, G. M., Degroot, M. H., and Marschak, J. (1964). Measuring utility by a single-response sequential method. Behavioral Science, 9(3):226–232.

Behaghel, L., Gignoux, J., and Macours, K. (2020). Social Learning in Agriculture: Does Smallholder Heterogeneity Impede Technology Diffusion in Sub-Saharan Africa?

Bopp, C., Engler, A., Poortvliet, P. M., and Jara-Rojas, R. (2019). The role of farmers' intrinsic motivation in the effectiveness of policy incentives to promote sustainable agricultural practices. Journal of Environmental Management, 244:320–327.

Brewer, N. T. and Chapman, G. B. (2002). The fragile basic anchoring effect. Journal of Behavioral Decision Making, 15(1):65–77. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/bdm.403.

Bénabou, R. and Tirole, J. (2006). Incentives and Prosocial Behavior. The American Economic Review, 95(5):1652–1678.

Chen, J. and Roth, J. (2024). Logs with Zeros? Some Problems and Solutions. The Quarterly Journal of Economics, 139(2):891–936.

Chouinard, H. H., Paterson, T., Wandschneider, P. R., and Ohler, A. M. (2008). Will Farmers Trade Profits for Stewardship? Heterogeneous Motivations for Farm Practice Selection. Land Economics, 84(1):66–82. Publisher: University of Wisconsin Press Section: Articles.

Chowdhury, S., Meenakshi, J. V., Tomlins, K. I., and Owori, C. (2011). Are Consumers in Developing Countries Willing to Pay More for Micronutrient-Dense Biofortified Foods? Evidence from a Field Experiment in Uganda. American Journal of Agricultural Economics, 93(1):83–97.

Corrigan, J. R. and Rousu, M. C. (2006). The Effect of Initial Endowments in Experimental Auctions. American Journal of Agricultural Economics, 88(2):448–457.

Crudeli, L., Mancinelli, S., Mazzanti, M., and Pitoro, R. (2022). Beyond individualistic behaviour: Social norms and innovation adoption in rural Mozambique. World Development, 157:105928.

DAPSA, de la Prévision et des Statistiques Agricoles, D. d. l. (2021). Enquête Agricole Annuelle 2020-2021. Report.

DAPSA, de la Prévision et des Statistiques Agricoles, D. d. l. (2022). Enquête Agricole Annuelle 2021-2022. Report.

De Groote, H., Kimenju, S. C., and Morawetz, U. B. (2011). Estimating consumer willingness to pay for food quality with experimental auctions: the case of yellow versus fortified maize meal in Kenya. Agricultural Economics, 42(1):1–16.

De Groote, H., Narrod, C., Kimenju, S. C., Bett, C., Scott, R. P. B., Tiongco, M. M., and Gitonga, Z. M. (2016). Measuring rural consumers' willingness to pay for quality labels using experimental auctions: the case of aflatoxin-free maize in Kenya. Agricultural Economics, 47(1):33–45.

Deutschmann, J., Bernard, T., and Yameogo, O. (2024). Flexible contracting and quality upgrading under market volatility: Experimental evidence in Senegal.

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., and Sunde, U. (2018). Global evidence on economic preferences. The Quarterly Journal of Economics, 133(4):1645–1692.

Gong, Y. Y., Watson, S., and Routledge, M. N. (2016). Aflatoxin Exposure and Associated Human Health Effects, a Review of Epidemiological Studies. Food Safety, 4(1):14–27.

Grace, D., Wu, F., and Havelaar, A. (2020). MILK Symposium review: Foodborne diseases from milk and milk products in developing countries—Review of causes and health and economic implications. Journal of Dairy Science, 103(11):9715–9729.

Gyrd-Hansen, D., Kjær, T., and Seested Nielsen, J. (2016). The value of mortality risk reductions. Pure altruism – a confounder? Journal of Health Economics, 49:184–192.

Hoang, T. and Wooldridge, J. M. (2024). Consistency of the fixed effects Poisson estimator with multiplicative measurement error and unbalanced panels. Economics Letters, 234:111436.

Hoffmann, V. and Gatobu, K. M. (2014). Growing their own: Unobservable quality and the value of self-provisioning. Journal of Development Economics, 106:168–178.

Hoffmann, V. and Jones, K. (2021). Improving food safety on the farm: Experimental evidence from Kenya on incentives and subsidies for technology adoption. World Development, 143:105406.

Hoffmann, V., Kariuki, S., Pieters, J., and Treurniet, M. (2023). Upside risk, consumption value, and market returns to food safety.

American Journal of Agricultural Economics, 105(3):914–939. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ajae.12349.

Hoffmann, V., Moser, C., and Saak, A. (2019). Food safety in low and middle-income countries: The evidence through an economic lens. World Development, 123:104611.

Jaffe, S. and Grace, D. (2020). Flattening the curve on foodborne illness and its costs in Africa | IFPRI : International Food Policy Research Institute.

Jones-Lee, M. W. (1991). Altruism and the value of other people's safety. Journal of Risk and Uncertainty, 4(2):213–219.

Kadjo, D., Ricker-Gilbert, J., Shively, G., and Abdoulaye, T. (2020). Food Safety and Adverse Selection in Rural Maize Markets. Journal of Agricultural Economics, 71(2):412–438.

Li, L., Maniadis, Z., and Sedikides, C. (2021). Anchoring in Economics: A Meta-Analysis of Studies on Willingness-To-Pay and Willingness-To-Accept. Journal of Behavioral and Experimental Economics, 90:101629.

Liu, Y. and Wu, F. (2010). Global Burden of Aflatoxin-Induced Hepatocellular Carcinoma: A Risk Assessment. Environmental Health Perspectives, 118(6):818–824.

Lusk, J. L. and Shogren, J. F. (2007). Experimental Auctions: Methods and Applications in Economic and Marketing Research. Cambridge University Press, 1 edition.

Magnan, N., Hoffmann, V., Opoku, N., Gajate Garrido, G., and Kanyam, D. A. (2021). Information, technology, and market rewards: Incentivizing aflatoxin control in Ghana. Journal of Development Economics, 151:102620.

Marrone, A. K., Tryndyak, V., Beland, F. A., and Pogribny, I. P. (2016). MicroRNA Responses to the Genotoxic Carcinogens Aflatoxin B $_1$ and Benzo[*a*]pyrene in Human HepaRG Cells. Toxicological Sciences, 149(2):496–502.

