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Memories of environmental change and local adaptations among *molapo* farming communities in the Okavango Delta, Botswana—A gender perspective

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ABSTRACT

This paper focuses on ways in which three riparian communities (Xobe, Shorobe and Tubu) practising flood recession (*molapo*) farming along the fringes of the Okavango Delta in Ngamiland District in north-western Botswana, present memories of experiential impacts of and adaptation to key environmental and anthropogenic change events. Participatory methodological tools were used to capture local knowledge of people who had resided in the Okavango wetlands for many years. Findings indicate that key environmental change events were characterized by intergenerational experiences of severe and frequent droughts, floods, and recurrent outbreaks of human and animal disease. These events had impacted livelihoods and well-being of communities. Community adaptation strategies were embedded in local institutions of governance, especially chieftainship and the *Kgotla*, as legitimate platforms for community re-organization against unpredictable environmental change. We concluded that policy/program formulation processes need to take cognisance of local communities' historical knowledge of environmental change and adaptation. In particular it emerged that men and women, and people of different ages have differentiated memories of historical events which are complementary and necessary in developing a comprehensive adaptation strategy.

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1. Introduction

Past and present societies in Africa, and elsewhere in the world, have been, and continue to be daunted by uncertainty due to vulnerability to environmental change risks (Phillips and Orlove, 2004; Suarez and Patt, 2004) and hydro-climatic change. Communities in southern Africa continue to struggle to mitigate such changes through locally embedded and innovative ways of coping and adapting to change. One of the most neglected areas of research is the gendered impacts and adaptation to environmental change (Ziervogel et al., 2006; Acosta-Michlik and Espaldon, 2008; Hertel and Rosch, 2010).

Women are among 'structurally vulnerable' social groups by virtue of their history and/or unequal treatment by the rest of the society (UNDP, 2014). Other vulnerable groups include children, people with disability, ethnic minorities and the elderly. Women in rural and urban settings are particularly sensitive to environmental change (Watson et al., 1996; Kasperson et al., 2005), partly because of gendered division of labour (Nelson et al., 2002) and their dependence on local natural resources (Kakota et al., 2011). Analysis of past and present experience of environmental impacts therefore has to consider these differences between and among men and women.

Memory is one of the most important ways that communities connect past and present experiences (Vogt, 2010) by searching for the things that bind and/or divide them (Weightman, 2012). Memory is therefore a crucial component of creating and maintaining individual and collective identities of women and men. Social memory however, is a context-sensitive process. Remembering (and forgetting) present and past events is mediated by complex relationships (social and institutional) (Vogt, 2010; Hautaniemi et al., 2006). This paper focuses on ways in which *flood recession* farming communities in the Ngamiland District in the north western

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Botswana, individually and collectively present compelling memories of key events depicting experiences of women and men on environmental change and local adaptations in the Okavango Delta.

The results presented in this paper are a product of a larger Botswana Eco-Health Project whose overall goal was to investigate the likely impacts of hydro-climatic change on the health, food security, environmental sustainability and livelihoods of the vulnerable communities dependent on molapo (flood recession) farming in the Okavango Delta (Chimbari et al., 2009). The Project adopted an ecosystem approach to human health, emphasising trans-disciplinarity, community participation, as well as gender and social equity (Charron, 2012).

2. Material and methods

2.1. Study area

The study was conducted in the Okavango Delta area in Ngamiland district, north-western Botswana. The Okavango Delta (OD), is a wetland of local, national and international importance, being a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage and RAMSAR site (http://www.ramsar.org). Nationally, it is a flagship tourism destination and locally, a source of livelihood to resident communities. Among other livelihood activities, the local communities within the Okavango Delta practice flood recession farming, locally known as *molapo* farming. This traditional farming system is made possible by the flood–pulsed nature of the OD that forms the distal end of the Okavango River Basin, originating from the highlands of Angola, traversing through northern Namibia and culminating into the Okavango Delta in north-western Botswana (Fig. 1). The Okavango Delta system is dependent on rainfall in the highlands of Angola which averages 1400 mm per year. The average local rainfall within the Delta is 450–550 mm per year. The flooding, rainfall variability and local topography of the Delta leads to variations in nature-based sources of livelihoods such as fishing, harvesting of non-timber products, livestock as well as dry-land and *molapo* farming. *Molapo* farming is highly dependent on hydro-climatic variability and anthropogenic change processes, including timing and extent of flooding (Molefe et al., 2014).

