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Citizens' preferences for development outcomes and governance implications

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Abstract

People's preferences influence national priorities for economic development and ecological integrity. Often policymakers and development agents base their actions on unclear assumptions about such preferences. This paper explores rural citizens' preferences for economic and ecological development outcomes and how they differ within and between communities. We collected data from three purposely selected communities representing dominant social-ecological systems in the transboundary Cubango-Okavango River basin in southern Africa. We used contingent ranking survey experiments, which are a novel methodological advance in policy related research. This included a qualitative experimental design process that provided a broad framing underpinning the research. The contingent ranking itself allowed us to simultaneously assess: (i) respondents' priorities for development domains; and (ii) respondents' preferences for the ordering of outcomes in diverse domains. We found relatively strong preference homogeneity within and between communities. Economic development was given high priority across all communities. At the same time, all communities expressed a high preference for a healthy river system providing stable water quality and quantity. This does not mean that our respondents prioritised nature conservation. They showed low preferences for preserving biodiversity and forests that provide fewer local benefits. This is of high governance relevance. The results point at development domains where policymakers can most likely expect stronger buy-in from citizens. Understanding citizens' preferences help to better align national development priorities with what citizens want.

KEYWORDS
Angola, Botswana, contingent ranking, development trade-offs, Namibia, transboundary river basin

1 | INTRODUCTION

Balancing economic and ecological goals is one of the main challenges in sustainable development (McShane et al., 2011; Schleicher et al., 2018). People's preferences are one factor explaining whether the relationship between economic development and ecological integrity is conflicting or synergistic (Dinda, 2004). Often policymakers, development agents, and academics base their actions on assumptions about people's preferences. One such assumption is implicitly reflected by the environmental Kuznets curve. This hypothesises that, at low levels of economic development, people are concerned primarily about material welfare and are, therefore, willing to sacrifice ecological integrity for economic growth. Concerns about the environment are only apparent if it is instrumental in improving

material welfare, or once a certain threshold of material welfare is reached (Dinda, 2004). However, this assumption does not fit the observation that preferences differ between people (Bromley, 2003).

Improving our understanding of people's preferences is critically important. First, preferences reflect the utility people experience from different domains of development (Horiuchi et al., 2018). Strong preferences for ecological integrity imply that nature is particularly important in underpinning a society's wellbeing (Schleicher et al., 2018). This would therefore need to be considered when assessing a country's development status (Fioramonti et al., 2019). Second, preferences influence people's aspirations and drive their behaviour (Dalton et al., 2016; Kosec & Khan, 2017). Ignoring people's preferences create the risk that development interventions work against what people want, or do not make use of their intrinsic motivations. This strongly affects the effectiveness and efficiency of interventions. Third, the ability of citizens to voice their policy preferences has a moral and ethical dimension. This ability is the foundation for political participation, responsiveness, inclusion, and accountability as critical aspects of good governance (Grammatikopoulou et al., 2012; Sheng, 2009). Finally, in representative democracies, the success of political parties strongly depends on the extent citizens' multidimensional preferences for development outcomes are captured within party programmes (Horiuchi et al., 2018; Zander & Straton, 2010). In the face of constraints such as budget limitations (Anderson, 2012), parties routinely aggregate policy proposals around clusters of perceived preferences from which citizens can choose in elections (Horiuchi et al., 2018). People's preferences can therefore be central to success at elections.

These observations motivate us to explore the preferences of rural citizens for economic and ecological development outcomes and how they differ within and between communities. We can then compare how well national development priorities are aligned with what citizens want. In doing so, our research also contributes to the discourse on development paradigms (Fioramonti et al., 2019).

We place our assessment in the context of the southern African transboundary Cubango-Okavango River basin, one of the last near-pristine aquatic ecosystems in Africa. The basin straddles Angola, Namibia, and Botswana and is therefore a good case study for exploring development preferences. Although the ecosystem is still largely intact, diverse drivers are increasing the pressure on natural resources (Pröpper et al., 2015). This will inevitably create trade-offs between ecological and economic development goals that are clearly recognised by the national governments (Republic of Angola, 2008; Republic of Botswana, 2010; Republic of Namibia, 2004). Indeed, intensified water extraction, mainly for irrigation, threatens the UNESCO World Heritage site of the Okavango Delta (Mbaiwa, 2004) within the basin. Globally this is a common phenomenon, whereby upstream water extraction and public infrastructure development influence water availability further downstream (De Stefano et al., 2010, 2017). In such circumstances, downstream communities can have less control over water availability, and its associated economic and environmental benefits. We might therefore expect preferences for economic development and ecological integrity to vary between such communities. We explore the extent to which this is the case in the Cubango-Okavango River basin. This is of political relevance, as understanding upstream-downstream preference differences can inform ongoing coordination efforts by the riparian countries such as under the Permanent Okavango River Basin Water Commission (OKACOM). OKACOM is an advisory body to the three states (The Permanent Okavango River Basin Water Comission, 1994) promoting co-operation over the management of the shared water resources (Mbaiwa, 2004; Mogomotsi et al., 2020).