Meenakshi, J., Banerji, A., Manyong, V., Tomlins, K., Mittal, N., and Hamukwala, P. (2012). Using a discrete choice experiment to elicit the demand for a nutritious food: Willingness-to-pay for orange maize in rural Zambia. Journal of Health Economics, 31(1):62–71.

Meneely, J. P., Kolawole, O., Haughey, S. A., Miller, S. J., Krska, R., and Elliott, C. T. (2022). The Challenge of Global Aflatoxins Legislation with a Focus on Peanuts and Peanut Products: A Systematic Review. Exposure and Health.

Oparinde, A., Banerji, A., Birol, E., and Ilona, P. (2016). Information and consumer willingness to pay for biofortified yellow cassava: evidence from experimental auctions in Nigeria. Agricultural Economics, 47(2):215–233.

PACA, P. f. a. c. i. A. (2017). Strenghtening aflatoxin control in Senegal : Policy recommendations. Technical report.

Senghor, L. A., Ortega-Beltran, A., Atehnkeng, J., Callicott, K. A., Cotty, P. J., and Bandyopadhyay, R. (2020). The Atoxigenic Biocontrol Product Aflasafe SN01 Is a Valuable Tool to Mitigate Aflatoxin Contamination of Both Maize and Groundnut Cultivated in Senegal. Plant Disease, 104(2):510–520. Publisher: Scientific Societies.

Sheeder, R. J. and Lynne, G. D. (2011). Empathy-Conditioned Conservation: "Walking in the Shoes of Others" as a Conservation Farmer. Land Economics, 87(3):433–452. Publisher: University of Wisconsin Press Section: Articles.

Silva, J. M. C. S. and Tenreyro, S. (2006). The Log of Gravity. The Review of Economics and Statistics, 88(4):641–658. Publisher: The MIT Press.

Simonsen, N. F., Kjær, T., and Gyrd-Hansen, D. (2021). Pure altruism and misjudgement: A bad combination? Journal of Health Economics, 80:102550.

Watson, S., Diedhiou, P., Atehnkeng, J., Dem, A., Bandyopadhyay, R., Srey, C., Routledge, M., and Gong, Y. (2015). Seasonal and geographical differences in aflatoxin exposures in Senegal. World Mycotoxin Journal, 8(4):525–531.

World Health Organization (2015). WHO estimates of the global burden of foodborne diseases: foodborne disease burden epidemiology reference group 2007-2015. World Health Organization.

