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FARMERS' PERCEPTIONS ON THE IMPACT OF DAMS ON LIVESTOCK DYNAMICS IN DROUGHT-PRONE INITIAL RESETTLEMENT SCHEMES: A CASE OF MUSHANDIKE (MASVINGO)

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ABSTRACT

A study was carried out to investigate farmers' perceptions on the impact of Mushandike dam on livestock dynamics in an initial resettlement scheme, located in a drought prone area. The study focused on farmers resettled in Mushandike resettlement scheme who depend on a dam located upstream in Mushandike Sanctuary, Masvingo. Data were collected through focal group interviews and structured questionnaires that were administered to local farmers and agricultural extension workers. Farmers were selected from the 9 villages in Mushandike resettlement scheme. More than 70% (42) of the interviewees perceived that cattle numbers had decreased during the past 12 years, despite the presence of dam. Donkeys (90%) and goats (100%) were generally perceived to have increased over the same period. A large majority (80%) reported that the dam had little impact on cattle production, mainly due to inequitable allocation of the water resource. Chief among perceived causes of low cattle population trends were reduced water flow, frequent droughts and loss of grazing areas. Surprisingly, very few (2%) respondents pointed out the impact of climate change on livestock population dynamics. Reduced water flow in canals to the villages and competing water resource demands impacted negatively on cattle production. This study concluded that in the face of competing water resource claims and the climate change phenomena, cattle production is at risk.

INTRODUCTION

Most communal areas of Zimbabwe are located in semi-arid areas which are marginal for crop production (Hungwe *et al*., 2013). Initial resettlement schemes in Zimbabwe were set up in the early 1980s to among others, decongest communal areas, bringing under-utilized land into full production and addressing inequality in land holding (Adams and Howell, 2001). Most initial resettlement schemes were concentrated in semi-arid communal areas, characterized by erratic and unreliable rainfall as well as high rates of evaporation. Production systems in communal areas rely directly on rainfall and that constitute a major risk for production (Masikati, 2010). In most communal areas, farmers keep various classes of livestock (Mapiye *et al*., 2009). Livestock, especially cattle, are valued due to their multiple functions within the mixed farming system of smallholder farmers (Masters, 1994).

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Dam construction remains a major factor in uplifting farming enterprises in drought-prone communal areas. There is an increasing concern about the availability of water supplies in developing countries to cater for among other issues, irrigation and wildlife conservation (Andre, 2012; Inkoon and Nanguo, 2011). Given the hydrological changes and unsustainable water uses over space and time, induced by both climate change and anthropogenic factors (Chifamba, 2011; Cudennec *et al*., 2007), dam construction remains a priority in semi-arid areas. In some initial resettlement areas, set up in post-independent Zimbabwe, there was provision for a regular supply of water through dam construction. The initial phase (1980-1997), though slow, was remarkably successful by historical standards (Deininger *et al*., 2002). While cattle generally thrive well in semi-arid areas, little is known about the perceptions of farmers on dams constructed in such areas. Although benefits of dam construction are numerous especially in the face of climate change, some negative consequences are common (Baxter, 1977; Brown *et al*., 2009). Water modification and appropriation for human purposes is costing more than benefiting due to irreversible damage on

species and ecosystem services (Postel, 2003). The irrigation scheme, relying on water from Mushandike dam, has ceased to operate due to competing demands on the water resource (Gwazani *et al*., 2012). Therefore, there is need to document the perceptions of livestock farmers on multipurpose dams constructed in their locality. Mushandike dam supplies water to the wildlife sanctuary and Mushandike resettlement scheme. The objective of this study was to determine farmers' perceptions of the role of the dam on livestock production in Mushandike resettlement scheme in the semi-arid area of Masvingo province. Information from this study seeks to address any potential conflicts arising from increasing water scarcity and the awareness on the interdependence between upstream and downstream water users.

MATERIALS AND METHODS

Study area

Mushandike Resettlement scheme lies in Masvingo province in the country's agro-ecological region IV. The area is marginal for crop-based enterprises. The scheme consists of nine villages for farmers relocated mainly from the Mushandike sanctuary. Villages in the resettlement scheme were initiated between 1986 and 1993. The size of the scheme is about 11834 hectares of which 10840 ha are for grazing. A multi-purpose dam, located within the sanctuary, is used for wildlife, agriculture and domestic purposes (Gwazani *et al*., 2012). An open canal stretching for about 25km supplies water for irrigation purposes in the area downstream (Ndamba *et al*., 1999). Farmers in this scheme were selected as the target group because they have a dam constructed to cater for their farming activities.