We use contingent ranking survey experiments to elicit citizens' preferences for economic and ecological development outcomes. In the experiment, respondents ranked a number of distinct development scenarios. A major advantage of contingent ranking is the ability to elicit how preferences for distinct development outcomes compare to alternatives within and between domains (Horiuchi et al., 2018), such as between economic and ecological development. Contingent ranking is a recent advance in social and political science to study development and policy preferences (Hainmueller et al., 2014; Horiuchi et al., 2018). The method has been used to compare distributional impacts and trade-offs related to attributes of nature and landscapes (e.g., Birol et al., 2006; Farber & Griner, 2000; Grammatikopoulou et al., 2012; Sangkapitux et al., 2017; Scarpa & Thiene, 2005). We expand the approach by directly comparing ecological and economic development outcomes in order to reveal trade-offs which contributes to more recent advances in assessing multidimensional policy preferences of citizens (Horiuchi et al., 2018).

2 | CONCEPTUAL BACKGROUND

Our empirical approach assumes that each citizen has preferences for specific development outcomes in different domains. For example, favouring moreover fewer jobs in the employment domain. These preferences allow individuals to rank different outcomes in terms of their desirability, that is, the utility they generate for themselves. We assume that the generated utility is one important factor influencing people's choices such as when voting in elections or lobbying parliamentary representatives. We acknowledge that there are also other factors influencing choices, such as people's available endowments (Di Gregorio et al., 2012), their habits (Kahneman, 2003), and emotions (Lerner et al., 2015). In this paper, we focus on preferences as one determinant of people's behaviour.

Acknowledging heterogeneity in citizens' priorities, tastes, and preferences (Boxall & Adamowicz, 2002; Grammatikopoulou et al., 2012; Shepherd et al., 2015) implies that political actors are confronted with often conflicting expectations from the population. Using the aforementioned example, the preference for more jobs may depend on the employment status or the education level. Political parties in a representative democracy have incentives to propose policy that lead to outcomes, and therefore that maximise the utility of as many citizens as possible (Hainmueller et al., 2014).

Comparing citizens' preferences for different development outcomes within and across domains is challenging. To do this we implemented a contingent ranking survey experiment. In the

experiment, we presented respondents different hypothetical development scenarios. Each scenario consisted of the same development domains, but with a unique combination of development outcomes in each domain. Here we use the terms development scenarios, domains and, outcomes as respective synonyms for the more technical terms of alternatives, attributes, and attribute levels as used in the general contingent ranking literature. We asked respondents to rank all development scenarios according to their preferences. The approach allows us to compare preferences for diverse outcomes (across domains) on the same scale (i.e., utility) (Hainmueller et al., 2014). To achieve the same with traditional surveys requires strong assumptions about interactions and can become a demanding exercise for respondents (Horiuchi et al., 2018). Data SA2 presents a more formal perspective of the underlying economic theory and how it translates into the experiment design. Stated preferences methods, including contingent ranking experiments, build on the assumption of utility-maximising decisions-makers, which is considerably challenged by insights from behavioural economics. Despite these shortcomings, we believe that stated preferences, even though not perfectly aligned with revealed preferences (i.e., actual behaviour), can provide meaningful insights into the normative preferences of citizens (Carlsson, 2010).