A Appendix

A.1 Figures

Figure 1: Blank card

	Répartition
<u>Consommation</u> 	
<u>Don</u> 	
<u>Vente</u> 	

Figure 2: Payoff tree

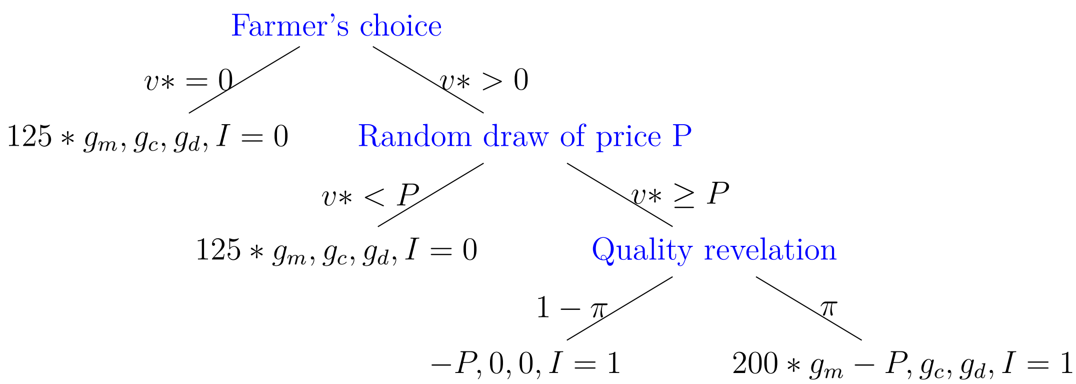


Figure 3: Average WTP for food-safety information, by round

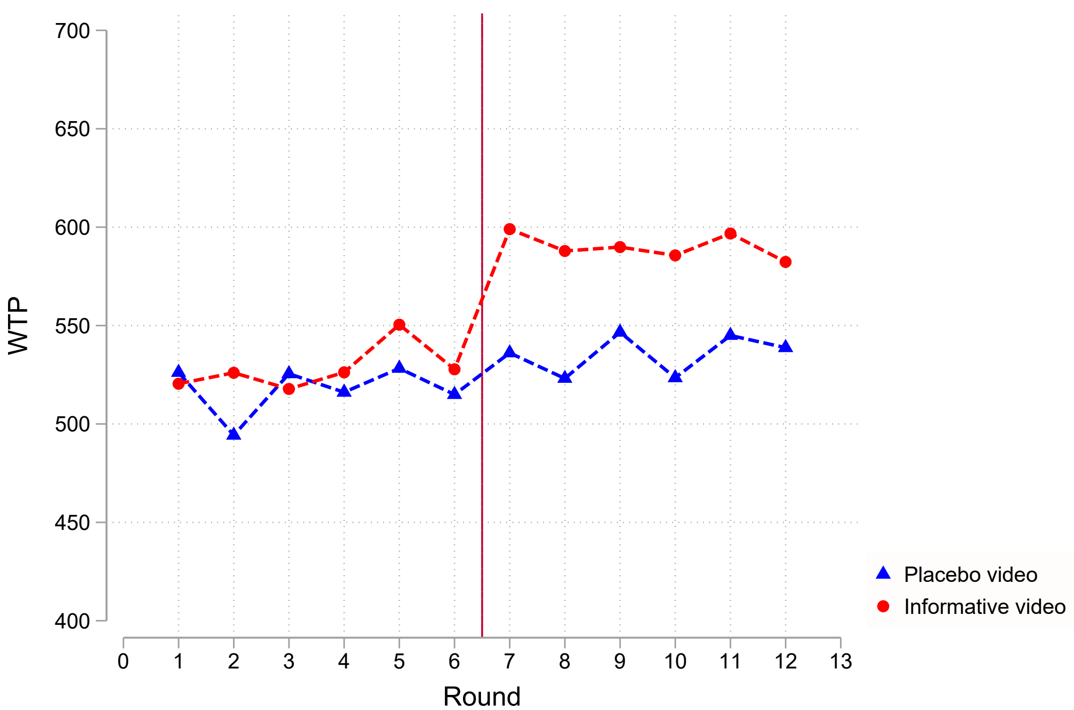
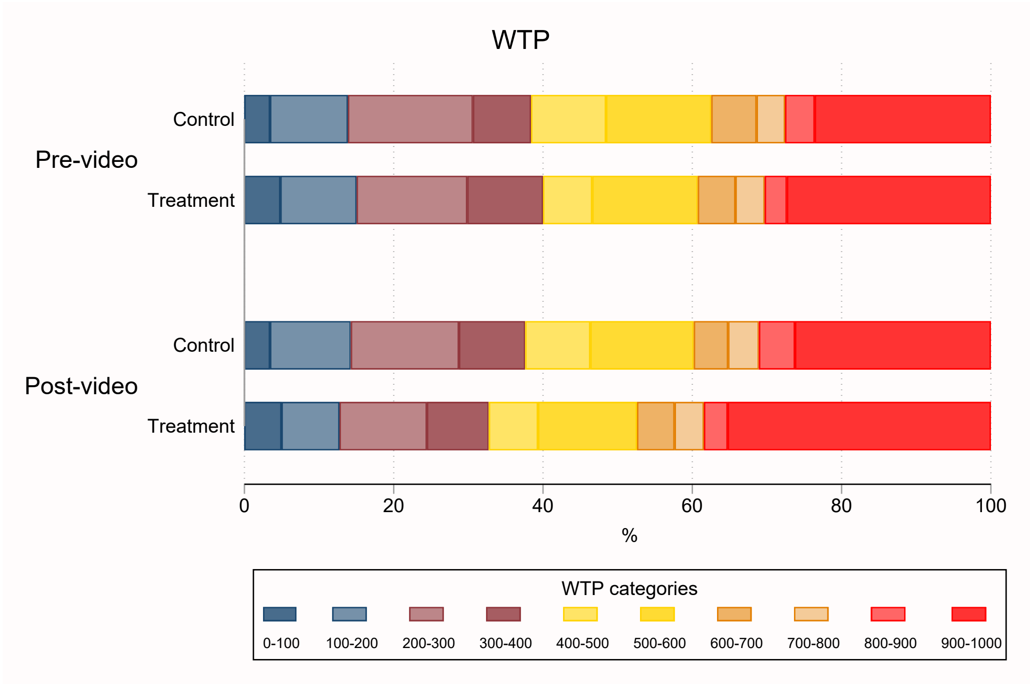


Figure 4: Distribution WTP for food-safety information, by treatment status



A.2 Tables

A.2.1 Descriptive statistics

Table A1: Descriptive statistics of farmers WTP for food-safety information

	Full sample	Control	Treatment	
	Mean	Mean	Mean	Diff
Always WTP > 0	0.98	0.98	0.98	0.00
Always WTP=1 000 FCFA	0.15	0.12	0.18	0.05***
WTP	543.27	526.53	559.19	32.65***
WTP before video	522.96	517.55	528.11	10.56
WTP after video	563.57	535.51	590.26	54.75***

A.2.2 Additional Tables

Table A2: Valuation of health and altruism relatively to financial gain and altruism for the first 6 rounds

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-84.774***	-74.756***	-40.233**	-36.061**
	(23.266)	(21.201)	(15.725)	(15.010)
Consumption	-14.364	3.540	15.225	20.198
	(28.331)	(26.267)	(14.964)	(14.276)
Donation × Heard of aflatoxins	58.282		3.940	
	(40.513)		(27.122)	
Consumption × Heard of aflatoxins	89.454		11.074	
	(57.568)		(28.587)	
Donation × Knows of aflatoxins		6.135		-42.987
		(40.758)		(34.054)
Consumption × Knows of aflatoxins		-32.787		-45.172
		(59.053)		(40.569)
Donation × WTP DC above average	156.208***	158.066***	56.749**	60.194**
	(35.473)	(37.471)	(24.116)	(24.139)
Consumption × WTP DC above average	-10.790	-2.546	-63.249***	-58.441***
	(42.707)	(44.988)	(21.757)	(21.068)
Mean WTP	523	523	523	523
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A + D × γ=0	0.00	0.00	0.45	0.57
C+ C × A + C × γ=0	0.31	0.57	0.23	0.05
D+ D × A + D × γ =C+ C × A + C × γ	0.17	0.04	0.06	0.11
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	1170	1170	1170	1170

Note: Panel restricted to the first 6 rounds and does not include rounds from which we derive the Dictator Game measure (i.e., rounds were all bags are donated). All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption.*Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *WTP DC above average* is a dummy variable equal to 1 if the farmer proposed a WTP higher than the average WTP proposed in the round where all bags were allocated to donation (Dictator Game). Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual and round). The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A3: Impact of increased awareness on farmers WTP to access food-safety information: Awareness and pro-sociality restricted to the last 6 rounds

	OLS		OLS	
	Share of bags		**At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-51.145	-44.669	-31.868**	-25.540**
	(32.975)	(30.579)	(13.235)	(12.481)
Consumption	26.509	32.183	-14.763	-13.834
	(25.814)	(25.390)	(15.515)	(15.070)
Donation × Heard of aflatoxins	87.291**		72.645**	
	(37.175)		(28.566)	
Consumption × Heard of aflatoxins	75.875		17.697	
	(70.303)		(43.186)	
Don. × Heard of aflatoxins × Treat.	-137.945*		-75.852*	
	(70.860)		(40.948)	
Cons. × Heard of aflatoxins × Treat.	-121.115		-30.424	
	(98.977)		(59.388)	
Donation × Knows of aflatoxins		49.284		39.364
		(35.730)		(30.157)
Consumption × Knows of aflatoxins		39.049		12.644
		(52.698)		(34.436)
Don. × Knows of aflatoxins × Treat.		-135.720		-55.572
		(99.568)		(57.288)
Cons. × Knows of aflatoxins × Treat.		-110.026		-24.198
		(123.287)		(72.720)
Don. × WTP DC above average				
Cons. × WTP DC above average				
Don × DC above average × Treatment	28.246	14.398	16.952	3.412
	(46.475)	(46.601)	(29.576)	(30.407)
Cons × DC above average × Treatment	46.931	33.100	42.966	39.469
	(56.581)	(60.816)	(37.398)	(39.506)
Don × WTP DC above average	-0.554	10.336	-11.081	-1.921
	(41.924)	(45.572)	(23.706)	(25.289)
Cons × WTP DC above average	-52.488	-42.885	-23.058	-21.408
	(42.405)	(48.327)	(29.289)	(32.632)
Mean WTP	562	562	562	562
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A + D × A × T + D × γ + D × γ × T=0	0.41	0.35	0.42	0.43
C+ C × A + C × A × T + C × γ + C × γ × T =0	0.75	0.67	0.88	0.92
D+ D × A + D × A × T + D × γ + D × γ × T= C+ C × A + C × A × T + C × γ + C × γ × T	0.55	0.63	0.64	0.63
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	1170	1170	1170	1170

