

Parlasca, Martin C.; Martini, Christina A.; Köster, Maximilian; Ibañez, Marcela

Article — Published Version

Aspirations and weather shocks: Evidence from rural Zambia

Agricultural Economics

Provided in Cooperation with:

John Wiley & Sons

Suggested Citation: Parlasca, Martin C.; Martini, Christina A.; Köster, Maximilian; Ibañez, Marcela (2024) : Aspirations and weather shocks: Evidence from rural Zambia, *Agricultural Economics*, ISSN 1574-0862, Wiley Periodicals, Inc., Hoboken, NJ, Vol. 55, Iss. 6, pp. 985-999, <https://doi.org/10.1111/agec.12858>

This Version is available at:

<https://hdl.handle.net/10419/313702>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.



If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/4.0/>

ORIGINAL ARTICLE

Aspirations and weather shocks: Evidence from rural Zambia

Martin C. Parlasca¹  | Christina A. Martini²  | Maximilian Köster³ |
Marcela Ibañez³ 

¹Center for Development Research (ZEF),
University of Bonn, Bonn, Germany

²German Centre for Integrative
Biodiversity Research (iDiv)
Halle-Jena-Leipzig, Leipzig University,
Leipzig, Germany

³Göttingen University, Göttingen,
Germany

Correspondence

Martin Christoph Parlasca, Center for
Development Research (ZEF), University
of Bonn, Germany.

Email: parlasca@uni-bonn.de

Funding information

German Research Foundation,
Grant/Award Number: CRC-TRR 228;
“FutureRuralAfrica”, Project-ID,
Grant/Award Number: 328966760;
German Research Foundation,
Grant/Award Number: FZTI18,202548816

Abstract

Aspirations defined as future-oriented desires or ambitions, can determine agricultural investments and rural development. Aspirations are shaped by people's social, cultural, and physical environment and can be affected by external factors such as natural disasters. This article addresses the question of how weather shocks can influence individual and community aspirations. Using primary panel data from two survey rounds before and during a major drought in Zambia, we show that such extreme weather events can be associated with adverse impacts on individual aspirations. Further exploratory analyses suggest that aspirations towards assets that are particularly vulnerable to droughts are affected most. We do not find any significant effects of drought on community aspirations.

KEYWORDS

Africa, climate change, drought, water scarcity

JEL CLASSIFICATION

Q12, Q54, D84, O13, I31

1 | INTRODUCTION

Aspirations, which can be defined as forward-looking desires or ambitions to achieve a specific goal, are vital for future oriented behavior and are thus important ingredients for economic development (Beaman et al., 2012; Dalton et al., 2016; Ray, 2006; Serneels & Dercon, 2021). If aspirations are too low, people are more likely to miss out on profitable investments in income generating activities, assets, education, or health. In agricultural contexts, aspirations have also surfaced as an influential force in several decisions directly related to farming, including fertilizer use, investments in livestock, technology adoption, farm renovations, or climate risk mitigation strategies (Cecchi

et al., 2022; Knapp et al., 2021; Mausch et al., 2018; Tabe-Ojong et al., 2023). Aspirations can, therefore, represent critical internal constraints to personal and community growth and are behavioral drivers of many decisions on and off the farm (DeJaeghere et al., 2022; Genicot & Ray, 2020; Lybbert & Wydick, 2018; Nandi & Nedumaran, 2021).

At the same time, increasing climate variation and extreme weather events threaten agricultural activities, income generation, and well-being of farmers all over the world. Especially in developing countries, weather shocks, including droughts, cause substantial damage to livelihoods that have been painstakingly built up over many years. As a result, prolonged drought periods have been shown to be associated with higher emotional distress and

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2024 The Author(s). *Agricultural Economics* published by Wiley Periodicals LLC on behalf of International Association of Agricultural Economists.

anxiety among affected populations (Abunyewah et al., 2024; Crandon et al., 2022; Meierrieks, 2021; Zamani et al., 2006).

This article sets out to investigate if prolonged periods of rainfall scarcity cause farmers to lower their aspirations. We thereby connect two separate strands of literature. On the one side, we build on the existing research on the psychological consequences of droughts. This strand of literature comes primarily from medical research in high-income countries and shows that climate change can erode mental health, cause anxiety and is even associated with crime and increased suicide rates (Daghagh Yazd et al., 2019; Dean & Stain, 2010; Freund, 2023; Heilmann et al., 2021; Hua et al., 2023; Jones, 2022; Mullins & White, 2019; Obradovich et al., 2018; Vins et al., 2015). Farmers are particularly vulnerable to such effects due to their strong dependence on rainfall. On the other side, we also build on a small, but growing area of economic research linking people's aspirations with exposure to natural disasters. Adverse effects of natural disasters on aspirations have recently been documented for floods in Pakistan (Kosec & Mo, 2017) and an invasive species in Kenya (Tabe-Ojong et al., 2021). In both of these examples, natural disasters lowered income and wealth, both in the present and future expectations, and thereby led to a reduction in the goals that people perceive as achievable.

Motivated by these two, so far disconnected, strands of literature, we examine how the aspirations of farmers in Zambia were affected by a major drought that struck Southern Africa in late 2018 and early 2019. As in many sub-Saharan countries, droughts represent critical hazards to Zambia's agrarian economy. The country's average temperatures and climate variability have increased over the last three decades with severe consequences. The 2015/16 El Niño, for example, has been associated with a decrease in economic growth and negatively affected the productivity of rice and wheat (Alfani et al., 2021; Callahan & Mankin, 2023). The 2019 drought, analyzed in this article, was one of the worst and driest periods in Zambia since several decades (Hulsman et al., 2021).

This article makes two main contributions to the literature. First, it is the first to analyze the critical relationship between drought and aspirations. Droughts are slow-onset and systemic shocks that affect approximately 55 million people each year, thereby representing the greatest threat to livestock and crops in almost all parts of the world (UNCCD, 2022). Even though the physical damages of droughts are well documented, adverse effects on aspirations, ambitions, and hope are under-researched. A better understanding of aspiration formation in this context is much needed, for designing policies and programs that try to safeguard vulnerable populations against such events and to understand the potential long-term conse-

quences of droughts beyond the loss of physical assets. The second contribution of the article is a methodological differentiation between farmers' aspirations for themselves ("individual aspirations"), as well as farmers' aspirations for their communities ("community aspirations") (see Martini et al., 2021). Most of the research on aspiration formation focuses on individual aspirations. We motivate the inclusion of community aspirations in this article by the fact that droughts are not idiosyncratic shocks that only affect specific households in a community and leave others unaffected, but rather systemic shocks that influence an entire community, region or even country at once. While extreme weather events can lead to increased competition for resources within a community and, therefore, increasing conflict (Hsiang et al., 2013; Papaioannou & Haas, 2017), extreme weather events can potentially also stifle compassion or a sense of belonging among members of a community, and thereby strengthen their bonds within the community (Fleming et al., 2014; Stephane, 2021).

Our results show that droughts reduce individual aspirations, particularly among those directly affected by drought-related losses. Aspirations related to arable farming and cow ownership are significantly more affected by drought compared to goat ownership or children's education. However, no statistically significant effects of the drought on aspirations for the community were found.

The remainder of this article is structured as follows. Section 2 presents our conceptual framework, followed by a description of the data collection and empirical approach in Section 3. In Section 4, we present and discuss relevant outcomes. We conclude by summarizing the most important findings and their implications for future research and policies in Section 5.

2 | CONCEPTUAL FRAMEWORK

Based on Bernard et al. (2011), we define aspirations as desires or ambitions to achieve a specific goal. Aspirations differ from related concepts such as wishes, beliefs, or hope because (i) aspirations are future-oriented, meaning that they represent goals that can be achieved in the future but not immediately, and (ii) aspirations are motivators, meaning that an individual can and wants to put effort into achieving the goal which distinguishes aspirations, for example, from fatalism or having a mere wish (Bernard et al., 2011). Aspirations relate to a specific domain. In the past, these domains mostly involved individual aspects such as own wealth, social status, health, or education. In this article, however, we also consider people's aspirations regarding their community.