3 | MATERIALS AND METHODS

3.1 | Study sites

The Cubango-Okavango River basin is a mosaic of natural forest landscapes, low-input agricultural systems, and patches of intensive high-input agriculture. Rural settlements cluster along the river, a limited road network, and scattered boreholes (Revermann & Finckh, 2013). Poor transport infrastructure in combination with a very low population density are probably the most important reasons for the current integrity of the ecosystems (Pröpper et al., 2015). The study was conducted at three sites representing dominant socio-ecological systems in the basin (Figure 1). Site selection followed a purposive sampling approach and was guided by a GIS-based landscape analysis. The selection represents the variety of ecological systems and the most dominant land use types in the basin. A spectrum of socio-economic variables was considered. (1) Sites were all distant from markets and from large urban centres, as the project concentrated on dynamics of the rural areas. (2) The sites presented a variety of alternative land use systems to allow for comparison. (3) Safety of access was another important issue especially in Angola where land mines were still widespread at the time of the research. (4) Finally, sites represent regions along a climatic gradient with increasing annual mean temperature and decreasing precipitation towards the south (Pröpper et al., 2015; Weber, 2013).

The most northerly site is Cacuchi in Angola in the upstream area of the basin. The long-running Angolan civil war, which ended in 2002, strongly affected Cacuchi. Given the more favourable agro-ecological conditions, land productivity is higher than at the other sites. Land use at the Mashare site in Namibia is dominated by extensive rain-fed agro-pastoral production systems. Households have highly diversified livelihood sources while salaries are across the community the most important but unequally distributed source of income. The third site Seronga in Botswana is the most southerly site at the edge of the Delta. This downstream region of the delta is characterised by stronger human-wildlife interactions. The average per capita income was highest compared to the other sites but also

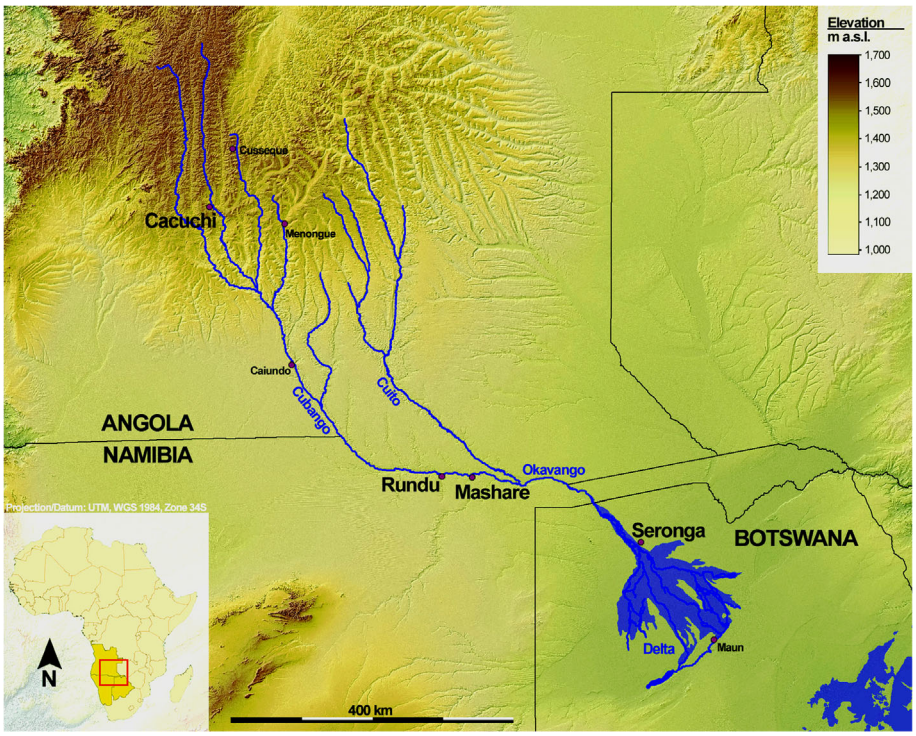

FIGURE 1 The project area (Source: SRTM, Jarvis et al., 2008, edited by Jan Wehberg, University of Hamburg) [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Study site details

	Cacuchi/Angola	Mashare/Namibia	Seronga/Botswana
Vegetation type	*Miombo* woodland	Woodlands on Kalahari sand	Wetlands and Kalahari sandveld
Mean annual precipitation	987 mm	571 mm	478 mm
Approximate population density	10 people/km^2	5 people/km^2	1 person/km^2
Average annual total per capita income including subsistence income in 2011	US$ 332	US$ 615	US$ 1623
Intra-community Gini-coefficient.	0.56	0.55	0.71
Main livelihood strategies	Crop production	Livestock keeping, crop production, employment	Employment, business, diverse resource use
Coordinates	−13.71S, 17.08E	−17.88S, 20.18E	−18.79S, 22.41E

the most unequally distributed. The Seronga population is slightly younger and most households are female headed. (Table 1, Data S1, and Data SA3) provide more details on the socio-economic characteristics of the sites. Additional information on the social-ecological systems of the sites can be found in Pröpper et al. (2015).