Note: Panel restricted to the last 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual and round). The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

A.2.3 Robustness: Experimental design

Table A4: WTP to access food-safety information (controlling for previous round allocation)

	OLS Share of bags		OLS At least one bag	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-29.097***	-23.307*	-27.592***	-28.345***
	(10.909)	(13.016)	(7.438)	(7.793)
Consumption		11.284		-3.335
		(13.659)		(7.740)
Mean WTP	523	523	523	523
D.=C.		0.01		0.01
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Control previous round alloc.	Yes	Yes	Yes	Yes
Observations	2195	2195	2195	2195

Note: Panel restricted to the first 6 rounds.All results are obtained from OLS regressions of the WTP with round and individual fixed effects, controlling for the allocation in the previous round, standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second rows presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual and round). The fourth row presents the level of the clustered standard errors, the fifth row present whether we controlled for the allocation in the previous round and the sixth row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: WTP to access food-safety information: Awareness and pro-sociality (controlling for previous round allocation)

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-34.428**	-29.661**	-30.487***	-28.544***
	(14.323)	(13.308)	(8.763)	(8.038)
Consumption	-2.073	8.818	-8.316	-2.429
	(15.035)	(14.269)	(8.232)	(7.917)
Donation × Heard of aflatoxins	52.127*		11.387	
	(27.456)		(15.946)	
Consumption × Heard of aflatoxins	60.428*		21.980	
	(32.479)		(20.313)	
Donation × Knows of aflatoxins		63.512*		3.787
		(33.360)		(20.490)
Consumption × Knows of aflatoxins		22.299		-11.516
		(42.119)		(30.815)
Donation × Index Pro-sociality	1.049	2.837	-2.086	-1.724
	(11.834)	(11.755)	(8.323)	(8.258)
Consumption × Index Pro-sociality	1.029	3.833	3.225	3.889
	(13.403)	(13.370)	(8.113)	(8.039)
Mean WTP	523	523	523	523
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A=0	0.46	0.27	0.15	0.20
C+ C × A=0	0.06	0.40	0.39	0.75
D+ D. × A=C+ C × A	0.18	0.97	0.08	0.61
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Control previous round alloc.	Yes	Yes	Yes	Yes
Observations	2195	2195	2195	2195

Note: Panel restricted to the first 6 rounds. All results are obtained from Poisson regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, the seventh row presents whether we controlled for the allocation in the previous round and the last row presents the number of observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Impact of increased awareness on farmers WTP to access food-safety information: Controlling for previous round allocation

	OLS	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP
Post video	29.562**	28.479*	28.675*	29.662**	29.672**
	(14.598)	(14.601)	(14.629)	(14.546)	(14.549)
Treatment × Post	40.918**	44.167**	37.172*	39.978**	33.364*
	(16.554)	(17.413)	(19.670)	(17.651)	(19.728)
Donation		-34.811***	-26.856**	-25.718***	-27.506***
		(9.285)	(10.793)	(6.458)	(6.592)
Donation × Treatment × Post		-7.835	-0.727	2.351	3.861
		(15.225)	(18.156)	(10.784)	(11.034)
Consumption			16.136		-9.240
			(11.662)		(6.499)
Consumption × Treatment × Post			14.403		7.880
			(22.039)		(11.600)
Mean WTP Control group		527	527	527	527
D+ P + T × P+ D × T × P=0		0.11	0.04	0.01	0.03
C + P + T × P+ C × T × P=0			0.00		0.00
C+ P + T × P+ C × T × P = D + P + T × P+ D × T × P			0.00		0.06
FE	Id. & Rd.	Id. & Rd.	Id. & Rd.	Id. & Rd.	Id. & Rd.
Clustered SE	Id.	Id.	Id.	Id.	Id.
Control previous round alloc.	Yes	Yes	Yes	Yes	Yes
Observations	4829	4829	4829	4829	4829

Note: All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, the seventh row presents whether we controlled for the allocation in the previous round and the last row presents the number of observations. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A7: WTP to access food-safety information

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-22.471**	-14.697	-21.441***	-21.219***
	(10.717)	(12.175)	(7.078)	(7.303)
Consumption		15.120		0.981
		(12.302)		(6.879)
Round order	2.219	2.301	2.296	2.300
	(2.087)	(2.080)	(2.090)	(2.091)
Mean WTP	523	523	523	523
D.=C.		0.02		0.01
FE	Indiv.	Indiv.	Indiv.	Indiv.
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual). The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A8: WTP to access food-safety information: Awareness and pro-sociality

	OLS **Share of bags**		OLS **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-27.926**	-25.875**	-23.802***	-22.780***
	(13.921)	(13.107)	(8.548)	(7.817)
Consumption	5.202	14.295	-0.262	3.878
	(13.696)	(12.958)	(7.604)	(7.140)
Donation × Heard of aflatoxins	61.436**		11.887	
	(26.967)		(15.929)	
Consumption × Heard of aflatoxins	47.210		4.825	
	(31.108)		(17.472)	
Donation × Knows of aflatoxins		111.122***		12.165
		(30.401)		(21.426)
Consumption × Knows of aflatoxins		19.395		-31.321
		(39.755)		(25.758)
Donation × Index Pro-sociality	4.118	5.835	3.497	3.873
	(11.934)	(11.990)	(8.196)	(8.133)
Consumption × Index Pro-sociality	5.318	7.630	7.397	7.677
	(12.662)	(12.599)	(6.908)	(6.860)
Round order	2.332	2.478	2.366	2.319
	(2.082)	(2.082)	(2.108)	(2.105)
Mean WTP	523	523	523	523
Mean aflatoxins knowledge	0.22	0.11	0.22	0.11
D+ D × A=0	0.15	0.00	0.57	0.75
C+ C × A=0	0.05	0.28	0.47	0.44
D+ D. × A=C+ C × A	0.52	0.27	0.33	0.65
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *Index pro-sociality* is a standardized weighted index of 3 variables on the elicitation of pro-sociality, following a GLS weighting procedure as described in Anderson (2008). Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, and the eighth row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A9: Impact of increased awareness on farmers WTP to access food-safety information