Data collection and analysis

Field surveys, interviews and structured questionnaires were administered to 68 local farmers and two agriculture extension officers in Mushandike area in October and November, 2012 (Table 1). Questionnaires were pre-tested on a sample of farmers from outside the study villages. Discussions focused on water use efficiency (Howell, 2001) and patterns and possible dam impacts on livestock production. Descriptive statistics and quantitative approaches were used for data analysis. Where multiple responses were possible on open response questions, data are represented as a percent of farmers giving each response, and may add up to over 100%.

RESULTS AND DISCUSSION

Respondents' perceptions on general trends in domestic animal populations from the year 2000 to 2012 are shown in Table 2. Cattle are the major class of livestock recommended in the grazing scheme. This is in line with reports for Masvingo province (Mavedzenge *et al*., 2006) and the southern Africa (Musemwa *et al*., 2008). The farmers showed mixed perceptions on qualitative cattle population trends between 2000 and 2012, with 10% (n=6) of the respondents perceiving an increase, while 70% (n=42) and 20% (n=12) perceived a decline and no change, respectively. Donkeys and small stock (mainly goats) were largely perceived to have increased during the same period. For cattle population trends, the perceived decline was attributed to negative effect of unreliable water supply from the dam, frequent droughts, loss of grazing, straying and climate change (Table 3). Goats and donkeys, largely perceived to have increased, were reportedly introduced into the scheme after the year 2000. During the initial phases of resettlement, these livestock species were not allowed. They were also less affected by drought and low volumes of water flowing in the canals from the dam, possibly due to their versatile foraging behavior. Maburutse *et al*., (2012) reported that donkeys seemed to be an alternative source of draught power in communal areas. Mamabolo and Webb (2005) reported that goats are primarily kept for meat and milk to some extent. Goats are adaptable to harsh conditions and are also easy to sale, in addition to their various socio-economic and cultural roles. Therefore, the presence of donkeys and goats in the resettlement scheme could be an adaptation measure of resilience by the farmers. The respondents who indicated increases in cattle numbers during the period under study attributed this to improvement in herd health management supported by efficient dipping and extension services. This is in line with reported trends which show diseases as major constraints to livestock improvement (Devendra *et al*., 2000). Diseases decrease production and increase morbidity and mortality among animals (Mwacharo and Drucker, 2005). This finding contrasts other studies that showed herd health as a major challenge in communal areas (Maburutse *et al*., 2012).

The key reason for the decline in cattle numbers was cited as unreliable water supply from the dam. In the absence of reliable source of water, cattle in communal areas walk long distances in research of the resource (Masikati, 2010). Water is a major limiting factor for crop success in smallholder systems. Crop residues, especially maize stover are commonly used as livestock feed (Lukuyu *et al*., 2009; Masikati, 2010) during the dry season. Cattle herd dynamics on communal rangelands in semi-arid areas is determined by feed resource availability (Angassa and Oba, 2007). However, few farmers in communal areas use untreated crop residues to mitigate feed shortages (Maburutse *et al*., 2012). The use of cattle manure as a fertilizer further highlights the integration between crop and livestock enterprises. While crop failure can be attributed predominantly to climatic conditions, farmers cited inequitable distribution of water from the dam as the major cause. Crop failure could have adverse effects on livestock numbers since farmers engage in subsistence mixed farming.

Losses due to sales were conspicuously absent, yet in drought prone southeast lowveld, cattle-based households generally cope with hazards of crop failures and economic decline by selling cattle (Murungweni, 2011). Therefore, any sales of cattle to buffer households against drought probably contributed to the perceived decline in populations. Surprisingly, no deaths due to drought were reported, given that the region is drought-prone. Apart from Mushandike dam, other sources of water in the study area included seasonal streams, wells and boreholes. Some respondents suggested that water can be diverted from Muzhwi dam, enroute to the sugar estates in the south-east low veld to supply water to the nearby Mushandike resettlement scheme. This option may be too far-fetched, though. While climate change has been a topical issue among several communities, its effects on cattle population were perceived as negligible (about 2%). Dwindling water resources in the face of climate change sees dams failing to