3.2 | Experiment design

3.2.1 | Domain selection

Focus group discussions were conducted at all three study sites as a qualitative method for domain development (Coast et al., 2012). Anybody from the community was welcome to attend the workshops, and special efforts were made to mobilise women and youth. At all sites, approximately one-third of the community members participating in the workshop were female. Ensuring such representation was important for equality and inclusion perspectives, but also because attributes within stated preference surveys need to be relevant to all respondents to obtain statistically significant estimates (Jeanloz et al., 2016). We also specifically invited representatives of government and traditional authorities as well as civil society. Government and traditional authorities were mainly represented by men, which reflects a general gender bias in these sectors. Civil society stakeholders were also represented by female staff and especially in Seronga/Botswana vocal and influential women such as teachers participated. In total, between 25 and 35 participants attended each workshop. Each workshop took approximately 2 hr.

The main purpose of the focus group discussions was to introduce the project to stakeholders, clarify expectations and allow them to propose aspects of natural resource management that the project should pay attention to. As part of the programme, the participants were asked to list the community's main development issues during group work. The groups received cards on which each participant could write their top priority issues. A speaker of the group presented a synthesis of the group discussion. The cards were organised on pin boards and then rated by importance by all participants using stickers. In this way, all participants had an equal chance to express their views.

Insights from the group work were used to outline the development domains that were in highest demand in the communities in order to identify what would most strongly affect respondents' valuation of potential development scenarios. In a second step, the policy relevance of the locally prioritised domains was assessed by screening diverse policy documents, such as national development plans (Republic of Angola, 2008; Republic of Botswana, 2010; Republic of Namibia, 2004) and Voluntary National SDG Reviews (High-Level Political Forum, 2017, 2018). We further reviewed technical reports, such as the ones prepared in the frame of OKACOM's Okavango River Basin Transboundary Diagnostic Assessment (TDA). These analyses led us to select the following development domains:

1. Employment opportunities: Increasing employment is one of the top goals of all three countries (Republic of Angola, 2008; Republic of Botswana, 2010; Republic of Namibia, 2004). Total household income is lowest at the Angolan site and highest at the Botswana site, largely because of differences in employment rates (Data SA3).
2. State of PUBLIC INFRASTRUCTURE: The countries set up ambitious health and education policies (Republic of Botswana, 2010; Republic of Namibia, 2013). By the time this research was done, none of the riparian countries provided adequate level of health services in the rural areas of the basin (Ngwenya, 2009). At the same time, high poverty levels support the widespread occurrence of diseases such as tuberculosis, respiratory infections, malaria, and HIV/AIDS. Literacy rates were lower in the respective basin districts compared to national averages (Barnes et al., 2009).
3. Access to WATER: water scarcity is most severe in the downstream semiarid part of the basin that receives on average less than 460 mm rainfall per year (Wilk et al., 2010). At the same time, the water demand is anticipated to increase in all countries in particular because of plans to increase the areas under irrigated intensive agricultural production (Gomes, 2009; King & Brown, 2009). Such developments in upstream areas would significantly affect downstream water access (Turton & Ashton, 2003). In addition, population growth, economic development, and ongoing urbanisation will increase demand for water in all three countries (Kgathi et al., 2006; Republic of Namibia, 2013).

4. Extent of agricultural land in comparison to area: The need for agricultural land is the main driver of the dramatic decline of forest coverage over recent decades (Pröpper et al., 2010). There are local trade-offs between using land as forests or fields. Deforestation reduces the availability of firewood, construction wood, fruits, medicinal plants, thatch grass, or game meat especially for the poor (Barnes et al., 2009; Pröpper et al., 2015). In addition, the forests provide global public goods such as carbon sequestration and supporting biodiversity (Falk et al., 2018). In contrast, agricultural land provides communities with food and income.
5. Presence of wildlife: Large areas of the basin support abundant wildlife. The basin constitutes a major share of the world's largest transboundary conservation area, the Kavango Zambezi Transfrontier Conservation Area, which is home to almost half of Africa's elephant population (Ramberg et al., 2006). On-the-one-hand, wildlife is of economic importance as it creates tourist income (Republic of Botswana, 2010; Republic of Namibia, 2004; The Permanent Okavango River Basin Water Comission, 2011). On-the-other-hand, wildlife, such as elephants, frequently damage crops. Predators kill livestock and even people (Darkoh & Mbaiwa, 2009; Kgathi et al., 2007).
6. Grazing availability: Livestock is an essential asset of households, providing meat, milk, and draft power but also status and insurance (Barnes et al., 2009; Falk, 2008). Livestock numbers are moderate compared to the carrying capacity recommended by the respective Ministries of Agriculture (Kgathi et al., 2007).