	OLS	OLS Share of bags		OLS At least one bag	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP
Post video	11.577	11.606	11.250	11.392	11.827
	(14.386)	(14.362)	(14.296)	(14.373)	(14.363)
Treatment × Post	44.183***	50.044***	43.469**	46.668***	40.772**
	(16.184)	(17.013)	(19.143)	(17.263)	(19.167)
Donation		-27.343***	-19.609*	-20.830***	-22.491***
		(9.129)	(10.293)	(6.205)	(6.269)
Donation × Treatment × Post		-16.224	-9.719	-3.014	-1.572
		(15.425)	(18.229)	(10.664)	(10.903)
Consumption			15.511		-8.347
			(10.783)		(5.956)
Consumption × Treatment × Post			13.255		7.156
			(21.557)		(11.334)
Round order	1.065	1.033	1.073	1.114	1.074
	(1.547)	(1.548)	(1.538)	(1.550)	(1.548)
Mean WTP Control group		527	527	527	527
D+ P + T × P+ D × T × P=0		0.30	0.17	0.04	0.11
C + P + T × P+ C × T × P=0			0.00		0.00
C+ P + T × P+ C × T × P = D + P + T × P+ D × T × P			0.00		0.05
FE	Id.	Id.	Id.	Id.	Id.
Clustered SE	Id.	Id.	Id.	Id.	Id.
Observations	5268	5268	5268	5268	5268

Note: All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second, third and fourth row presents the p-value for the F-test of significance. The fifth row presents the level of fixed effects (Individual and round). The sixth row presents the level of the clustered standard errors, and the last row presents the number of observations. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

A.2.4 Robustness: Mechanisms

Table A10: Valuation of health and altruism relatively to financial gain for the first 6 rounds: Risk aversion

	OLS			
	Share of bags			
	(1)	(2)	(3)	(4)
	WTP	WTP	WTP	WTP
Donation	-21.734**	-13.329	-21.510***	-21.249***
	(10.742)	(12.156)	(7.106)	(7.300)
Donation × Index risk	0.452	-1.340	-5.055	-6.213
	(10.305)	(11.063)	(6.594)	(6.700)
Consumption × Index risk		-3.587		-5.326
		(10.910)		(6.478)
Consumption		16.344		0.681
		(12.255)		(6.891)
Mean WTP	523	523	523	523
D+ D × I.R=0	0.14	0.34	0.01	0.01
C+ C × I.R=0		0.46		0.63
C+ C × I.R=D+ D. × I.R		0.13		0.08
FE	Indiv. & Round	Indiv. & Round	Indiv & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Index risk* is a risk preference variable created as a standardized weighted index of 5 indicator variables on risk perception in life and agriculture, following a GLS weighting procedure as described in Anderson (2008); it is equal to one if the index score is above the median and zero otherwise. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual). The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A11: Impact of increased awareness on farmers WTP to access food-safety information: Risk aversion

	OLS		OLS	
	Share of bags		**At least one bag**	
	(1)	(2)	(3)	(4)
	WTP	WTP	WTP	WTP
Donation	-42.373***	-31.926***	-24.427***	-25.693***
	(9.945)	(11.712)	(6.255)	(6.319)
Donation × Index risk	16.494	15.487	9.626	10.399*
	(12.292)	(13.848)	(8.352)	(5.886)
Donation × Index risk × Treat.	-0.142	-0.772	7.082	
	(17.632)	(20.317)	(11.831)	
Consumption		21.026*		-7.051
		(12.753)		(7.155)
Consumption × Index risk		-2.121		-18.129*
		(17.278)		(10.996)
Consumption × Index risk × Treat.		-0.379		10.186
		(22.978)		(13.333)
Mean WTP	564	564	564	564
D+ D × I.R=0	0.14	0.39	0.18	0.08
C+ C × I.R=0		0.41		0.06
C+ C × I.R=D+ D. × I.R		0.11		0.54
FE	Indiv. & Round	Indiv. & Round	Indiv & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the last 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise.*Index risk* is a risk preference variable created as a standardized weighted index of 5 indicator variables on risk perception in life and agriculture, following a GLS weighting procedure as described in Anderson (2008); it is equal to one if the index score is above the median and zero otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second, third and fourth row presents the p-value for the F-test of significance. The fifth row presents the level of fixed effects (Individual and round). The sixth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

A.2.5 Robustness: Estimators

Table A12: Valuation of health and altruism relatively to financial gain for the first 6 rounds (Fixed Effects vs Random Effect)

	OLS				OLS			
	Share of bags				**At least one bag**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTP	WTP	WTP	WTP	WTP	WTP	WTP	WTP
Donation	-21.7235**	-21.6395**	-13.2598	-13.3265	-21.5039***	-20.6157***	-21.2811***	-20.4335***
	(10.7276)	(10.7132)	(12.1399)	(12.1091)	(7.1072)	(7.0945)	(7.3248)	(7.3071)
Consumption			16.4218	16.1447			0.9864	0.8131
			(12.2329)	(12.1581)			(6.8471)	(6.8083)
Don.=Cons			0.02	0.02			0.01	0.01
FE	Indiv. & Round	Round	Indiv. & Round	Round	Indiv. & Round	Round	Indiv. & Round	Round
RE	No	Yes	No	Yes	No	Yes	No	Yes
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) to (4), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (5) & (8), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the p-value for the F-test of significance. The second row presents if there are and the level of fixed effects (Individual and round). The third row presents if there are random effects. The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A13: Valuation of health and altruism relatively to financial gain for the first 6 rounds: Awareness and pro-sociality (Fixed Effects vs Random Effect)