We employ the community aspiration index developed by Martini et al. (2021). To arrive at relevant dimensions

and indicators for community aspirations, Martini et al. (2021) considered community well-being as a set of freedoms individuals can enjoy in their village and hence construct their community aspirations dimensions based on Sen's conceptualization of development (Sen, 1999). Accordingly, community aspirations relate to social opportunities, economic facilities, protective security, political freedoms and transparency. The indicators for each dimension reflect the degree to which individuals aspire their community to have access to public goods such as education or police protection, but also to live in a community characterized by political freedoms and an improved standard of living. Because community welfare has a public good character, it is crucial to consider the aspirations that each individual has for the community rather than the aspirations of one single individual as the community leader.

From a theoretical perspective, aspirations are assumed to be shaped by a person's "cognitive neighborhood" (Genicot & Ray, 2020). By observing others, people are able to imagine what they could do and what they or their community could achieve (Appadurai, 2004; Genicot & Ray, 2017). Aspirations are, therefore, not only determined by a person's past aspirations but also strongly depend on ongoing and anticipated social, economic, and cultural influences (Dilley et al., 2021; Genicot & Ray, 2017).

In addition to the social component of aspiration formation, aspirations can be shaped by external influences, such as environmental shocks (Nandi & Nedumaran, 2021). When such external circumstances impede the achievement of specific goals, individuals may revise downwards the goals that seem attainable in the future. In one of the first studies to investigate the relationship between natural disasters and aspirations, Kosec and Mo (2017) analyze the effects of a flood in Pakistan on individual aspirations. The authors show that, due to the flood, aspirations fell by a similar magnitude to what would be experienced if household spending were slashed by 50 percent. Tabe-O et al. (2021) further show that farmers' aspirations in Kenya are negatively affected by ecological stressors such as an invasive plant. Unlike previous studies, Tabe-O et al. (2021) also consider different dimensions of individual aspirations, revealing that the negative association is driven by reductions in aspirations towards future income and assets.

The effect of a natural shock on individual aspirations can have both physical and mental components (Kosec & Mo, 2017). Physically, natural shocks can have negative impacts on capital assets, people's livelihood, and create economic barriers, such as worse infrastructure and market frictions, reduced access to education, markets, and health care. Thereby, people may perceive certain goals as more difficult to achieve which leads them to aspire less.

Since natural shocks can cause people to see their hard work and investments being damaged or wasted, disasters can also affect aspirations through a mental component.

People may perceive that they are losing control over their lives without clear paths forward, making them less willing to invest and, therefore, lowering their aspirations. Furthermore, Kosec and Mo (2017) hypothesize that a shock could also impact individuals' community negatively, leading to conflicts and instability, which would reduce aspirations.

In this article, we therefore aim to test the following two main hypotheses empirically:

Hypothesis I: Droughts are negatively associated with people's individual aspirations.

Hypothesis II: Droughts are negatively associated with people's community aspirations.

Based on this, we expect that community aspirations are also affected negatively. However, it is possible that the effects differ across community aspiration dimensions. Effects of a drought on a community aspiration dimension that, for example, reflects social support within a village community may be particularly strong since such dimensions could suffer from political frictions or imbalances the most. For dimensions that look at more tangible, security-related aspects, such as the degree of police presence, it can be hypothesized that the potential effects of a drought are smaller because people aspire to have more safety against future shocks. However, since research on community aspirations is so far extremely thin, it is not yet clear whether such differences actually exist.

3 | MATERIALS AND METHODS

3.1 | Study region

To test our hypotheses, we use two rounds of survey data collected by the authors in the Southern Province in Zambia. The region has different micro-climates and is hence characterized by diverse agroecological conditions. Only few villages in the area have direct access to boreholes, ponds, or dams. Most households rely on rain-fed small-scale agriculture and are particularly vulnerable to variations in precipitation (Marcantonio, 2020).

Inter- and intra-annual precipitation in the region varied substantially over the last 50 years (Hamududu & Ngoma, 2020). Even though the Southern Province has experienced several dry conditions, dry spells and unpredictable weather events over the past decades, the drought with El Niño-like conditions in 2018/2019 marked a low point as one of the driest seasons (Hulsman et al., 2021). The

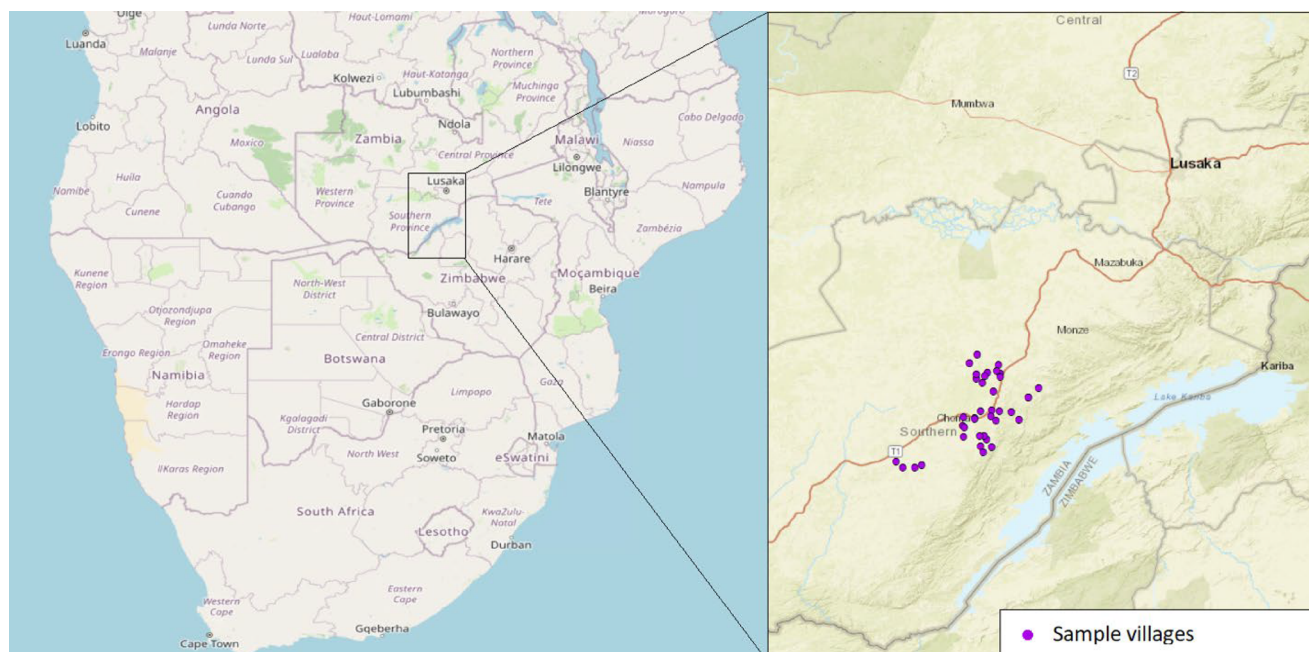


FIGURE 1 Study location.

production of maize, which is the most important crop in the region, decreased by about 24% at the national level compared to the 5-year average (FAO, 2020). The fact that previous milder droughts already weakened households' conditions further exacerbated the situation up to the point that approximately 192,000 people (10% of the population) in the province were in a crisis situation and 54,000 people (3% of the population) even in an emergency situation from October 2018 to March 2019 (ACAPS, 2019).

3.2 | Survey and measurement of key variables

We collected two rounds of survey data in 37 villages (see Figure 1.) The first round of data collection from August to September 2018 covered 643 households. For the second round in August/ September of 2019, we were able to collect follow-up survey data from 495 individuals. Although we made many attempts in the field to track and interview as many households as possible, attrition is still, unfortunately, relatively high.

The attrition is not entirely unexpected. Seasonal and permanent migration are common coping and adaptation strategies to the effects of climate change in Zambia and other countries in sub-Saharan Africa (Nawrotzki & DeWaard, 2018). Farming households often migrate to more suitable farming areas or to alternative sources of income generation such as mining sites (Simatele & Simatele, 2015), which has played a large role in the difficulties of re-interviewing farmers. To understand possible

biases that could arise from this, we therefore pay special attention to the issue during the analysis.