3.2.2 | Outcome assignment

For all development domains, we assigned two easy-to-communicate outcomes. The current local status quo at each study site was always one of the outcomes. The second outcome described a variation from the current state within a realistic range. Since the social-ecological conditions differ substantially across the basin, we adjusted the outcomes for site-specific conditions, as respondents would not be able to relate highly hypothetical values to their subjective experiences (Hess et al., 2008; Hoyos, 2010). Different outcomes for each site do not allow direct comparisons across sites. We assume, however, that respondents have well-defined preferences for qualitative changes within a realistic range rather than for site-unspecific absolute values. While domain outcomes differed between sites, they were the same for all respondents at one site.

We are aware that certain outcome combinations are more likely. For instance, better water quality, more forest, and better grazing are supportive of wildlife populations. In addition, wildlife can be harnessed to create income opportunities. However, all outcomes are strongly influenced by external factors such that no outcome combinations contain a relationship whereby one domain outcome necessarily results in a certain outcome in another domain. Each domain can be improved independent from the other domains and all combinations are plausible and possible (Nilsson et al., 2016).

3.2.3 | Construction of stimuli

Six domains with two outcomes each can be combined into 64 hypothetical development scenarios (the full factorial design). To create a manageable task for respondents, we applied an orthogonal fractional factorial design of eight mutually exclusive hypothetical development scenarios (Table 2, Data S2). Given widespread illiteracy, visual profile cards were used for data collection. Respondents were first introduced to the six domains. Each domain and its outcomes were explained by enumerators separately using explanations and connecting them to illustrations (Figure 3; Data SA1 for all domain cards and explanations). The order in which domains were explained varied randomly. In the second step, the hypothetical development scenarios with different outcomes in each domain were presented as full profiles to the respondents. This was facilitated by the profile cards (Figure 2 and Data SA3), which were used as reminders for the domain outcomes.

3.2.4 | Data collection and sampling

Within the three rural sites, the sample was drawn randomly from complete household lists and consisted of 171 households in Cacuchi/Angola; 185 in Mashare/Namibia and 271 in Seronga/Botswana. All heads of the selected households were individually visited during the dry season and interviewed with a 100% response rate. During data collection, the eight profile cards were shown to respondents one after another in a random sequence. Each time a new card was presented, the respondents were asked to first describe all six outcomes symbolised by the card to ensure the full understanding of the illustrations. If necessary, outcomes were explained again by the facilitator. After having described and ranked two cards, respondents had to rank each following card relative to the prior cards. In the third step, we verified consistency by asking the respondents to confirm the order of their ranking.

3.2.5 | Data analysis

For data analyses, we decomposed the ranking data into seven pseudo-choice experiment situations with decreasing number of choice options (i.e., development scenarios) (Hanley et al., 2001; Train, 2009, p.156-158). In the first pseudo-choice situation the most preferred scenario is chosen. In the second pseudo-choice situation, the most preferred scenario is removed and the most preferred scenario from the remaining ones is identified. This process is continued until only two scenarios remain. The data for each site is analysed through regression models that provide coefficient estimates for each development domain. The coefficients illustrate the average effect of an increase in the domain's outcome (from low to high) on the respondents' overall utility. This allows us to compare the relative weighting of preferences for the development domains within one site. We use

