Aspirations and Weather Shocks:

Evidence from Rural Zambia

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Abstract

Aspirations are future-oriented desires or ambitions that determine various choices including economic and agricultural activities. Aspirations are shaped by the 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 the aspirations of farmers in rural Zambia with regards to their individual and community goals. Using primary panel data from two survey rounds before and after a major drought, we show that such extreme weather events can be associated with adverse impacts aspirations for individual goals. 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 aspirations for community goals.

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1. Introduction

Aspirations, which can be defined as forward-looking desires or ambitions to achieve a specific goal vital for future oriented behavior and are thus important ingredients for economic development (Kosec and Mo, 2017; Dalton et al., 2016; Ray, 2006; Beaman et al., 2012; Duflo, 2012; Serneels and Dercon, 2020). 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 or climate risk mitigation strategies (Mausch et al., 2018; Knapp et al., 2021; Tabe-Ojong et al., 2022). Aspirations can, therefore, represent critical internal constraints to personal and community growth and are behavioral drivers of many decisions on and off the farm (Bernard et al., 2014; Genicot and Ray, 2020; Nandi and Nedumaran, 2021; Lybbert and Wydick, 2018).

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 shown to be associated with higher emotional distress and anxiety among affected populations (Zamani et al., 2006).

This article sets out to investigate if prolonged periods of little to no rainfall cause farmers to adjust their aspirations downwards. We thereby connect two separate strands of literature. On the one side, we build on the existing research on drought-related mental health effects. This strand of literature, which comes largely from psychological and medical fields, has shown that droughts can erode mental health, cause anxiety and are even associated with increased suicide rates. Farmers are particularly vulnerable to such effects due to their strong dependence on rainfall. On the other side, we also build on a much smaller, 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 et al., 2018) and an invasive species in Kenya (Tabe-Ojong et al., 2021). In both instances, natural disasters lowered income and wealth, both in the present and in the future, and thereby led to a reduction in the goals that people thought were achievable.

Motivated by these two strands of literature, we examine the influence of a major drought that struck Southern Africa in late 2018/2019 on the aspirations of Zambian farmers. As in many sub-Saharan countries, droughts represent critical hazards to Zambia's agrarian economy. Average temperatures in the country have risen over the last three decades and the 2015/16 El Niño threat to livestock and crops in almost all parts of the world UN (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 urgently needed, also for the design of policies and programs that try to safeguard vulnerable populations against such events and to understand potential long-term consequences of droughts that go beyond the loss of physical assets. The second contribution of the article is a methodological differentiation between aspirations for individual goals ("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 certain households in a community and leaving others unaffected, but rather systemic shocks that influence an entire community, region of even country at once.

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 compromising 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 a 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 with regards to their community. As argued by Martini et al. (2021), important community characteristics may relate to the political freedom, quality of infrastructure, social opportunities, safety, or solidarity within one's own community.

From a theoretical perspective, aspirations are assumed to be shaped by a person's "cognitive neighborhood" (Genicot and Ray, 2020). By observing others, people are able to imagine what they could do and what they or their community could achieve (Arjun et al., 2004; Genicot and Ray, 2017). Aspirations are, therefore, not only determined by own past aspirations, but also strongly depend on ongoing and anticipated social, economic, and cultural influences (Genicot and Ray, 2017; Dilley et al., 2021). In addition to the strong social component of aspiration formation, aspirations can also be shaped by other external influences such as environmental shocks. When such external circum- stances impede the achievement of certain 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 people's aspirations. The authors show that the aspirations of people affected by the flood fell by a similar magnitude to what would be experienced if household spending were slashed by 50 per cent. Tabe-Ojong et al. (2021) further show that farmers' aspirations in Kenya are negatively affected by ecological stressors in the form of an invasive plant. Unlike previous studies, Tabe-Ojong et al. (2021) also consider different dimensions of individual aspirations, revealing that negative associations are 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 and 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 and 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 to lose control over their life without clear paths forward, making them less willing to invest and, therefore, lowers their aspirations accordingly. Furthermore, Kosec and Mo (2017) hypothesize that a shock could also impact individuals' community negatively, leading to conflicts and instability, which would reduce aspirations.