2.2. Study sites

The study was conducted in three rural villages that practice varied *molapo* farming styles because they experience different types of flooding. Tubu experiences frequent flooding on a vast flood plain where the crops make great use of moisture left behind by a dropping water table, Shorobe is characterized by periodic flooding of local lagoons in which farmers plough following receding flood waters, while Xobe is subjected to occasional flooding of the river channel banks and farmers plough following receding water.

Tubu is in Ngamiland West Sub-district 10 km east of Gumare on the banks of the Thaoge River (Fig. 1). Flooding occurs every year but its extent varies. The major source of livelihood in Tubu is agriculture (both crops and livestock). The village population is 483, made up of 219 males and 264 females (CSO, 2012). Shorobe village is in Ngamiland East Sub-district, about 36 km northeast of Maun. To the northwest of the village there is an extensive network of *molapo* fields fed by the Santantadibe and Gomoti Rivers; and by backflow from the Thamalakane River (Fig. 1). Livelihood sources include both arable and pastoral farming, sale of traditional beer made from sorghum, palm wine, fish and baskets. The village has a population of about 1031, comprising 482 males and 549 females (CSO, 2012). Xobe is located on the southern bank of the Boteti River about 13 km east of Maun (Fig. 1). The village has 277 residents, comprising of 160 males and 117 females (CSO, 2012). Livelihood activities in Xobe include rain-fed farming, *molapo* farming, irrigated vegetable production, livestock rearing, and harvesting of medicinal and edible wild plants (for domestic consumption or sale).

2.3. Data collection

Data were collected from the three villages in 2010 and 2011 using Participatory Rural Appraisal (PRA) tools. In Shorobe, there were 40 participants (15 males and 25 females); Tubu had 63 participants (22 males and 41 females), and Xobe 28 (17 males and 11 females). There was no specific inclusion criteria for workshop participants as that depended on people who presented themselves after a general invitation was sent out through the village chief. This paper uses data generated from 18 Focus Group Discussions (FGDs); 6 from each study site. The FGD groups comprised of men only (3 groups), females only (3 groups) and both males and females (12 groups). Additional data was sourced through field observations, unstructured interviews and secondary data.

2.4. Focus group discussions (FGDs)

Female or male FGD groups were constructed by grouping men and women of different ages separately. Each group had 8–20 members depending on the attendance, with Tubu having the biggest groups and Xobe the smallest. They were asked to construct a historical timeline (HTL) based on individual and collective cultural memories. Both males and female mixed groups were constituted asking participants to count 1–4 following their seating order. This generated four working groups in each site. The groups reflected the Project thematic areas namely environment and biodiversity; health; agriculture and food security; and hydro-climatic variability/policy/gender. These working groups at each site were asked to reconstruct trend-lines in relation to climatic variability (CTL) and people's wellbeing. Each FGD selected a scribe and a presenter.

Researchers, graduate students and community research assistants who had previously received a 2 day training on participatory rural appraisals (PRA) methodologies (Chimbari et al., 2010) from a PRA specialist facilitated in each of the FGD groups.

2.5. Field observations and secondary data

Field observations, informal unstructured interviews as well as secondary data sources were used for structural corroboration to enhance credibility (Ary et al., 2009). Direct and systematic unobtrusive field observations of the historical landscape and material culture were employed to gather additional data. The researchers took part in transect drives across the three study sites, accompanied by community guides to make observations. The community representatives, mostly comprising of community elders and authorities, made several stops along the transects to explain some key historical events. The respondents for the unstructured interviews comprised of either male or female tribal/community leaders; traditional health practitioner/personnel, community members and government/NGO officers.

Secondary data were collected from review of published scholarly articles and unpublished sources from government reports. This included health reports of trends of diseases from the Ministry of Health and District Health Management Teams in Ngamiland, meteorological data (rainfall and temperature trends) from the Department of Meteorological Services in Shakawe and Statistics Botswana. Hydrological flood inflow variability trends were sourced from the Department of Water Affairs at Mohembo and the Okavango Research Institute. Data related to pastoral

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