For the measurements of individual aspirations, we follow the most common approach used in recent quantitative research to build an individual aspirations index (e.g., Bernard et al., 2014; Kosec & Mo, 2017). Even though other ways to measure aspirations based on indirect and direct methods are able to yield decent quality data for single dimensions, to look at multiple dimensions at once, a summary index is currently the most-used option (Nandi & Nedumaran, 2021).

Our index consists of four dimensions: a farmer's number of cows, their number of goats, their plot size, and their children's education. These aspects have been shown to closely resemble relevant individual aspiration dimensions for many African farmers (Rao et al., 2020). For each dimension, farmers reported their current status, their aspired status in 10 years, and their expected status in 10 years. Each dimension is first winsorized at a 95% level and then standardized using the 2018 baseline sample mean and standard deviation. The standardized measures are aggregated with equal weights. This gives us the individual aspirations index A_i :

$$A_i = \sum_{d=1}^4 \left(\frac{a_d^i - \mu_d^s}{\sigma_d^s} \right) \quad (1)$$

where a_d^i is individual i 's aspiration in dimension d . Further, σ_d^s is the sample standard deviation and μ_d^s the sample mean for an aspiration in dimension d . For the community

aspirations index, we follow Martini et al. (2021) and build an equal-weighted index consisting of different dimensions: number of community meetings, share of people in the community with suitable housing, school distance, security, share of households in the community receiving financial support, and financial contributions to village. We also winsorize each dimension at a 95 % level and standardize each dimension using the 2018 sample mean and standard deviation. We then aggregate all dimensions with equal weights to one index. The community aspirations index A_c can be formalized as:

$$A_c = \sum_{d=1}^6 \left(\frac{a_d^i - \mu_d^s}{\sigma_d^s} \right), \quad (2)$$

with a_d^i for individual i 's aspiration in dimension d . Further, σ_d^s is the sample standard deviation and μ_d^s the sample mean for an aspiration in dimension d .

For the rainfall measurements, we use TAMSAT (Tropical Applications of Meteorology using Satellite and ground-based observations) data, which offers rainfall estimates for Zambia with a spatial resolution of .0375° latitude by .0375° longitude, covering about 4 km². Rainfall data from TAMSAT have shown to be highly correlated with rain gauge data in Zambia (Libanda et al., 2020), which underlines the suitability for these data for our context. Since we do not have GPS coordinates of each individual farm, we use the coordinates of headmen interviews to measure rainfall at a village level. Since rainfall is likely to be very highly correlated within villages, we do not expect large losses of variation from this aggregation.

Following a standard approach in the literature (Hendrix & Salehyan, 2012; Hidalgo et al., 2010; Kosec & Mo, 2017), we estimate the absolute rainfall deviation from the 30-year mean for each village using a two-step procedure. In the first step, we take monthly rainfall totals for each of the five rainy season months (November–March) and standardize them using the 30-year mean (μ_{vm}) and standard deviation (σ_{vm}) of rainfall for village v in month m . We then take a sum over these five values. This can be formalized as:

$$x_{v,2019} = \sum_{m=1}^5 \left(\frac{x_{vm,2019} - \mu_{vm}}{\sigma_{vm}} \right), \quad (3)$$

In the second step, we standardize these deviations by the 30-year season mean (μ_v) and standard deviation (σ_v) of rainfall in village v . Lastly, since droughts represent a negative deviation of rainfall, we use the absolute value of the standardized deviation in rainfall to ease interpretation of the variable. A higher value of absolute rainfall deviation thus reflects a more intense drought situation.

Our primary measure, the absolute value of rainfall deviations from the 30-year village season mean z_{abs} , therefore, follows the formula:

$$z_{abs} = \left| \frac{x_{v,2019} - \mu_v}{\sigma_v} \right| \quad (4)$$

Even though rainfall deviation is the most commonly used indicator for drought, we also consider alternative drought indicators, namely, the square of rainfall deviation as well as the Agricultural Stress Index (ASI) for crop-land. The ASI is a tool that combines the Vegetation Health Index in the time and space dimension. Firstly, it calculates the intensity and duration of dry periods during the crop cycle at each location, using crop coefficients to account for how different crops respond to water stress. Secondly, it determines the spatial extent of drought by identifying the percentage of arable land with Vegetation Health Index values below a critical threshold of 35 percent (Kogan, 1995). Administrative areas are then classified based on the percentage of affected land.

3.3 | Empirical approach

Motivated by our interest in the effects of droughts on farmers' aspirations, our empirical approach aims to isolate the impact of rainfall deviation on individual and community aspiration indices using multivariate models that control for potential confounders. Potential threats of bias coming from systematic measurement error or reverse causality are very low in our case, given the exogenous nature of rainfall and the rainfall measurement. To account for time-invariant unobserved heterogeneity among households, we apply a linear model with individual fixed effects, which can be expressed as follows:

$$y_{it} = \alpha_0 + \beta_1' R_{it} + \beta_2' X_{it} + \omega_i + \epsilon_{it}, \quad (5)$$

where y_{it} is either the individual aspiration index or the community aspiration index. R is continuous variable capturing drought intensity. X is a time variant set of individual characteristics. The parameter of interest is β_1 , since a negative and statistically significant coefficient would indicate that higher drought intensity is associated with lowered aspirations. Unobserved time invariant heterogeneity is captured through a fixed effect ω_i . ϵ_{it} is the individual error term. We calculate robust standard errors clustered at the village level. Since the data only cover two rounds and the variation of rainfall deviation in a given year across villages is quite low, our main specification does not include a dummy variable for the year 2019. Ide-

ally, such a year dummy could be included to account for any other general changes that occurred in the region between 2018 and 2019 which may have affected aspirations apart from the drought, such as socio-economic developments. To address this possibility, we include two village level variables that measure structural changes in the region, namely, road quality as well as the share of households in each village with decent housing. However, we also show the results of a secondary specification, in which we include a year dummy. In this secondary specification, the rainfall deviation parameter does not anymore capture the large variation in rainfall between the year 2018 and 2019, but rather the much smaller variation across villages.

To improve the precision of our estimates, we also adjust for a vector of time variant socio-economic characteristics X , namely, herd size, plot size, children's education, and membership in health and savings groups. However, if some of these covariates lie on the causal pathways through which the drought affects aspirations, their inclusion into the model could lead to an under- or overestimation of the true effect.

Similarly, conditioning on socio-economic characteristics also creates possibilities of collider bias. For example, including farm size in the regression could introduce such bias if a reduction in farm size is both a result of the drought as well as of lowered aspirations. We, therefore, also present a model without any control variables.

To explore a potential mechanism, we additionally estimate the following model:

$$y_{it} = \alpha_0 + \gamma_0(R_{it}|S_{it} = 0) + \gamma_1(R_{it}|S_{it} = 1) + \beta_2'X_{it} + \omega_i + \epsilon_{it}, \quad (6)$$

where S_{it} is an indicator variable that is one if a respondent experienced a loss in livestock or a crop failure 12 months prior to the data collection and zero otherwise. The comparison of size and statistical significance of γ_0 and γ_1 helps analyze whether the effect of the drought is more severe for respondents with agricultural losses compared to those who did not report any losses.

We also conduct several robustness tests. First, we test how sensitive the rainfall deviation coefficient is with regard to the choice of control variables. To that end, we estimate the model shown in Equation (5) for all possible combinations of control variables. Point estimates and confidence intervals of the main parameter of interest, that is, rainfall deviation, for these alternative specifications are then summarized and illustrated in a specification curve. Furthermore, we estimate the relative degree of selection under proportional selection of observables and unobservables (Oster, 2019). Similar to Ruml and Parlasca (2022), we present the parameter δ to indicate the extent of bias stemming from unobservable factors in compari-

son to observable ones that would be required to nullify the obtained results. Assuming proportional selection, greater values of δ indicate more robust results concerning unobserved confounding variables. Oster (2019) suggests a threshold value of 1. The parameter δ is, however, also contingent upon the extent to which unobserved confounders are allowed to explain variability in the regression. This extent, which we denote as R_{max}^2 , is calculated as the R^2 of the regression with all control variables included, multiplied by a certain factor larger than one. Oster (2019) suggests a factor of 1.3, while a more conservative factor of 2.2 is also commonly used. We show results for the more conservative value of R_{max}^2 .