TABLE 2 Outcome levels of the experiment by development domains

Development domain	Low level outcome	High level outcome
Employment opportunities	Status quo as determined on the basis of socio-economic surveys (Pröpper et al., 2015)	A 15% increase of the status-quo. Governments consider this to be within the realistic range of possible developments within 10 years (see e.g., RoN 2013).
Availability of public Infrastructure	The status quo as only primary schools and medical points or clinics with temporary presence of nurses and doctors being present.	Establishing a secondary school and a clinic with a permanent doctor within the village.
Water quality and quantity	The dry season water gauge drops regularly to the lowest river water level that residents experienced over the last decade (2002–2012). Water quality declines to the lowest levels experienced over the preceding decade	The status quo in terms of typical water quantity and quality.
Extent of agricultural land versus forest area	The whole village territory is characterised by the lowest levels of forest cover that are currently only present in small areas.	The status-quo outcome in this domain was a typical share of the village area with mixed forest and agricultural land use.
Presence of wildlife	In Cacuchi/Angola and Mashare/Namibia, the status-quo outcome was described as the absence of large wildlife. In Seronga/Botswana, the status quo outcome was set described as the lowest number of elephants that had been experienced in the previous decade (from the year 2008).	In Cacuchi/Angola and Mashare/Namibia one herd of elephants would settle permanently in the area. In Seronga/Botswana, wildlife numbers remain high as has been experienced in the preceding decade.
Grazing availability	During a good rainfall year, livestock look healthy and fat.	During a good rainfall year, livestock look sick and skinny.

FIGURE 2 One of the eight profile cards illustrating a hypothetical development scenario (status-quo outcome of employment domain, status-quo outcome of public Infrastructure domain, status-quo outcome of water domain, high/second outcome of wildlife domain, low/second outcome of Forestdomain, and status-quo outcome of grazing domain) [Colour figure can be viewed at wileyonlinelibrary.com]

FIGURE 3 Example of the illustration used to explain the wildlife domain and its outcomes (left high, right low) [Colour figure can be viewed at wileyonlinelibrary.com]

random parameter logit models (RPLM) as they assume that coefficients vary over respondents but not across choice situations. This allows us to reveal preference heterogeneity. A major weakness of RPLMs is, however, the need for a priori assumptions about the distributions of random parameters (Greene & Hensher, 2003). This is not the case for latent class models, which we calculated in a second analysis step. The latter assume a discrete distribution of coefficients. The model estimates for everyone the probability to belong to unobserved latent classes. The choice probability for a development scenario by any respondents is hence conditional on her class membership. We controlled for respondents' characteristics to identify patterns of socio-economic class association. Data SA2 gives detailed information on the methods.

4 | RESULTS

The random parameter models indicated relatively similar preference patterns across the sites. The water domain always had the highest coefficient value. Its relative importance compared to the other domains increased as we move downstream from Cacuchi in Angola through Mashare in Namibia to Seronga in Botswana. The public infrastructure, employment, and grazing domains were also given a high importance. The significant negative mean coefficient of the FOREST domain indicated that respondents in Mashare/Namibia and Seronga/Botswana had a clear preference for transforming forest into agricultural land. Preferences for the wildlife domain were ambiguous. Only in Mashare/Namibia did respondents express a clear preference for continuing to live with less wildlife (Figure 4 and Data S3)[1].

The random parameter models showed significant standard deviation coefficients for most domains across all sites (Data S3). To better understand the considerable preference heterogeneity across respondents in each site, we used latent class models to identify subgroups with distinct preference patterns.

For all sites, the conditional Akaike information criterion (CAIC) and the Baysian information criterion (BIC) suggested three distinct classes. Figure 5 (Endnote 5) illustrates coefficients for the latent class models explaining preferences for development scenarios taking socio-economic controls into account (for full models see Data S4).

In Cacuchi, the two largest classes had the highest preference for the water domain. They further indicated a high importance of the public infrastructure domain. Only the largest and best-educated class supported an increase in wildlife. The results indicated that a small comparatively less educated class gave employment a much higher priority compared to all other domains.

In Mashare, the smallest class was dominated by female and rather older household heads, and had the most pronounced preference for the water domain. What was remarkable about this class was that it was indefinite about the employment domain. The other two classes show similar preferences for the water, grazing, employment, and public infrastructure domains. One class, representing one third of the respondents, had a clear preference for transforming forest into agricultural land and keeping wildlife numbers low. This class was

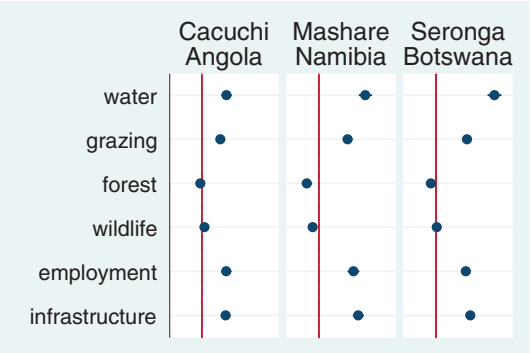

FIGURE 4 Coefficient plots of the random parameter/mixed logit models illustrating the average effect of an increase in the domain outcome from low to high on the respondents' overall utility of development scenarios. The dots show the relative values of attributes' coefficients at a site. The horizontal lines through the dots represent the 95% confidence interval and the solid vertical line the 0 value. A result is statistically significant if the confidence interval does not cross zero [Colour figure can be viewed at wileyonlinelibrary.com]

constituted by older respondents. The other two classes showed an ambiguous inclination to the forest and wildlife domains.