	OLS **Share of bags**				OLS **At least one bag**			
	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP	(6) WTP	(7) WTP	(8) WTP
Donation	-26.280*	-26.091*	-24.246*	-25.308*	-23.588***	-23.344***	-22.676***	-23.131***
	(13.877)	(13.586)	(13.090)	(12.923)	(8.567)	(8.420)	(7.841)	(7.771)
Consumption	6.459	6.609	15.687	14.399	-0.149	-0.778	3.925	2.339
	(13.597)	(13.239)	(12.905)	(12.708)	(7.568)	(7.408)	(7.118)	(7.022)
Donation × Heard of aflatoxins	60.365**	59.348**			10.617	13.365		
	(26.960)	(25.311)			(15.946)	(14.912)		
Consumption × Heard of aflatoxins	47.196	45.201			4.258	6.304		
	(31.134)	(28.844)			(17.371)	(16.146)		
Donation × Knows of aflatoxins			108.484***	119.297***			10.629	23.912
			(30.360)	(29.345)			(21.454)	(19.200)
Consumption × Knows of aflatoxins			17.694	28.208			-32.057	-16.372
			(39.928)	(37.783)			(25.759)	(23.531)
Donation × Index Pro-sociality	3.327	5.211	5.009	6.843	2.782	3.323	3.106	3.566
	(11.873)	(11.097)	(11.926)	(11.049)	(8.237)	(7.637)	(8.173)	(7.534)
Consumption × Index Pro-sociality	5.151	8.123	7.510	10.287	7.518	8.763	7.797	9.032
	(12.619)	(11.594)	(12.539)	(11.529)	(6.848)	(6.375)	(6.793)	(6.343)
Mean WTP	523	523	523	523	523	523	523	523
Mean aflatoxins knowledge	0.22	0.22	0.11	0.11	0.22	0.22	0.11	0.11
D+ D × A=0	0.15	0.12	0.00	0.00	0.49	0.63	0.68	0.82
C+ C × A=0	0.05	0.03	0.29	0.15	0.48	0.36	0.42	0.83
D+ D. × A=C+ C × A	0.49	0.49	0.28	0.28	0.29	0.31	0.69	0.74
FE	Indiv. & Round	No	Indiv. & Round	No	Indiv. & Round	No	Indiv. & Round	No
RE	No	Yes	No	Yes	No	Yes	No	Yes
Clustered SE	Indiv.		Indiv.		Indiv.		Indiv.	
Observations	2634	2634	2634	2634	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *Index pro-sociality* is a standardized weighted index of 3 variables on the elicitation of pro-sociality, following a GLS weighting procedure as described in Anderson (2008). Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents if there are and the level of fixed effects (Individual and round). The seventh row presents if there are random effects. The eight row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A14: Impact of increased awareness on farmers WTP to access food-safety information (Fixed Effects vs Random Effect)

	OLS		OLS **Share of bags**		Poisson **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP	(6) WTP
Post video	15.2250	14.9298	23.1662	22.5850	31.0533	31.1860
	(15.3187)	(15.2654)	(19.3735)	(19.3059)	(19.6067)	(19.5564)
Treatment × Post	44.1832***	44.7592***	38.7850*	39.2423*	30.7861	31.1182
	(16.1983)	(15.9301)	(21.2581)	(21.0646)	(20.6993)	(20.5161)
Donation			-11.9033	-12.0146	-20.2224***	-19.7447**
			(12.2920)	(12.2783)	(7.7601)	(7.7485)
Donation × Post			-20.9212	-19.7957	-6.2019	-6.3408
			(21.5302)	(21.5134)	(11.6828)	(11.6490)
Donation × Treatment × Post			2.8982	2.2945	2.3141	1.6523
			(24.3005)	(24.3266)	(13.4756)	(13.4562)
Consumption			17.4589	17.2573	-2.6533	-2.6448
			(12.6481)	(12.6019)	(6.9198)	(6.9006)
Consumption × Post			-2.7363	-2.9904	-16.8350	-17.3338
			(22.7981)	(22.7478)	(13.0251)	(12.9823)
Consumption × Treatment × Post			14.5892	15.5174	18.1369	19.1545
			(26.8579)	(26.8589)	(14.7859)	(14.7851)
Mean WTP Control group	523	523	523	523	523	523
D+ P + T × P+ D × T × P=0			0.23	0.24	0.55	0.54
C + P + T × P+ C × T × P=0			0.01	0.00	0.01	0.01
C+ P + T × P+ C × T × P = D + P + T × P+ D × T × P			0.15	0.14	0.10	0.09
FE	Id. & Rd	Round	Id. & Rd	No	Id. & Rd	No
RE	Yes	No	No	Yes	No	Yes
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.
Observations	5268	5268	5268	5268	5268	5268

Note: All results are obtained from OLS regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second, third and fourth row presents the p-value for the F-test of significance. The fifth row presents if there are and the level of fixed effects (Individual and round). The sixth row presents if there are random effects. The seventh row presents the level of the clustered standard errors, and the last row presents the number of observations. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A15: Valuation of health and altruism relatively to financial gain restricted the first 6 rounds (Poisson)

	Poisson **Share of bags**		Poisson **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-0.041**	-0.026	-0.040***	-0.040***
	(0.021)	(0.024)	(0.014)	(0.014)
Consumption		0.032		0.003
		(0.023)		(0.013)
Mean WTP	523	523	523	523
D.=C.		0.02		0.01
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from Poisson regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the p-value for the F-test of significance. The third row presents the level of fixed effects (Individual). The fourth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A16: Valuation of health and altruism relatively to financial gain for the first 6 rounds: Awareness and pro-sociality (Poisson)

	Poisson **Share of bags**		Poisson **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP
Donation	-0.050*	-0.047*	-0.044***	-0.043***
	(0.027)	(0.026)	(0.016)	(0.015)
Consumption	0.014	0.031	0.001	0.009
	(0.026)	(0.024)	(0.015)	(0.014)
Donation × Heard of aflatoxin	0.119**		0.022	
	(0.051)		(0.030)	
Consumption × Heard of aflatoxin	0.082		0.005	
	(0.056)		(0.032)	
Donation × Knows of aflatoxin		0.207***		0.022
		(0.053)		(0.037)
Consumption × Knows of aflatoxin		0.024		-0.055
		(0.068)		(0.044)
Donation × Index Pro-sociality	0.006	0.010	0.006	0.007
	(0.024)	(0.024)	(0.016)	(0.016)
Consumption × Index Pro-sociality	0.010	0.015	0.015	0.015
	(0.024)	(0.024)	(0.013)	(0.013)
Mean WTP	523	523	523	523
Mean aflatoxin knowledge	0.22	0.11	0.22	0.11
D+ D × A=0	0.17	0.00	0.52	0.68
C+ C × A=0	0.05	0.29	0.48	0.44
D+ D. × A=C+ C × A	0.53	0.28	0.30	0.71
FE	Indiv. & Round	Indiv. & Round	Indiv. & Round	Indiv. & Round
Clustered SE	Indiv.	Indiv.	Indiv.	Indiv.
Observations	2634	2634	2634	2634