meet multiple objectives and satisfy aspirations of different communities. This calls for concerted effort among stakeholders to raise awareness among communal farmers to be adaptable by harnessing the fragile balance between water supply and demand. By stressing on uneven allocation of water resource and de-emphasizing the fact that climate change was taking its toll, respondents were possibly deflecting responsibility. Farmers indicated that water supply tended to be reliable in the up-stream area which incorporates a wildlife conservation area. While this may be the case to some extent, the sanctuary is also not spared as shown by the dwindling fish sizes and species in the area (Gwazani *et al*., 2012). The regulation of flow regime and the conflicts that this generates is a subject that has been extensively studied elsewhere (Adams, 1990). While water regulation is under Zinwa (Zimbabwe National Water Authority), farmers interact with Agritex officials and hence the ignorance of the happenings in the up-stream. The regulation of flow regimes and conflicts that this generates is a subject that has been extensively studied elsewhere (Adams, 1990). However, there is need to achieve rationale and efficient allocation of water as scarcity intensifies.

Some of the factors that strain the water resources included new settlements within the initial scheme and the areas surrounding. New settlements included those in Acton, Brigade and Chikore farms. These originated after the fast track resettlement and given the different legislations, other classes of livestock are now a common feature in the resettlement scheme. The emergence of new farmers resettled under a different model in nearby farms could have impacted negatively on the communal grazing areas. While there have been little changes in the numbers of farmers settled in the resettlement scheme (Table 1), further constraints to livestock viability could be explained by poor grazing management and limited control over herd size and composition. The Village Production committee responsible for grazing seems to be overwhelmed by the task. This is further evidenced by the presence of other livestock species such as goats and donkeys, which were not permitted in the initial set up and the possible ballooning of herd size above six animals. The initial number of cattle recommended per family (6) is above the mean herd size of 3.6 for Masvingo (Ndlovu *et al*., 2004). In addition, ownership of less than 4 cattle is considered as inadequate access to draught power (Christensen and Zindi, 1991).

Table 1. Characteristics of the nine villages constituting Mushandike resettlement scheme, Masvingo

Village	Year of settlement	Initial nos.	Current nos.	Grazing area (ha)
Mistvale	1986	41	42	814
Invicta	1987	63	66	1808
Ashcroft	1987	53	53	615
Umshandike	1988	52	57	431
Avondale	1988	47	64	1965
Charlton Park	1989	52	52	461
Trebar	1989	52	52	728
Montvideo	1990	35	36	2673
Lochiel	1993	33	33	1345

Source: this study

Table 2. Farmers' perceptions on trends in domestic animal populations in Mushandike resettlement scheme, Masvingo, Zimbabwe, between 2000 and 2012

	Perception		
Livestock species	Increase	Decrease	Constant
Cattle	10% (6)	70% (42)	20% (12)
Donkeys	90% (54)	0%	10% (6)
Goats	100% (60)	0%	0%

Table 3. Explanations for the perceived increase and decline in cattle populations in Mushandike resettlement scheme, Masvingo, Zimbabwe, from 2000 to 2012

Explanation	Number of respondents	%
Perceived increase:	6	
Efficient dipping	4	66.67
Reliable extension services	3	50.00
Perceived decline:	54	
Unreliable water supply	30	55.56
Frequent droughts	25	46.30
Loss of grazing	20	37.04
Straying	8	14.81
Climate change	1	1.85

Table 4. Perceived impact of Mushandike dam on cattle population trends in the resettlement scheme

Perceived effect	Number of respondents	Percent
Increase	12	20%
Decrease	0	0%
No effect	48	80%

Settlement schemes have a high failure rate around the world, due to among others, psychological and socio-cultural stress they impose (Ackermann, 1973). The absence of a fence along the highway linking Masvingo and Beitbridge could also have attributed to the decline in cattle numbers, though this was not highlighted. In some initial resettlement schemes, vast tracts of land were cleared while in areas reserved for grazing, continuous grazing, tree felling and occasional veld fires prevailed (Chinuwo *et al*., 2003). However, even where resettlements have effective planning, psychological and socio-cultural stress involved, some farmers never come to terms with their new homes (Goldsmith and Hildyard, 1984).

Conclusion

Most farmers perceived that the dam had no effect on cattle population dynamics. Over the years, populations of donkeys and goats were perceived to be on the increase. While rationale and efficient allocation of the scarce water needs to be achieved, the climate change phenomenon is straining the already fragile balance between water supply and demand. Farmers need to be re-oriented to mitigate the impact of climate change on farming activities, as water scarcity increases. The diversification and resilience measures could include establishment of fodder banks comprising forage tree legumes. Data on perceptions, though mostly inherently qualitative and difficult to validate, could help to identify coarse changes in population sizes (Gilchrist *et al*., 2005).

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