In Seronga, the class represented by rather younger household heads, expressed the strongest preference for the water domain. The two largest classes showed strong preferences for the water, grazing, employment, and public infrastructure domains. Only the smallest class representing rather old respondents, had a clear preference for reducing wildlife numbers and was relatively ambiguous regarding the employment and public infrastructure domains.

5 | DISCUSSION

Our study demonstrates the scope to apply contingent ranking more widely in policy analysis and design (Grammatikopoulou et al., 2012; Hainmueller et al., 2014; Horiuchi et al., 2018). It is important to note that applying contingent ranking in this context is already a multi-methods approach. The typically more qualitative research required to design the experiment (Coast et al., 2012) provides the important background for the narrower contingent ranking.

Across three sites and countries within the transboundary Cubango-Okavango River basin we show that communities have relatively strong preference homogeneity for development outcomes. This sends a clear signal to political actors regarding what their priorities should be (Horiuchi et al., 2018; Zander & Straton, 2010). Interestingly, the preference patterns revealed are in line with SDG priorities expressed in Voluntary National Reviews (VNR) (High-Level Political Forum, 2017, 2018). The results confirm that many people living within the basin hope for better employment opportunities and improved public infrastructure. This is also a top policy priority as reflected in the VNRs for Botswana and Namibia (High-Level Political Forum, 2017, 2018). All three countries report significant economic

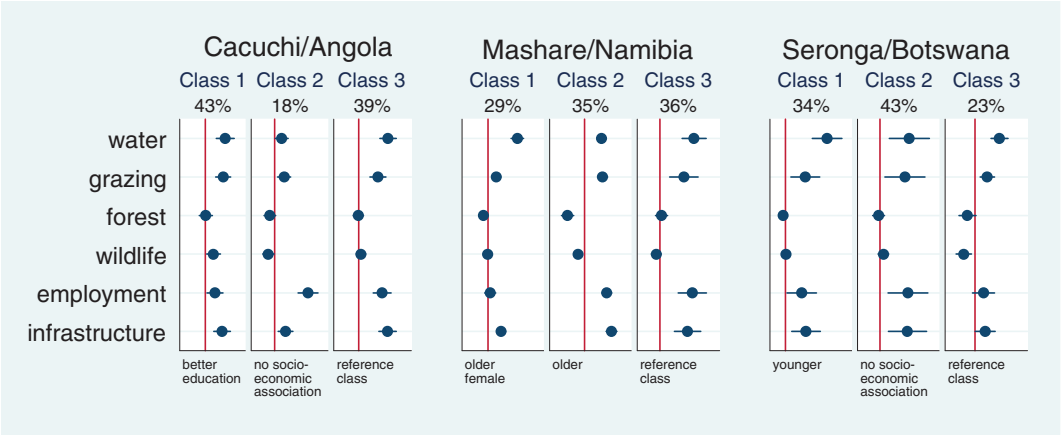

FIGURE 5 Coefficient plots of latent class models describing the preferences for development domains by class. The class share in percent is provided above each plot. Socio-economic attributes associated with a class are provided below the plot. The dots show the relative value of the coefficients, the horizontal lines the 95% confidence intervals and the vertical lines the zero values. A result is statistically significant if the confidence interval does not cross zero [Colour figure can be viewed at wileyonlinelibrary.com]

growth but express the concern that the growth has not yet lead to substantial creation of employment opportunities. Botswana and Namibia report significant improvements in terms of primary and secondary education. The Botswana government sees public infrastructure development as a key entry point to amplify achievements in multiple SDGs.