This article considers the effect of droughts on both community and individual aspirations. It is, therefore, important to examine how these two types of aspirations can react differently to shocks. Evidence shows that weather shocks can lead to adverse effects not only on individuals, but also on community aspects, such as increased political violence and social distress (Miguel et al., 2004; Papaioannou and de Haas, 2017).

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

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 effect differ across community aspiration dimensions. Effects of a drought on community aspiration dimension that, for example, reflect the social cohesion of 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 or quality of housing, it can be hypothesized that 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

4.1 Study region

To test our hypotheses, we use two rounds of survey data collected by the authors in the Southern Province of 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-annual and intra-annual precipitation in the region varied substantially over the last 50 years (Hamududu and Ngoma, 2020). Even though the Southern Province in Zambia has experienced several dry conditions, dry spells and unpredictable weather events over the past decades, the drought with El Niño like conditions in 2018/19 marked a low point as the driest season since 1981 (ACAPS, 2019; FAO, 2020). The production of maize, which is the most important crop in the region, decreased by about 24% at the national level compared to the five-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).

4.2 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 covers 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 relatively high.

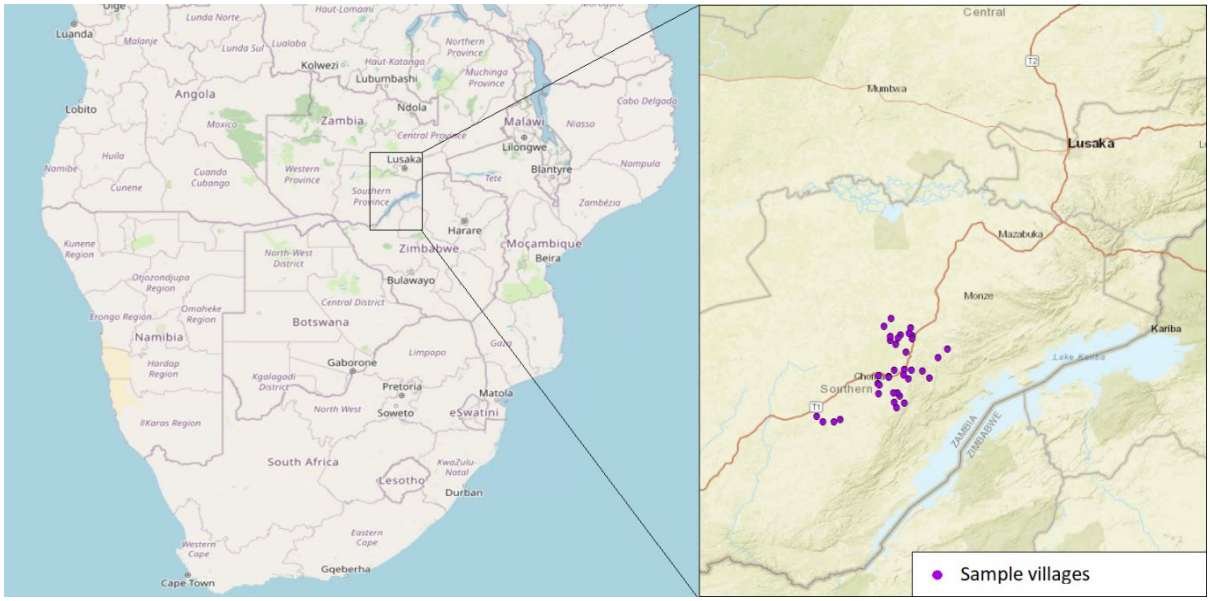

Figure 1: Study location

Yet, the attrition is not entirely unexpected. Seasonal and permanent migration are common coping and adaption strategies to the effects of climate change in Zambia and other countries in sub-Saharan Africa (Nawrotzki and DeWaard, 2018). Farming households often migrate to more suitable farming areas or to alternative sources of income generation such as mining sites (Simatele and 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 later on 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 and 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, for the purpose of looking at multiple dimensions at once, a summary index is currently the most used option (Nandi and 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. For each dimension, farmers reported their current status, their aspired status in ten years as well as their expected status in ten years. Each dimension is 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:

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

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 six different dimensions: number of community meetings, share of people in the community with good housing, school distance, security, share of households in the community receiving financial support, and financial contributions to village. Again, we standardize each dimension using the 2018 sample mean and standard deviation and then aggregate all dimensions with equal weights to one index. The community aspirations index A_s can be formalized as:

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

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 0.0375° latitude by 0.0375° longitude, covering about 4 square-kilometers. 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 measure rainfall at a village level and use coordinates of headmen interviews to assign the rainfall data for each village. Since rainfall is likely to be highly correlated within villages, we do not expect large losses of variation from this.