Attrition between the two survey rounds is substantial and requires particular attention. To better understand the potential threat of attrition bias, we follow two approaches. First, we use observable characteristics of the baseline to estimate Inverse Probability Weights giving higher weight to those observations that – based on observable baseline characteristics – were more likely to have attrited between survey rounds. The selection equation is a probit model with the following predictors: age, gender, education, marriage, mobile phone usage, locus of control, individual aspiration index, community aspiration index, rainfall deviation, distance to the next water source, education of the youngest child, herd size, plot size, membership in a health group, membership in a savings group, housing, and road quality in the village, and the time lived in the village.

Second, we follow Özler et al. (2021) to estimate treatment effect bounds. To do so, we impute the outcome of missing observations with the round-specific mean plus or minus the round specific standard deviation multiplied by the factors .1, .2, .3, and .4. Since the drought variables are estimated at the village level, we do not need to impute the treatment variables of attriters.

4 | RESULTS

4.1 | Descriptive overview

Table 1 provides basic summary statistics for the balanced sample of 495 households in 2018 and 2019. About half of all individuals are female and the average age is around 44 years. Most households engage in crop farming, but keeping livestock is also common. The descriptive statistics also demonstrate the severity of the 2019 drought. While the sample average absolute rainfall deviation in 2018 was around .75, it jumped to 6.02 in 2019. Due to the drought, 79% of the sampled farmers reported a loss of livestock or crop failure. Table 1 also shows that individual aspirations decreased significantly from 2018 to 2019. The reduction

TABLE 1 Summary statistics.

	2018		2019		Difference
	Mean	SD	Mean	SD	
Female (1 = yes)	.51		.51		
Age (years)	44.05	14.93	44.10	14.96	
Education (years)	7.15	2.77	7.17	2.76	
Absolute rainfall deviation	.75	.24	6.02	.29	***
Experienced crop failure or livestock loss in the last year due to drought			.79		
Plot size	5.89	7.60	5.66	6.67	
Cows owned	3.51	4.07	6.22	5.36	***
Goats owned	5.12	5.88	5.92	6.65	**
Children's education (average years)	3.79	2.82	3.18	2.97	
A: Aspiration indices					
Individual aspiration index	-.07	2.64	-.37	2.46	*
Community aspiration index	.00	2.96	-.10	3.57	
B: Dimensions of individual aspirations					
Child's education	13.76	1.44	13.58	1.42	**
Plot size	15.55	13.09	10.37	9.39	**
Number of cows	26.11	27.49	23.91	25.14	
Number of goats	37.56	36.89	40.21	37.67	
C: Dimensions of community aspirations					
Housing	62.60	55.61	72.25	71.74	**
School distance	.09	.06	.08	.07	***
Security	6.23	3.42	6.28	3.71	
Village contributions	130.80	160.02	144.35	174.52	
Mutual support	33.77	33.70	30.86	55.89	
Meetings	3.18	1.43	2.70	1.38	***

Note: $N = 990$. P -values are calculated using two-tailed t -tests. *** $p < .01$, ** $p < .05$, * $p < .1$. SD = standard deviation.

seems to be driven by lower aspirations regarding plot size and cow ownership. We also observed a small drop in plot size from 2018 to 2019, which is not an uncommon response of Zambian farmers to drought (Alfani et al., 2021).

Differences regarding to the community aspiration index between 2018 and 2019 are not statistically significant. There are a few differences in specific dimensions. Aspirations for school distance, share receiving support, and the number of meetings decreased from 2018 to 2019, while aspirations regarding the contributions to the village even increased by approximately 12 Kwacha.

As mentioned earlier, attrition in the study is relatively high. To better understand reasons for attrition and potential threats to the validity of our analysis, we first compare baseline characteristics of non-attriters and attriters. Results are shown in Table 2. Attriters are on average more often male, are younger, and have received more education. They are also more likely to be single and are less likely to be a savings group member. These systematic differences are intuitive since they can be linked to either

a person's need to leave the study area or their chances to find sources of income outside their rural village. Gender roles in the region often suggest that women should stay at home and men work outside, which makes it easier for men to leave the village and find work elsewhere. Similar arguments can be made for education. Differences with regards to the aspiration indices are not statistically significant.

4.2 | Regression results and discussion

Table 3 summarizes the impacts of drought on individual aspirations. Column (1) shows the results following the model shown in Equation (5) without adjusting for control variables. Column (2) shows the results for the same regression with control variables included, but without a dummy for the year 2019. As discussed earlier, this is our preferred specification.

Results shown in column (3) contain both control variables as well as a dummy for the year 2019. Generally, we

TABLE 2 Attrition – Baseline comparison.

	Non-Attriter (N = 495)	Attriter (N = 148)	Difference
Female (1/0)	.51	.41	**
Age (years)	44.05	40.96	**
Highest grade	7.145	7.621	*
Single (1/0)	.07	.14	**
Locus of control	.96	.94	
Herd size (TLU)	4.09	4.10	
Plot size control	5.89	5.15	
Children's education	3.81	3.84	
Health group member	.02	.01	
Savings group member	.19	.12	**
Individual Aspirations	-.07	.25	
Community Aspirations	-.00	.00	

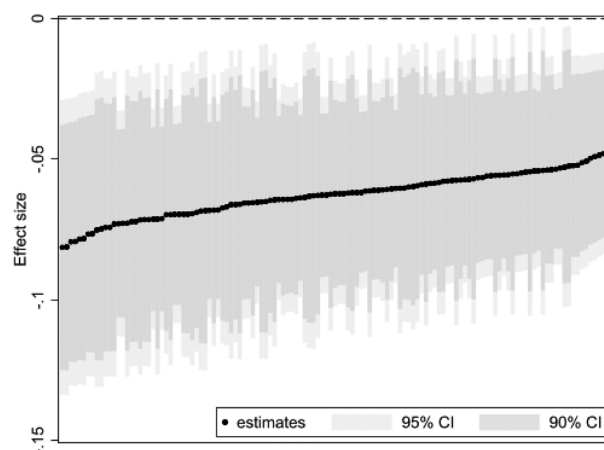
Notes: N = 643. We were able to re-interview 495 of 643 people. P-values are calculated using two-tailed t-tests. *** $p < .01$, ** $p < .05$, * $p < .1$. Abbreviation: TLU, tropical livestock unit.

find a negative and statistically significant effect of drought intensity on individual aspirations. The coefficients for the drought intensity in columns (1) and (2) are very similar, which lends some support to the argumentation that rainfall is exogenous to the time variant control variables.

The parameter δ for the main specification in column (2) is well above the threshold of one, even for conservative values for R^2_{max} . However, the results in column (3) show that when a dummy variable for the year 2019 is also included, the coefficient for rainfall deviation is not statistically significant anymore. This may be caused by the limited spatial variation of rainfall deviation and, hence, a strong correlation between the two variables.

In columns (4) to (7), we explore different drought indicators, specifically the square of rainfall deviation (columns 4 and 5) and the ASI for cropland (columns 6 and 7). The results remain highly consistent across these alternative specifications and are also statistically significant when the dummy for 2019 is included. This finding is noteworthy, given that the correlation between rainfall deviation and the ASI in the drought year 2019 is relatively modest (approximately 12%). This implies that the drought indicators capture different aspects of drought intensity for the affected population, yet all exhibit a consistent negative association with individual aspirations.