Note: Panel restricted to the first 6 rounds. All results are obtained from Poisson regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. *Heard of aflatoxins* is a dummy variable equal to 1 if the farmer has heard of aflatoxins prior to the experiment. *Knows of aflatoxins* a dummy variable equal to 1 if they knew before the start of the experiment that aflatoxins have a negative effect on health. *Index pro-sociality* is a standardized weighted index of 3 variables on the elicitation of pro-sociality, following a GLS weighting procedure as described in Anderson (2008). Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second row presents the mean knowledge for the chosen variable related to aflatoxins awareness among the sample. The third, fourth and fifth rows present the p-value for the F-test of significance. The sixth row presents the level of fixed effects (Individual and round). The seventh row presents the level of the clustered standard errors, and the eighth row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table A17: Impact of increased awareness on farmers WTP to access food-safety information (Poisson)

	Poisson	Poisson **Share of bags**		Poisson **At least one bag**	
	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP
Post video	0.030	0.043	0.045	0.035	0.061
	(0.029)	(0.031)	(0.036)	(0.031)	(0.036)
Treatment × Post	0.080***	0.081**	0.069*	0.076**	0.050
	(0.030)	(0.032)	(0.039)	(0.032)	(0.037)
Donation		-0.040*	-0.024	-0.036**	-0.036**
		(0.022)	(0.024)	(0.015)	(0.015)
Donation × Post		-0.033	-0.035	-0.008	-0.013
		(0.035)	(0.040)	(0.022)	(0.022)
Donation × Treatment × Post		-0.000	0.010	0.005	0.011
		(0.037)	(0.043)	(0.024)	(0.024)
Consumption			0.032		-0.005
			(0.024)		(0.013)
Consumption × Post			-0.003		-0.031
			(0.042)		(0.024)
Consumption × Treatment × Post			0.021		0.032
			(0.048)		(0.026)
Mean WTP Control group		527	527	527	527
D+ P + T × P+ D × T × P=0		0.13	0.10	0.07	0.07
C + P + T × P+ C × T × P=0			0.01		0.00
C+ P + T × P+ C × T × P = D + P + T × P+ D × T × P			0.20		0.15
FE	Id. & Rd.	Id. & Rd.	Id. & Rd.	Id. & Rd	Id. & Rd.
Clustered SE	Id.	Id.	Id.	Id.	Id.
Observations	5268	5268	5268	5268	5268

Note: All results are obtained from Poisson regressions of the WTP with round and individual fixed effects, and standard errors are clustered at the individual level. *Post video* is a dummy variable equal to 1 if the round is played after having watched the video. *Treatment* is a dummy variable equal to one if the farmer is in the treatment group and 0 otherwise. In columns (1) & (2), *Donation* represents the share of groundnut bags allocated to donation, and *Consumption* represents the share allocated to consumption. In columns (3) & (4), *Donation* represents the presence of at least one bag for donation, and *Consumption* represents the presence of at least one bag for consumption. Second part of the table: The first row presents the mean willingness-to-pay (WTP) for the first 6 rounds. The second, third and fourth row presents the p-value for the F-test of significance. The fifth row presents the level of fixed effects (Individual and round). The sixth row presents the level of the clustered standard errors, and the last row presents the number of observations. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

B Baseline details

B.1 Experiment script

Thank you for participating in this survey. You will now receive a fee of 2,000 FCFA for your participation in this survey, and we would like to point out that the participation fee is yours regardless of the results of the next part.

At this point, we give 1,000 FCFA to the respondent and then proceed to ask about participation in the experiment.

We would like to propose that you participate in a game where you are offered a series of choices to obtain a quantity of groundnut powder (Noflay). Are you willing to participate in this experiment?

If the farmer wants to end, the survey stops here. Otherwise, the script continues as follows:

I will present you successively with several cards like this one [SHOW EXAMPLE CARD], each having a different distribution of 500g of Noflay.

The distribution of the 500g of Noflay is between 3 different purposes: we can give it to you for your own consumption, you can let us keep it to give it as a donation to a Talibe, and you can sell it to us. The price is the market price of 1,000 FCFA per kg, therefore 125 FCFA for one bag. For each card, you will be asked whether you want to pay to know if the level of aflatoxins contained in the groundnut is high or low.

We present a brief description of aflatoxins and their prevalence in Senegalese groundnut.

Aflatoxins are toxins present in some groundnuts and has a long-term impact on health. It can cause liver cancer if consumed over a long period. Aflatoxins are present in 1/3 of the groundnut production in Senegal according to a recent study.

If you choose to pay to know the level of aflatoxin contained in the groundnut, we will reveal it. If the level of aflatoxin is revealed to be high, we will keep it as it is not safe for consumption. If the level is low, we will give it to you, to the Talibe, or buy it from you at 1,600 FCFA per kg, so 200 FCFA per bag. To determine the price, you will be asked to propose the maximum price you are ready to pay to have the information on the aflatoxin level.

We will then randomly draw a multiple of 50 between 0 and 600; if the price you chose is above, the price randomly chosen will be applied. If it is under, you cannot test the groundnut. We will draw 6 cards, then have a break and show you a video, then draw 6 other cards. After the experiment is completed, one of the choices you make will be selected randomly, and you will be rewarded according to the choice you made. We will do practice rounds with bags of biscuits for you to familiarize yourself and better understand how the main experiment with the groundnuts will occur.

Do you have any questions? Is everything clear?

We will now illustrate what will be done with the groundnut using bags of cookies. [SHOW THE COOKIES]

The enumerator proceeds to example rounds with the cookies.

This is how the groundnut experiment that we are now going to start will proceed.

The experiment begins.