Following a standard approach in the literature (Kosec and Mo, 2017; Hendrix and Salehyan, 2012; Hidalgo et al., 2010) 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_{im}) and standard deviation (σ_{im}) of rainfall for village v in month m. We then take a sum over these five values. This can be formalized as:

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

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:

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

4.3 Empirical approach

Motivated by our interest in the effects of droughts on farmers' aspirations, our empirical approach aims to isolate the effects of rainfall deviation on individual and social aspiration indices using multivariate models that control for potential confounders. Given the exogenous nature of rainfall, there is a very low threat of bias coming from systematic measurement error or reverse causality in our case. However, one cannot fully rule out that the drought intensity of 2019 may be correlated with other household characteristics that in turn influence aspirations. Drought intensity could, for example, be correlated with past drought experience and thereby personal resilience to cope and adapt to such shocks. To account for such time-invariant unobserved heterogeneity, we apply a linear model with household fixed effects, which can be expressed as follows:

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

where y_{it} is either the individual aspiration index or the social aspiration index. 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.

Individual fixed effects are included through ω_i. The error term ϵ_{it} is clustered at the village level. Since the data only cover two rounds and 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. Ideally, one would include such a year dummy to account for any other general socio-economic developments that occurred between 2018 and 2019 in the region apart from the drought that may have affected aspirations. 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 do 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.

We also adjust for a vector of socio-economic characteristics, 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. To test how sensitive rainfall deviation coefficient is with regards to the choice of control variables, we therefore estimate the model shown in equation (1) for all possible combinations of control variables. Point estimates and confidence intervals of the main parameter of interest, i.e. rainfall deviation, for these alternative specifications are then summarized and illustrated in a specification curve. Although we use observational data, we therefore argue that our estimations allow a close-to-causal interpretation of the relationship between drought and farmers' aspirations.

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 drought that we examine in this article.

While the sample average absolute rainfall deviation in 2018 was around 0.75, it jumped up to 6.02 in 2019. As a direct result of the drought, 73% of the sampled farmers reported loss of livestock or crop failure. Table 1 also shows that individual aspirations decreased from 2018 to 2019. The reduction seems to be driven by lower aspirations regarding children's education, plot size, and the number of cows households aspire to own.

Table 1: Summary statistics

	2018		2019	
	Mean	SD	Mean	SD
Female (1 = yes)	0.51		0.51	
Age (years)	44.05	14.93	44.10	14.96
Education (years)	7.15	2.77	7.17	2.76
Absolute rainfall deviation	0.75	0.24	6.02	0.29
Absolute rainfall deviation loss in the last year due to drought (1 = yes)			0.73	
Plot size	7.97	16.84	7.29	8.67
Cows owned	3.51	5.56	6.22	5.36
Goats owned	5.73	8.17	8.88	11.01
Children's education (average years)	3.81	2.81	3.06	2.97
Share of HHs with good housing	26.86	30.30	28.37	32.64
School distance (walking distance in minutes)	0.04	0.05	0.04	0.07
Security (number of community guards)	2.60	1.86	2.93	1.68
Contributions to community (Kwacha/HH/year)	110.08	182.58	92.66	139.84
Share of HHs receiving communal support	12.98	16.97	11.58	17.16
Number of community meetings (per month)	1.79	1.46	2.12	1.29
A: Aspiration indices				
Individual aspiration index	-0.06	2.51	-0.32	2.48
Community aspiration index	-0.01	2.82	0.18	4.53
B: Dimensions of individual aspirations				
Child's education	13.76	1.44	13.58	1.42
Plot size	15.86	27.07	10.97	11.46
No. cows	32.99	64.07	25.83	33.14
No. goats	41.32	51.15	49.73	85.79
C: Dimensions of community aspirations				
Housing	62.60	55.61	72.25	71.74
School distance	0.10	0.09	0.09	0.10
Security	6.23	3.42	6.28	3.71
Village contributions	164.54	301.91	187.01	363.48
Mutual support	33.37	33.70	30.86	55.89
Meetings	3.28	1.72	2.86	1.90

Note: N = 495. SD = standard deviation.