The square brackets below the coefficient for the drought indicators in columns (2), (4), and (6) contain the parameter δ for the relative degree of selection under proportional selection of observables and unobservables. The values are well above 1, meaning that even under conservative values for R^2_{max} , the results are insensitive to potential missing variable bias. Column (8) further presents the results for the main specification when respondents are

**FIGURE 2** Specification curve for the effect of drought intensity on individual aspirations.

Notes: N = 990. Point estimates for every combination of control variables without a 2019 dummy are shown as black dots. Confidence intervals are shown in dark grey (90%) and lighter grey (95%).

weighted using inverse probability weights to address potential attrition bias. Importantly, the key findings are similar and robust even under this adjustment.

In Figure 2, we show the specification curve to visualize the sensitivity of the regression coefficient for rainfall deviation in column (2) of Table 3 to the inclusion of control variables. The coefficient is negative and statistically significant at a 5% level for all possible combinations of control variables. The respective specification curves for the drought intensity coefficient in columns (4) and (6) of Table 3 are qualitatively similar and can be found in the [supplementary material](#).

In Figure 3 we show how the treatment effects in Table 3 change, depending on the assumption of endline aspirations for attriters. We show results for the regressions without control variables and with the treatment variable being either rainfall deviation or ASI. The coefficients remain statistically significant at a 10% level up to a bound of .3 standard deviations. If the endline aspirations of attriters were .4 standard deviations higher than the endline mean of non-attriters, the results would become statistically insignificant. A change of .4 standard deviations is twice as large as the aspiration change of non-attriters and, therefore, quite a large bound. We view this as a further indication that attrition bias is unlikely to be a significant concern for the validity of the key results. Overall, we therefore find strong and robust empirical support for hypothesis 1.

Table 4 summarizes the impacts of drought on respondents' aspirations for their community. Again, column (1) shows the results following the model shown in equation (5) without adjusting for control variables. Column (2) shows the results for the same regression with control

TABLE 3 Impact of drought on individual aspirations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rainfall deviation	−.059*** (.019)	−.062** (.024) [1.539]	−.438 (.431)					−.068*** (.024)
Square of rainfall deviation				−.010*** (.004) [1.678]	−.057* (.030)			
Agricultural stress index						−.439** (.163) [1.713]	−3.759** (1.633)	
2019			1.987 (2.256)		1.716 (1.077)		2.540* (1.277)	
Herd size		.044 (.026)	.043 (.026)	.044 (.026)	.042 (.026)	.045* (.026)	.056** (.025)	.044 (.026)
Size of plot(s)		.104*** (.012)	.104*** (.012)	.104*** (.012)	.104*** (.012)	.103*** (.012)	.103*** (.012)	.104*** (.012)
Education of youngest child		.054* (.031)	.055* (.031)	.055* (.031)	.060* (.031)	.054* (.031)	.055* (.031)	.057* (.030)
Member of health group		.720 (.531)	.755 (.533)	.726 (.531)	.765 (.530)	.714 (.532)	.701 (.545)	.676 (.527)
Member of savings group		.064 (.195)	.056 (.196)	.078 (.193)	.067 (.190)	.075 (.197)	.103 (.194)	.070 (.195)
Housing quality of village		.005* (.003)	.006* (.003)	.006* (.003)	.006* (.003)	.005* (.003)	.005* (.003)	.005 (.003)
Road quality		−.158 (.140)	−.135 (.169)	−.171 (.141)	−.220 (.176)	−.169 (.136)	−.220 (.147)	−.149 (.142)
Constant	−.024 (.064)	−1.162*** (.225)	−.888** (.390)	−1.202*** (.223)	−1.196*** (.220)	−1.167*** (.225)	−.874*** (.293)	−1.048*** (.227)
R ²	.017	.155	.156	.157	.161	.156	.159	.156

Note: Standard errors in parentheses are clustered at the village level. $N = 990$. *** $p < .01$, ** $p < .05$, * $p < .1$.

variables included, but without a dummy for the year 2019. Results shown in column (3) contain both control variables as well as a dummy for the year 2019. In columns (4) to (7), we again use the square of rainfall deviation (columns 4 and 5) and the ASI for cropland (columns 6 and 7) as alternative drought indicators. Generally, the results do not suggest a statistically significant effect of drought on the community aspiration index. Only the coefficient for the square of rainfall deviation in column 6 is statistically significant at a 10% level, but this result does not replicate for other drought indicators or when the dummy for the year 2019 is not included. We, therefore, do not find robust empirical support for hypothesis 2.

The results shown in Table 3 indicate a negative effect of drought on aspirations for individual aspirations. In an exploratory analysis, we further investigate potential mechanisms of this relationship. First, we would like to understand if the effects are stronger for people who

directly experienced drought related losses. To do so, we interact each drought indicator with a binary variable that equals one if a respondent lost livestock or experienced crop failure in the 12 months prior to the survey and zero otherwise.

The regression results with these interactions are shown in Table 5. We find that effects are both larger (in absolute terms) and have smaller standard errors for people who have experienced agricultural losses compared to people who have not (yet). Again, these results are consistent across the different drought indicators and also when weights are introduced to reduce potential attrition bias (see A1 in the [supplementary material](#)).

Effects for people who have not directly experienced agricultural losses are not statistically significant. It is also important to acknowledge that a binary variable cannot capture all nuances of drought-related agricultural losses. Still, the significant and robust effect sizes for the group

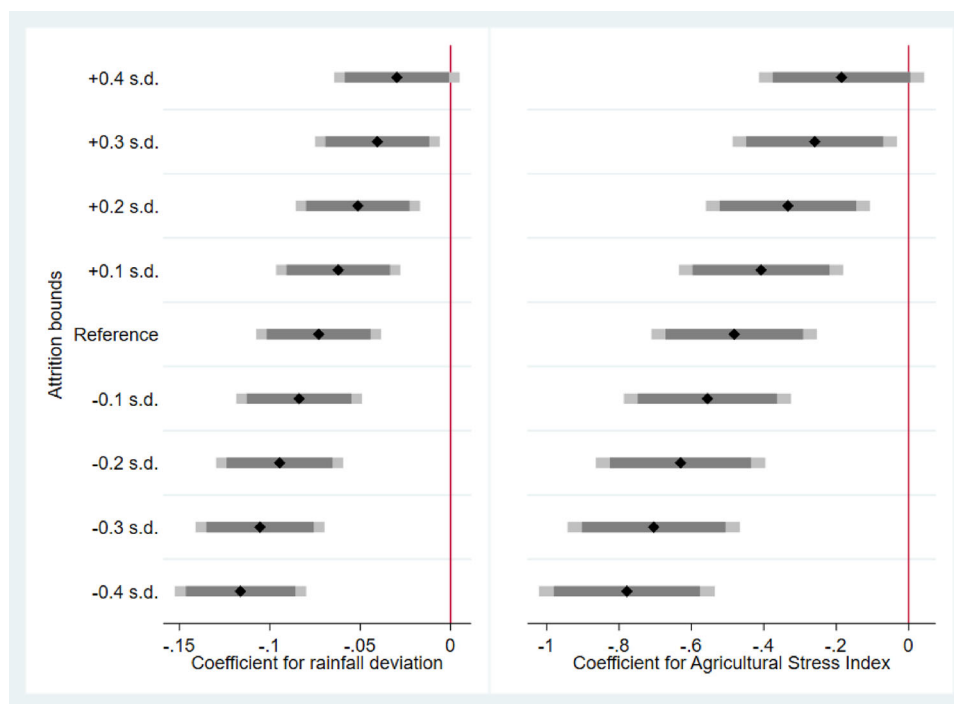


FIGURE 3 Sensitivity to attrition bias.

Notes: Point estimates for different attrition bounds are presented as black diamonds. Confidence intervals are shown in dark grey (90%) and lighter grey (95%).

of people who have experienced such losses align with our conceptual framework and indicate that livestock loss and crop failure could be important mechanisms through which drought affects people's individual aspirations.

In an exploratory analysis, we further try to investigate if the overall negative effect of drought intensity on individual aspirations can be traced back to specific components of the individual aspiration index. To do so, we estimate the model presented in equation 5 using each of the four components of the individual aspiration index as dependent variables. Results are presented in Table 6. We find that the negative effect of drought on individual aspirations is mostly driven by reduced aspirations with regards to future plot size and future number of cows. Aspirations for education and the number of goats are not affected by the lack of rainfall.