The local populations expressed a relatively uniformly, and similarly large, preference for a healthy river system providing stable water quality and quantity as compared to economic development domains. This may look like a contradiction or at least an economic development trade-off. However, this preference fits with the stakeholders' perception that the use of natural resources should be the basis for economic development (Domptail & Mundy, 2014; see also Rudi et al., 2012). This preference is also pragmatic and does not imply that our respondents prioritise nature conservation. Low preference for the wildlife and forest domains indicate that many are willing to sacrifice wildlife and forests for agricultural development. One can find this picture mirrored in Namibia's VNR. Namibia's efforts in biodiversity conservation (part of the UN Sustainable Development Goal (SDG) 15: Life on Land) preservation are widely recognised. At the same time, the Government gives high priority to increasing the share of land used for agriculture (part of SDG2: Zero Hunger) (High-Level Political Forum, 2018). Interestingly, in our study, the trade-offs are not linked to divergent preferences across citizens as has been observed in other research (e.g. Lemly et al., 2000). In our case they are deeply embedded in individual preference patterns. This finding also corresponds to the call to better understand trade-offs between competing bundles of compatible ecosystem services (Costanza et al., 2017; Falk et al., 2018).

The river basin context of the study leads to the question as to whether there are differences in preferences between upstream and downstream communities. One assumption could be that there is an endowment effect whereby upstream citizens have an increased preference for water because they have stronger control over its provision (Kahneman et al., 1991). In contrast, we find no evidence for considerable differences in water related preferences across the sites. Instead, relative priorities, as expressed in the preferences of local populations with regard to different types of natural resources, can be explained by the scales at which resource benefits are enjoyed. Water is of critical importance for rural communities as the river is, for many, the major source of potable water. Further, the river is used for domestic water consumption, livestock, and the harvesting of related resources such as fish and reeds. It is therefore more likely that these important local benefits explain the high preferences for the water domain.

Forests, in contrast, provide regulating and cultural ecosystem services enjoyed at the regional and global scale (Falk et al., 2018). For the communities themselves, forests provide only a fraction of the income of total household budgets, something that is especially true of downstream communities in Namibia and Botswana (Data SA3). Indeed, ecosystem service assessments indicate that benefits from cultivation calculated per hectare significantly exceed provisioning forest ecosystem services (Falk et al., 2018). Consequently, farmers have strong incentives to convert forest into agriculture land, and locally perceived benefits related to biodiversity are limited. It is therefore unsurprising that preferences for forests are substantially lower than for water management. Our results further question the widespread assumption that within community preference heterogeneity can be easily linked with socio-economic variables (see also Scarpa & Del Giudice, 2004) as we find only weak evidence for such relations. Socio-economic characteristics may affect constraints of citizens and their experience of benefits, the preferences for development outcomes are, however, not substantially affected by this.

6 | CONCLUSIONS

Our findings have important implications for the governance of natural resources. First, we confirm that the scale at which benefits are

enjoyed is an important component in whether communities are likely to support initiatives intended to support the sustainable management of natural resources. Communities are likely to support projects that offer them direct benefits, but if the real intention of a project is to deliver global public goods, such as climate change mitigation or biodiversity conservation, it is likely to be more challenging to ensure local support.

Second, our study questions widespread preconceptions about local communities. It can neither be assumed that they are mainly interested in economic development and worry about nature only if the first target is achieved (Dinda, 2004); nor can communities be seen as living in deep harmony with nature as a whole (Mpofu, 2020). Their view on development and natural resource management is more subtle than this dichotomy suggests.

When local communities benefit from land use transformation, instigating local level governance of global public goods is likely to fail unless communities receive some form of compensation. Payments for ecosystem services are one common instrument to respond to such situations (Angelsen, 2010). Regulating markets for forest products and improving enforcement so that local communities receive more financial benefits from sustainably managing such resources could also be part of the solution. The governance challenges for water are very different. Whereas the strong local importance of the resource is a good precondition for accepting institutions that might restrict excessive water use and pollution, the water quantity and quality experienced at a particular location largely depends on upstream water management. Coordination efforts by the riparian countries such as under OKACOM can support the formulation of laws and regulations ensuring the health of the river system.

Assessing development preferences of communities can be an important contribution for identifying areas where policies can expect stronger buy-in. This is of high governance relevance in the face of public budget and trade-offs between development goals. Our study demonstrates that carrying out such assessments can deliver new insights, and indicate which natural resources can be managed sustainably at local levels with limited use of incentives or regulatory mechanisms, versus those that require national or international interventions and funding to ensure the continued delivery of global public goods. Taking this logic of institutional fit into account would allow policymakers to invest resources more wisely (Ostrom, 2009).

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DATA AVAILABILITY STATEMENT

Data are available on request from the authors.

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ENDNOTE

[1] Utilities derived in contingent ranking models are ordinal and only the relative difference matters (Hensher et al., 2015).

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