Differences with regard to the community aspiration index between 2018 and 2019 are not statistically significant. There are a few differences in specific dimensions. The aspirations for school distance, share receiving support, and number of meetings decrease from 2018 to 2019, while aspirations regarding the contributions to the village even increased by approximately 22 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, have higher grades. They are more likely to be single,

have higher individual aspirations and are less likely to be a member of a savings group. 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 of 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. While individual aspirations among attriters are statistically significantly higher compared to non-attriters, we do not find statistically significant differences among the two groups for social aspirations. Again, this finding can be explained by the argument that individual aspirations may reflect a higher motivation to leave crisis situations and look for opportunities outside one's own village.

Table 2: Attrition - baseline comparison

	Non-attriter	Attriter	p-value ranksum-test
Female (1/0)	0.51	0.41	0.027
Age (years)	44.05	40.96	0.020
Highest grade	7.15	7.62	0.030
Single (1/0)	0.07	0.14	0.018
Social Aspirations	-0.16	0.14	0.729
Individual Aspirations	-0.07	0.22	0.077
Social current status	0.05	-0.19	0.357
Individual current status	0.01	-0.04	0.907
Locus of control	0.96	0.94	0.353
Self-efficacy	0.78	0.80	0.465
Trust villagers	0.90	0.89	0.682
Savings group member	0.19	0.12	0.049
Observations	495	148	

Notes: N = 643. We were able to re-interview 495 of 643 people. P-values are calculated using Wilcoxon ranksum tests.

We also investigate the relationship between attrition and aspirations using probit models where attrition is a binary dependent variable and aspirations as well as different control variables are explanatory variables. The results presented in the appendix in Tables A1 and A2 show that there are no statistically significant associations between community aspirations or individual aspirations and attrition. Results do not change much depending on whether or not individual and village controls are included. This lends some support to the argument that people most likely left their village due to the drought or to pursue better income opportunities elsewhere. While the relatively high attrition rate should be taken into account in the interpretation of the overall results, we assume that, at least in terms of internal validity, the threat of attrition bias is therefore small.

4.2 Regression results and discussion

Table 3 summarizes the impacts of drought on individual aspirations (columns 1 and 2) and com- munity aspirations (columns 3 and 4). Columns (1) and (3) present the results following the model shown in equation (5) without including a dummy for the year 2019. Columns (2) and (4) present the results for the model when a year dummy is included.

Generally, we find a negative and statistically significant effect of drought intensity on individual aspirations. While keeping in mind that drought intensity and the dummy for the year 2019 are highly correlated, the negative regression coefficient for drought intensity in column (2) implies that even after controlling for the overall drought situation in the study region, farmers in villages with relatively little rainfall reduce their individual expectations more than farmers in other villages.

Table 3: Impact of drought on individual and community aspirations

	Individual Aspirations		Community Aspirations	
	(1)	(2)	(3)	(4)
Drought intensity	-0.066**	-0.841*	0.051	-0.451
	(0.025)	(0.420)	(0.065)	(1.057)
2019 dummy		4.096*		2.654
		(-2.221)		(-5.533)
Herd size	0.041*	0.041*	0.013	0.013
	(0.023)	(0.023)	(0.017)	(0.017)
Size of plot(s)	0.039***	0.039***	-0.013	-0.013
	(0.008	(0.008)	(0.013)	(0.013)
Education of youngest child	0.058	0.060	0.024	0.025
	(0.037)	(0.037)	(0.057)	(0.057)
Member of health group	0.881**	0.952**	-1.125*	-1.079*
	(0.428)	(0.428)	(0.590)	(0.598)
Member of savings group	0.031	0.014	-0.240	-0.251
	(0.205)	(0.203)	(0.452)	(0.454)
Housing quality of village	0.008***	0.008***	0.003	0.003
	(0.002)	(0.002)	(0.005)	(0.005)
Road quality	-0.212	-0.163	-0.416	-0.384
	(0.176)	(0.208)	(0.383)	(0.383)
Constant	-0.905***	-0.346	-0.044	0.318
	(0.203)	(0.379)	(0.379)	(0.853)
R2	0.120	0.125	0.008	0.009

Note: Standard errors in parentheses are clustered at the village level. N = 990. ***p < 0.01, ** p < 0.05, * = p < 0.1.