These results align with our interpretation that the drought has caused reduced individual aspirations, since precisely those dimensions are negatively affected, for which water scarcity presents the most severe issues. Arable farming in Zambia depends critically on rainfall. This could explain the negative association between rainfall deviation and plot size aspirations. Climate change and droughts are also challenging for livestock farming. However, farmers often perceive goats and small ruminants as better adapted for climate change compared to cows, due to their higher thermal and drought resilience, their ability to survive on limited pastures, and higher disease

resistance (Berihulay et al., 2019; Nair et al., 2021). This could explain why drought intensity has a negative and statistically significant effect on the aspirations for cows, while the coefficient for aspirations regarding goats is not statistically significant.

Lastly, drought intensity does not have any obvious direct implications for educational choices, which could explain why we find no statistically significant effects of drought intensity on the aspirations for education. Again, we find similar results when we use the alternative drought indicators and when we include attrition weights. The regression results are shown in the [supplementary materials](#).

4.3 | Study limitations

There are some limitations to our study that deserve discussion. The sample suffers from attrition between the two survey rounds. Attrition can be directly affected by people's aspirations as well as drought exposure, which could have created biases. However, we find that attrition only correlates with few baseline values of key variables and the results are robust to inverse probability weighting. Bounding exercises also show that the results are not very sensitive to differential attrition so we are cautiously optimistic that potential bias from attrition is small.

TABLE 4 Impact of drought on community aspirations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rainfall deviation	−.023 (.040)	.005 (.060)	.121 (.858)					.012 (.060)
Square of rainfall deviation				.002 (.009)	.122* (.061) [−.180]			
Agricultural Stress Index						.048 (.410)	2.836 (3.766)	
2019			−.612 (4.487)		−4.314* (2.258)		−2.134 (2.943)	
Herd size		−.027 (.024)	−.027 (.024)	−.028 (.024)	−.025 (.021)	−.027 (.024)	−.036 (.028)	−.026 (.024)
Size of plot(s)		.009 (.020)	.009 (.020)	.009 (.020)	.009 (.020)	.009 (.020)	.009 (.020)	.009 (.022)
Education of youngest child		.029 (.061)	.029 (.061)	.031 (.061)	.019 (.060)	.030 (.061)	.029 (.061)	.036 (.059)
Member of health group		−1.195 (.812)	−1.206 (.820)	−1.209 (.816)	−1.305 (.784)	−1.197 (.810)	−1.186 (.826)	−.843 (.857)
Member of savings group		−.240 (.353)	−.237 (.353)	−.281 (.350)	−.253 (.336)	−.247 (.354)	−.270 (.347)	−.244 (.345)
Housing quality of village		.010* (.005)	.010* (.005)	.010* (.005)	.009* (.005)	.010* (.005)	.010* (.005)	.010* (.005)
Road quality		−.193 (.406)	−.200 (.414)	−.193 (.407)	−.070 (.423)	−.193 (.405)	−.150 (.414)	−.144 (.399)
Constant	.021 (.135)	−.234 (.366)	−.318 (.746)	−.243 (.361)	−.257 (.352)	−.236 (.364)	−.483 (.451)	−.284 (.373)
R ²	.001	.014	.014	.014	.022	.014	.014	.012

Note: Standard errors in parentheses are clustered at the village level. $N = 990$. *** $p < .01$, ** $p < .05$, * $p < .1$.

A further limitation is the temporal and regional scope of the analysis. Since droughts usually affect larger regions, there is a high spatial correlation between households in terms of drought exposure. With a larger regional and temporal coverage of the data, it may have been possible to capture rainfall variation within years and also to estimate the durability of the effects.

5 | CONCLUSIONS

The negative consequences of droughts and other weather shocks on livelihoods can be devastating, especially for farmers. Apart from physical damage, such shocks also cause psychological distress and lead to hopelessness and anxiety. Yet, research on the behavioral and psychological impacts of weather shocks is still very scarce. In this article, we used panel data to contribute important new insights on the impact of a major drought on the individual and community goals of farmers in the rural South of

Zambia. We find that a drought leads to a reduction in individual aspirations. These effects are strongest for people who directly experienced drought-related losses. Furthermore, aspirations with regarding arable farming and cow ownership are negatively affected by the drought, whereas aspirations for goat ownership or children's education are not. We find no statistically significant effect of the drought on community aspirations.

Our research adds to the growing literature on the detrimental impacts of environmental shocks on aspirations (Kosec & Mo, 2017; Tabe-O et al., 2021). The effects of droughts are particularly relevant for this literature, as droughts affect more than 50 million people every year and are likely to increase in frequency and severity due to climate change. We also find indications that droughts affect aspirations towards specific farming decisions, such as which type of animals to keep. To fully understand how weather extremes influence farmers, behavioral and psychological consequences aspirations need to be accounted for. So far, the interplay between weather shocks, behav-

TABLE 5 Impact of drought, agricultural damages, and individual aspirations.

	(1)	(2)	(3)
Rainfall deviation (loss = 0)	−.031 (.051)		
Rainfall deviation (loss = 1)	−.067*** (.024)		
Square of rainfall deviation (loss = 0)		−.005 (.008)	
Square of rainfall deviation (loss = 1)		−.011*** (.003)	
Agricultural stress Index (loss = 0)			−.231 (.353)
Agricultural stress Index (loss = 1)			−.467*** (.158)
Control variables	YES	YES	YES
Household fixed effects	YES	YES	YES
R ²	.169	.169	.169

Note: Standard errors in parentheses are clustered at the village level. $N = 990$. *** $p < .01$, ** $p < .05$, * $p < .1$.

TABLE 6 Impact of droughts on dimensions of individual aspirations.

	(1) Education	(2) Plot size	(3) Number of goats	(4) Number of cows
Rainfall deviation	−.016 (.013)	−.035*** (.010)	.011 (.011)	−.022** (.009)
Herd size	−.001 (.008)	.006 (.004)	.012 (.010)	.027** (.012)
Size of plot(s)	.001 (.008)	.070*** (.008)	.010*** (.004)	.022*** (.006)
Education of youngest child	.062*** (.015)	−.001 (.009)	.000 (.013)	−.008 (.013)
Member of health group	.528*** (.183)	−.187 (.271)	.513** (.202)	−.134 (.248)
Member of savings group	−.039 (.092)	.086 (.070)	−.023 (.090)	.041 (.060)
Housing quality of village	.002 (.002)	−.001 (.001)	.003** (.001)	.002 (.001)
Road quality	.042 (.124)	−.005 (.073)	−.130* (.068)	−.065 (.090)
Constant	−.288*** (.085)	−.394*** (.089)	−.217** (.085)	−.263** (.100)
R ²	.055	.336	.042	.091

Note: Standard errors in parentheses are clustered at the village level. $N = 990$. *** $p < .01$, ** $p < .05$, * $p < .1$.

ioral economic factors such as aspirations, expectations, or hope, and farmers' adaptation and coping decisions is poorly understood and deserves more attention. Here, new approaches to measure aspirations that include qualitative parts are as important as quantitative studies based on well-established aspiration indices (Mausch et al., 2021).

In order to address the impact of droughts on farmers' aspirations, policy recommendations can be structured around three key areas of focus. Given that our results indicate that aspirations are significantly lower for those who have directly experienced agricultural losses, the first direction of policy recommendations should aim to reduce drought-related losses among farmers. This can be achieved, for example, by strengthening early warning systems and agricultural extension services that promote drought-resistant crops and livestock management practices, as well as investing in water infrastructure.

The second policy direction is to implement financial support mechanisms to mitigate the significant effects of agricultural losses. This encompasses the implementation of affordable insurance schemes that cover crops and livestock, as well as the establishment of safety net programs for farmers affected by droughts. Furthermore, access to credit and savings programs can assist farmers in investing in resilience-building measures and recovering more quickly from losses (Ghosh et al., 2021).