B.2 Behavioral Variable Measurement

Pro-sociality

To define pro-sociality, we build an index using answers to four questions related to the elicitation of altruism, 3 drawn from Behaghel et al. (2020) and 1 from the Global Preference Survey (Falk et al., 2018):

- In the last 7 days, how many days have you been happy because you could provide somebody with advice?
- In the last 7 days, how many days did you feel good because you were able to help another person?
- In the last 7 days, how many days were you annoyed because you had to do something for somebody else?
- Please think about what you would do in the following situation. You are in an area you are not familiar with, and you realize that you lost your way. You ask a stranger for directions. The stranger offers to take you to your destination. Helping you costs the stranger about 5,000 FCFA in total. However, the stranger says he or she does not want any money from you. You have six presents with you. The cheapest present costs 1,000 FCFA, the most expensive one costs 6,000

FCFA. Do you give one of the presents to the stranger as a "thank you" gift? Which present do you give to the stranger? The present worth 1,000 / 2,000 / 3,000 / 4,000 / 5,000 / 6,000 FCFA / Don't know.

Risk

Following Deutschmann et al. (2024), we elicited risk aversion using an 11-point scale:

- Please tell me, in general, how willing or unwilling you are to take risks, using a scale from 0 to 10, where 0 means you are "completely unwilling to take risks" and 10 means you are "very willing to take risks." You can also use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

C Informative video script

Added voice to rhythm the video: Asalamu Aleikum, dear farmers and consumers. Today, we will discuss aflatoxins with Mr.Senghor, an expert in plant-related issues.

Dr. Senghor: My name is Amadou Lamine Senghor; I am being called Dr. Senghor. I work in the field of plant diseases at the International Institute of Tropical Agriculture (IITA) in Ibadan. I also work at Bamtaare, a subsidiary of Sodefitex, a company known in Senegal, which is a company that helps farmers with agricultural inputs and services they need in agriculture. I started working in agriculture in 1989, so it has been a long time. I am specialized in the diseases of cultivated plants in order to help the development of agriculture. I work to eradicate everything harmful to humans and animals in crops, especially aflatoxins in groundnuts and corn.

Added voice to rhythm the video: What is aflatoxin, and what causes it?

Dr. Senghor: Aflatoxins are known to be present in groundnuts, but it turns out that they are also present in corn. The subject of aflatoxins has been discussed for a long time in Senegal. Some people know about it, others do not. What gives aflatoxins is what is called "Guerté Sabou" [*Soap groundnuts*], groundnut seeds that are rotten and full of holes. These "Guerté Sabou" should not be eaten. In the past, when groundnuts were sorted, they were used to make soap. Today, this groundnut is consumed.

What gives aflatoxins is a disease that is found in the soil. Because groundnuts are in the soil until they mature, it is possible to find aflatoxins in groundnuts. For farmers, many factors promote aflatoxins in groundnuts or corn. When cultivating, a break in the rainfall can lead to the proliferation of aflatoxins in groundnuts and maize. During sowing or threshing, small scratches can be made in the groundnuts, and the aflatoxin-giving disease passes through these doors to enter the groundnut, develops by feeding on the groundnut and creates aflatoxin. It is visible in the form of a mold that is unhealthy to eat. This mold can also develop when the storage is not good because of heat and humidity. It is essential to know that we are in a region that is hot and humid, so when groundnuts or corn are stored, if rot or mold appears, it will increase a lot even if there was not much of it at the time of harvest. If we keep this production for a few months, the mold develops greatly.

Added voice to rhythm the video: What are the effect of aflatoxins on human health ?

Dr. Senghor: If we talk about the effects of aflatoxins on humans and food, aflatoxins are very bad because it attacks the liver, and we all know the importance of liver function for health. If we eat, it is thanks to the liver that we digest. If we can no longer digest what we eat, death follows. If what we eat contains a lot of aflatoxins and have the hepatitis B virus - and nobody knows that he has it unless he goes to the doctor, otherwise we can have it without knowing it- if, for example, it took 20, 10 or 5 years to have liver cancer, the alliance hepatitis B and aflatoxins shortened this delay because the cancer develops more quickly. This cancer that develops kills the liver, and death follows.

I can give you an example from Kenya. In 2004, many people ended up in hospital. What brought them there was that they had eaten maize from a stockpile with a very high level of aflatoxin. 125 people who ate this corn died. When their blood was analyzed, we saw that the aflatoxin level was very high. This is proof that aflatoxins can kill a person quickly when the quantity ingested is high. So far, there have been no such cases in Senegal. However, eating it over the years, since childhood, can cause problems in the long term, damaging the liver and leading to death.

In the case of Senegal, the existence of aflatoxins is known. It is a problem that has been studied since independence, but no solution has been found to solve this problem. This was highlighted by the accident that took place in Dakar years ago at the SONACOS factory. Ammonia, also called "Moniaque", caused an explosion and the death of several people; ammonia was used to reduce aflatoxins in groundnuts. Following this accident, its use was stopped. Since then, the European Union no longer buys Senegalese groundnuts because they want to protect their population from ingesting groundnuts with high aflatoxin levels. Indeed, the aflatoxin level in groundnuts is very high in Senegal. In 2012 and 2015, groundnuts from the groundnut basin in Kaolack, Diourbel, Fatick and surrounding regions were so contaminated that even the Chinese did not come to buy them. Today, they are the largest buyers of groundnuts in Senegal. The contaminated production has, therefore, remained in Senegal, and we are the ones who eat it. In Senegal, doctors have seen that out of 100,000 people, 10 to 14 people die of liver cancer each year, and this is partly due to ingested aflatoxin.

Farmers tend to say that groundnuts have been grown and consumed for a long time, and this has not impacted people. In fact, in the past, aflatoxins did not affect people much because the groundnuts were sorted. Now, it is no longer the case; today, we do not know what is sold in the markets. We see economic operators who "bess"[*sort and try to make prettier*] the groundnut at the market and sell it. It is not a groundnut that should be eaten or sold for consumption. groundnut paste, groundnut powder, and filtered oil are the forms of groundnuts that lead to problems that have been stated and that have been denounced by doctors. For the conclusion of this discussion, I remind you that aflatoxins are dangerous to health; this was not the case before because groundnuts were sorted, which is no longer done today. This groundnut is sold when it should not be because it is unfit for human consumption. It is time to join forces to fight aflatoxins in groundnuts and corn. We must also be careful with animals. When animals eat grains or groundnuts with high levels of aflatoxin, it comes back to us through milk or eggs. Thank you for listening.