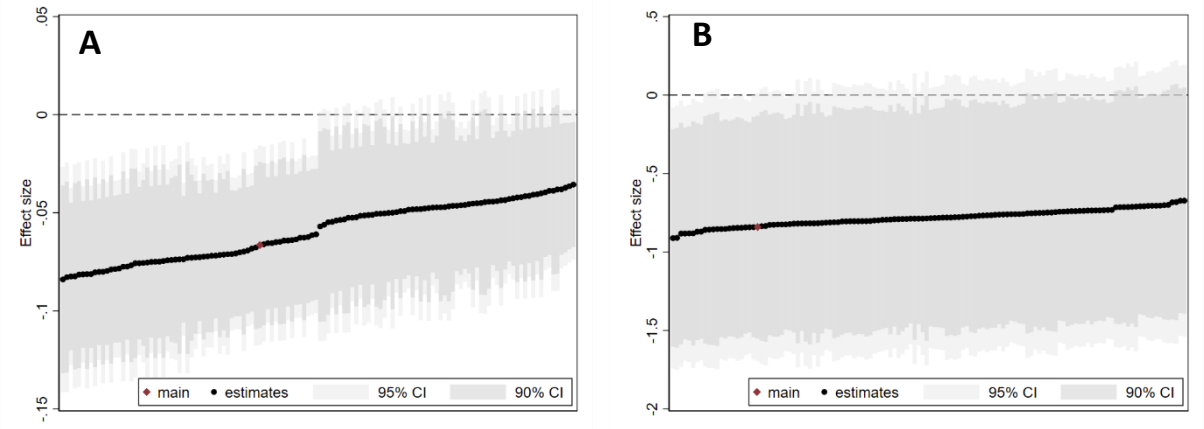

Figure 2: Specification curve for the associations between drought intensity and individual aspirations. Notes: N = 990. Point estimates for every combination of control variables are shown as black dots. Panel B controls for a 2019 year dummy, panel B does not. Confidence intervals are shown in dark grey (95%) and lighter grey (99%). The main specification with all control variables is shown as a red diamond.

In Figure 2, we visualize the sensitivity of the coefficient for drought intensity in column (1) of Table 4 through a specification curve. The coefficient is statistically significant for nearly all possible combinations of control variables, which underlines the robustness of this result. A similar specification curve for the drought intensity coefficient in column (2) of Table is shown in Figure 3. Here, the coefficient is very insensitive to the in- or exclusion of control variables and also remains mostly statistically significant. To further test the robustness of our results, we also consider the squared absolute rainfall deviation as our measure for drought intensity. The results are qualitatively similar (see Table A1). Overall, we therefore find support for hypothesis 1, but not for hypothesis 2.

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 aspiration index. To do so, we estimate the model presented in equation 5 using each of the four components as dependent variables. Results are presented in Table 4. We find that the negative effect of the drought on individual aspirations is mostly driven by reduced aspirations with regards to future plot size and future number of owned cows. Aspirations for education and the number of goats not affected by the lack of rainfall. These results can be well explained by the degree to which water scarcity affects the expected profitability of each component. Low rainfall is a major issue for farming and thereby could explain why aspirations for plot size are reduced. Furthermore, goats and small ruminants are often perceived animals better adapted to for climate change compared to cows, due to their high thermal and drought resilience, their ability to survive on limited pastures, and high disease resistance. This could explain why drought intensity has a negative and statistically significant effect on the aspirations for cows, while the coefficient for the number of goats is not statistically significant. Lastly, drought intensity does not have any direct implication for the profitability of education. This could explain why we do not find and statistically significant effects of drought intensity on the aspirations for education.