The third policy direction is concerned with providing of psychological support and community-based counselling. This includes increased investment in programs that assist farmers in coping with the stress and anxiety induced by droughts. In particular, community-based initiatives may be able to foster a supportive environment, helping to rebuild hope and aspirations. Additionally, educational programs on climate change and adaptive practices can empower farmers with knowledge and tools to better face future challenges. Comprehensive policies in these three areas will offer the highest level of protection and resilience against the adverse effects of droughts, promoting sustainable and adaptive farming practices amid increasing climate change challenges.

ACKNOWLEDGMENTS


This research was financially supported by the German Research Foundation (DFG) through grant number CRC-TRR 228 (Future Rural Africa: Future-making and social-ecological transformation). Christina A. Martini acknowledges the support of iDiv, which was funded by the German Research Foundation. We thank all survey participants and enumerators for their time and efforts. We also

appreciate the constructive comments by the anonymous reviewers and editor, Jacob Ricker-Gilbert.

Open access funding enabled and organized by Projekt DEAL.

ORCID

Martin C. Parlasca  <https://orcid.org/0000-0002-0562-3018>

Christina A. Martini  <https://orcid.org/0000-0002-4233-4012>

Marcela Ibañez  <https://orcid.org/0000-0002-3355-0880>

REFERENCES

- Abunyewah, M., Okyere, S. A., Opoku Mensah, S., Erdiaw-Kwasie, M., Gajendran, T., & Byrne, M. K. (2024). Drought impact on peri-urban farmers' mental health in semi-arid Ghana: The moderating role of personal social capital. *Environmental Development*, 49, 100960. <https://doi.org/10.1016/j.envdev.2023.100960>
- ACAPS. (2019). *Zambia drought – Southern Province*.
- Alfani, F., Arslan, A., McCarthy, N., Cavatassi, R., & Sitko, N. (2021). Climate resilience in rural Zambia: Evaluating farmers' response to El Niño-induced drought. *Environment and Development Economics*, 26(5-6), 582–604. <https://doi.org/10.1017/S1355770X21000097>
- Appadurai, A. (2004). The capacity to aspire: Culture and the terms of recognition. In M. Walton, & V. Rao (Eds.), *Stanford social sciences. Culture and public action: A cross-disciplinary dialogue on development policy* (pp. 59–84). Stanford University Press; Eurospan.
- Beaman, L., Duflo, E., Pande, R., & Topalova, P. (2012). Female leadership raises aspirations and educational attainment for girls: A policy experiment in India. *Science (New York, N.Y.)*, 335(6068), 582–586. <https://doi.org/10.1126/science.1212382>
- Berihulay, H., Abied, A., He, X., Jiang, L., & Ma, Y. (2019). Adaptation Mechanisms of Small Ruminants to Environmental Heat Stress. *Animals: An Open Access Journal from MDPI*, 9(3), 1–9. <https://doi.org/10.3390/ani9030075>
- Bernard, T., Dercon, S., Orkin, K., & Taffesse, A. (2014). *The future in mind: Aspirations and forward-looking behaviour in rural Ethiopia* (CSAE Working Paper Series No. WPS/2014-16). University of Oxford.
- Bernard, T., Dercon, S., & Taffesse, A. (2011). Beyond fatalism – an empirical exploration of self-efficacy and aspirations failure in Ethiopia (CSAE Working Paper Series No. WPS/2011-03). University of Oxford.
- Callahan, C. W., & Mankin, J. S. (2023). Persistent effect of El Niño on global economic growth. *Science (New York, N.Y.)*, 380(6649), 1064–1069. <https://doi.org/10.1126/science.adf2983>
- Cecchi, F., Garcia, A., Lensink, R., & Wydick, B. (2022). Aspirational hope, dairy farming practices, and milk production: Evidence from a randomized controlled trial in Bolivia. *World Development*, 160, 106087. <https://doi.org/10.1016/j.worlddev.2022.106087>
- Crandon, T. J., Dey, C., Scott, J. G., Thomas, H. J., Ali, S., & Charlson, F. J. (2022). The clinical implications of climate change for mental health. *Nature Human Behaviour*, 6(11), 1474–1481. <https://doi.org/10.1038/s41562-022-01477-6>
- Daghagh Yazd, S., Wheeler, S. A., & Zuo, A. (2019). Key risk factors affecting farmers' mental health: A systematic review. *International Journal of Environmental Research and Public Health*, 16(23), 1–23. <https://doi.org/10.3390/ijerph16234849>
- Dalton, P. S., Ghosal, S., & Mani, A. (2016). Poverty and aspirations failure. *The Economic Journal*, 126(590), 165–188. <https://doi.org/10.1111/eoj.12210>
- Dean, J. G., & Stain, H. J. (2010). Mental health impact for adolescents living with prolonged drought. *The Australian Journal of Rural Health*, 18(1), 32–37. <https://doi.org/10.1111/j.1440-1584.2009.01107.x>
- DeJaeghere, J., Pellowski Wiger, N., Le, H., Luong, P., Ngo, N. T. H., Vu, T. T., & Lee, J. (2022). Why do aspirations matter for empowerment? Discrepancies between the A-WEAI domains and aspirations of ethnic minority women in Vietnam. *World Development*, 159, 106057. <https://doi.org/10.1016/j.worlddev.2022.106057>
- Dilley, L., Mausch, K., Crossland, M., & Harris, D. (2021). What's the story on agriculture? Using narratives to understand farming households' aspirations in Meru, Kenya. *The European Journal of Development Research*, 33(4), 1091–1114. <https://doi.org/10.1057/s41287-021-00361-9>
- FAO. (2020). *Southern Africa Emergency Response Plan (2019–2020)* (Technical report). Rome.
- Fleming, D. A., Chong, A., & Bejarano, H. D. (2014). Trust and reciprocity in the aftermath of natural disasters. *The Journal of Development Studies*, 50(11), 1482–1493. <https://doi.org/10.1080/00220388.2014.936395>
- Freund, R. (2023). *From drought to distress: Examining the mental health consequences of water scarcity in Ethiopia* (CSAE Working Paper Series No. WPS/2023-07). University of Oxford.
- Genicot, G., & Ray, D. (2017). Aspirations and inequality. *Econometrica*, 85(2), 489–519. <https://doi.org/10.3982/ECTA13865>
- Genicot, G., & Ray, D. (2020). Aspirations and economic behavior. *Annual Review of Economics*, 12(1), 715–746. <https://doi.org/10.1146/annurev-economics-080217-053245>
- Ghosh, R. K., Gupta, S., Singh, V., & Ward, P. S. (2021). Demand for crop insurance in developing countries: New evidence from India. *Journal of Agricultural Economics*, 72(1), 293–320. <https://doi.org/10.1111/1477-9552.12403>
- Hamududu, B. H., & Ngoma, H. (2020). Impacts of climate change on water resources availability in Zambia: Implications for irrigation development. *Environment, Development and Sustainability*, 22(4), 2817–2838. <https://doi.org/10.1007/s10668-019-00320-9>
- Heilmann, K., Kahn, M. E., & Tang, C. K. (2021). The urban crime and heat gradient in high and low poverty areas. *Journal of Public Economics*, 197, 104408. <https://doi.org/10.1016/j.jpubeco.2021.104408>
- Hendrix, C. S., & Salehyan, I. (2012). Climate change, rainfall, and social conflict in Africa. *Journal of Peace Research*, 49(1), 35–50. <https://doi.org/10.1177/0022343311426155>
- Hidalgo, F. D., Naidu, S., Nichter, S., & Richardson, N. (2010). Economic determinants of land invasions. *Review of Economics and Statistics*, 92(3), 505–523. https://doi.org/10.1162/REST_a_00007
- Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science (New York, N.Y.)*, 341(6151), 1235367. <https://doi.org/10.1126/science.1235367>