Table 4: Impact of drought on individual aspiration dimensions

	Education	Plot size	Number of cows	Number of goats
	(1)	(2)	(3)	(4)
Drought intensity	-0.014	-0.035***	-0.027***	0.010
	(0.014)	(0.008)	(0.008)	(0.013)
Herd size	-0.005	0.008	0.017***	0.020
	(0.006)	(0.008)	(0.006)	(0.013)
Size of plot(s)	-0.003	0.039***	0.005	-0.003
	(0.003)	(0.006)	(0.003)	(0.007)
Education of youngest child	0.062***	-0.002	0.002	-0.003
	(0.015)	(0.009)	(0.013)	(0.023)
Member of health group	0.543***	-0.081	-0.014	0.433*
	(0.182)	(0.133)	(0.120)	(0.214)
Member of savings group	-0.038	0.025	-0.035	0.079
	(0.091)	(0.057)	(0.079)	(0.139)
Housing quality of village	0.002	0.001	0.002*	0.003**
	(0.002)	(0.002)	(0.001)	(0.001)
Road quality	0.043	-0.085	0.019	-0.189*
	(0.124)	(0.066)	(0.035)	(0.107)
Constant	-0.245***	-0.328***	-0.168*	-0.164
	(0.083)	(0.104)	(0.090)	(0.111)
R2	0.057	0.506	0.049	0.040

Note: Standard errors in parentheses are clustered at the village level. N = 990. ***p < 0.01, ** p < 0.05, * = p < 0.1.

5. Conclusions

Understanding the consequences of natural weather shocks on people's aspirations is still in its infancy. While Kosec and Mo (2017) provided the basis, we use panel data to contribute important new insights on the impact of a major drought on community and individual aspirations of people in the rural South of Zambia in 2019. This article contributes to the existing literature by investigating the association between rain variation and individual and community aspiration. We do not find any statistically significant effects of the drought on community aspirations, we find that in line with previous research on other types of environmental shocks, droughts can be associated with reduced individual aspirations.

Some limitations should be taken into consideration when designing new studies. Attrition between the two rounds could have created biases. Yet, we are cautiously optimistic that such potential bias of are not substantial based on baseline comparison.

We derive some policy recommendations from this study. During crisis situations, possible measures to mitigate negative aspiration effects are important and could, for example, involve social cash transfer programs as shown by a number of studies (cf. Kosec and Mo, 2017; Asfaw et al., 2017; Lawlor et al., 2019). Also, the observation that attriters of our sample on average get less external support than non-attriters could indicate that village-level support through various organizations should be bolstered. Promising measures might be improved water infrastructure and water management practices as well as agricultural extension programs (cf. Alfani et al., 2019; Chonabayashi et al., 2020). Policies that aim at increasing aspirations could also include role model interventions (Bernard et al., 2014).

Given that the emergence of weather extremes will increase in the future, more research on their consequences is vital (cf. IPCC, 2018). In light of the importance of aspirations for well-being outcomes, a stronger focus on behavioral and psychological consequences is necessary (cf. Ray, 2006). Here, new approaches to measure aspirations that include both quantitative and quali- tative parts which do not restrict respondents to certain categories are as important as quantitative studies based on well-established aspiration indices (Mausch et al., 2021). The necessity to study aspirations is not only given for the direct impacts of shocks on aspirations, but also with regards to people's ability to cope with shocks so that negative consequences of droughts and other similar events for farmers and other vulnerable populations are as small as possible.

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Appendix

Table A1: Impact of drought on individual and community aspirations

	Individual Aspirations		Community Aspirations	
	(1)	(2)	(3)	(4)
Drought intensity	-0.010**	-0.067*	0.009	0.114
	(0.004)	(0.030)	(0.010)	(0.078)
2019 dummy		2.052*		3.790
		(1.117)		(2.804)
Herd size	0.042*	0.041*	0.013	0.013
	(0.023)	(0.023)	(0.017)	(0.017)
Size of plot(s)	0.039***	0.039***	-0.013	-0.013
	(0.008	(0.008)	(0.013)	(0.013)
Education of youngest child	0.059	0.060	0.024	0.025
	(0.037)	(0.037)	(0.057)	(0.057)
Member of health group	0.887**	0.952**	-1.125*	-1.079*
	(0.428)	(0.428)	(0.590)	(0.598)
Member of savings group	0.044	0.031	-0.240	-0.251
	(0.201)	(0.203)	(0.452)	(0.454)
Housing quality of village	0.008***	0.008***	0.003	0.003
	(0.002)	(0.002)	(0.005)	(0.005)
Road quality	-0.212	-0.163	-0.416	-0.384
	(0.176)	(0.208)	(0.383)	(0.383)
Constant	-0.905***	-0.346	-0.044	0.318
	(0.203)	(0.379)	(0.379)	(0.853)
R2	0.121	0.127	0.009	0.013

Note: Standard errors in parentheses are clustered at the village level. N = 990. ***p < 0.01, ** p < 0.05, * = p < 0.1.