- Hua, Y., Qiu, Y., & Tan, X. (2023). The effects of temperature on mental health: Evidence from China. *Journal of Population Economics*, 36(3), 1293–1332. <https://doi.org/10.1007/s00148-022-00932-y>
- Hulsman, P., Savenije, H. H., & Hrachowitz, M. (2021). Satellite-based drought analysis in the Zambezi River Basin: Was the 2019 drought the most extreme in several decades as locally perceived? *Journal of Hydrology: Regional Studies*, 34, 100789. <https://doi.org/10.1016/j.ejrh.2021.100789>
- Jones, B. A. (2022). Dust storms and violent crime. *Journal of Environmental Economics and Management*, 111, 102590. <https://doi.org/10.1016/j.jeem.2021.102590>
- Knapp, L., Wuepper, D., & Finger, R. (2021). Preferences, personality, aspirations, and farmer behavior. *Agricultural Economics*, 52(6), 901–913. <https://doi.org/10.1111/agec.12669>
- Kogan, F. N. (1995). Application of vegetation index and brightness temperature for drought detection. *Advances in Space Research*, 15(11), 91–100. [https://doi.org/10.1016/0273-1177\(95\)00079-T](https://doi.org/10.1016/0273-1177(95)00079-T)
- Kosec, K., & Mo, C. H. (2017). Aspirations and the role of social protection: Evidence from a natural disaster in rural Pakistan. *World Development*, 97, 49–66. <https://doi.org/10.1016/j.worlddev.2017.03.039>
- Libanda, B., Mie, Z., Nyasa, L., & Chilekana, N. (2020). Deciphering the performance of satellite-based daily rainfall products over Zambia. *Acta Geophysica*, 68(3), 903–919. <https://doi.org/10.1007/s11600-020-00429-w>
- Lybbert, T. J., & Wydick, B. (2018). Poverty, aspirations, and the economics of hope. *Economic Development and Cultural Change*, 66(4), 709–753. <https://doi.org/10.1086/696968>
- Marcantonio, R. A. (2020). Water, anxiety, and the human niche: A study in Southern Province, Zambia. *Climate and Development*, 12(4), 310–322. <https://doi.org/10.1080/17565529.2019.1617664>
- Martini, C., Ibanez, M., & Khadjavi, M. (2021). *Community aspirations and collective action* (GlobalFood Discussion Papers No. 149).
- Mausch, K., Harris, D., Dilley, L., Crossland, M., Pagella, T., Yim, J., & Jones, E. (2021). Not all about farming: understanding aspirations can challenge assumptions about rural development. *The European Journal of Development Research*, 33(4), 861–884. <https://doi.org/10.1057/s41287-021-00398-w>
- Mausch, K., Harris, D., Heather, E., Jones, E., Yim, J., & Hauser, M. (2018). Households' aspirations for rural development through agriculture. *Outlook on Agriculture*, 47(2), 108–115. <https://doi.org/10.1177/0030727018766940>
- Meierrieks, D. (2021). Weather shocks, climate change and human health. *World Development*, 138, 105228. <https://doi.org/10.1016/j.worlddev.2020.105228>
- Mullins, J. T., & White, C. (2019). Temperature and mental health: Evidence from the spectrum of mental health outcomes. *Journal of Health Economics*, 68, 102240. <https://doi.org/10.1016/j.jhealeco.2019.102240>
- Nair, M. R. R., Sejian, V., Silpa, M. V., Fonsêca, V. F. C., Costa, M., de, C. C., Devaraj, C., Krishnan, G., Bagath, M., Nameer, P. O., & Bhatta, R. (2021). Goat as the ideal climate-resilient animal model in tropical environment: Revisiting advantages over other livestock species. *International Journal of Biometeorology*, 65(12), 2229–2240. <https://doi.org/10.1007/s00484-021-02179-w>
- Nandi, R., & Nedumaran, S. (2021). Understanding the aspirations of farming communities in developing countries: A systematic review of the literature. *The European Journal of Development Research*, 33(4), 809–832. <https://doi.org/10.1057/s41287-021-00413-0>
- Nawrotzki, R. J., & DeWaard, J. (2018). Putting trapped populations into place: climate change and inter-district migration flows in Zambia. *Regional Environmental Change*, 18(2), 533–546. <https://doi.org/10.1007/s10113-017-1224-3>
- Obradovich, N., Migliorini, R., Paulus, M. P., & Rahwan, I. (2018). Empirical evidence of mental health risks posed by climate change. *Proceedings of the National Academy of Sciences of the United States of America*, 115(43), 10953–10958. <https://doi.org/10.1073/pnas.1801528115>
- Oster, E. (2019). Unobservable selection and coefficient stability: Theory and evidence. *Journal of Business & Economic Statistics*, 37(2), 187–204. <https://doi.org/10.1080/07350015.2016.1227711>
- Özler, B., Çelik, Ç., Cunningham, S., Cuevas, P. F., & Parisotto, L. (2021). Children on the move: Progressive redistribution of humanitarian cash transfers among refugees. *Journal of Development Economics*, 153, 102733. <https://doi.org/10.1016/j.jdeveco.2021.102733>
- Papaioannou, K. J., & Haas, M. d. (2017). Weather shocks and agricultural commercialization in Colonial Tropical Africa: Did cash crops alleviate social distress? *World Development*, 94, 346–365. <https://doi.org/10.1016/j.worlddev.2017.01.019>
- Rao, N., Singh, C., Solomon, D., Camfield, L., Sidiki, R., Angula, M., Poonacha, P., Sidibé, A., & Lawson, E. T. (2020). Managing risk, changing aspirations and household dynamics: Implications for wellbeing and adaptation in semi-arid Africa and India. *World Development*, 125, 104667. <https://doi.org/10.1016/j.worlddev.2019.104667>
- Ray, D. (2006). Aspirations, poverty, and economic change. In A. V. Banerjee, R. Bénabou, & D. Mookherjee (Eds.), *Understanding poverty* (pp. 409–422). Oxford University Press. <https://doi.org/10.1093/0195305191.003.0028>
- Ruml, A., & Parlasca, M. C. (2022). In-kind credit provision through contract farming and formal credit markets. *Agribusiness*, 38(2), 402–425. <https://doi.org/10.1002/agr.21726>
- Sen, A. (1999). *Development as freedom*. Oxford University Press.
- Serneels, P., & Dercon, S. (2021). Aspirations, poverty, and education. Evidence from India. *The Journal of Development Studies*, 57(1), 163–183. <https://doi.org/10.1080/00220388.2020.1806242>
- Simatele, D., & Simatele, M. (2015). Migration as an adaptive strategy to climate variability: a study of the Tonga-speaking people of Southern Zambia. *Disasters*, 39(4), 762–781. Portico. <https://doi.org/10.1111/disa.12124>
- Stephane, V. (2021). Hiding behind the veil of ashes: Social capital in the wake of natural disasters. *World Development*, 145, 105518. <https://doi.org/10.1016/j.worlddev.2021.105518>
- Tabé-Ojong, M. P., Heckelee, T., & Baylis, K. (2021). Aspiration formation and ecological shocks in rural Kenya. *The European Journal of Development Research*, 33(4), 833–860. <https://doi.org/10.1057/s41287-021-00411-2>
- Tabé-Ojong, M. P., Heckelee, T., & Rasch, S. (2023). Aspirations and investments in livestock: Evidence of aspiration failure in Kenya. *Agricultural Economics*, 54(5), 674–696. <https://doi.org/10.1111/agec.12785>

- UNCCD. (2022). *Drought in numbers 2022 - Restoration for readiness and resilience*.
- Vins, H., Bell, J., Saha, S., & Hess, J. J. (2015). The mental health outcomes of drought: A systematic review and causal process diagram. *International Journal of Environmental Research and Public Health*, 12(10), 13251–13275. <https://doi.org/10.3390/ijerph121013251>
- Zamani, G. H., Gorgievski-Duijvesteijn, M. J., & Zarafshani, K. (2006). Coping with drought: Towards a multilevel understanding based on conservation of resources theory. *Human Ecology*, 34(5), 677–692. <https://doi.org/10.1007/s10745-006-9034-0>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Parlasca, M. C., Martini, C. A., Köster, M., & Ibañez, M. (2024). Aspirations and weather shocks: Evidence from rural Zambia. *Agricultural Economics*, 55, 985–999. <https://doi.org/10.1111/agec.12858>