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**The Okavango River Basin in Southern Africa:
A Case Study of Transboundary Resource Management Issues**

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Notes for a panel presentation
at the conference on

”Allocating and Managing Water for a Sustainable Future:
Lessons from Around the World”

Natural Resources Law Center
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1. Introduction

In a semiarid ecosystem such as that of the northern Kalahari Desert region of southern Africa, water is a critical natural resource. It is critical to the survival of people, animals, plants, and other species, and it serves a critical role in maintaining ecosystem viability. In Botswana, water was crucial in Tswana thought and ritual. The term pula (rain), for instance, is used as a positive statement at the end of all chiefly or political addresses in Botswana. The San (Bushmen) of southern Africa, including those who live along the Okavango River, engage in rain-making ceremonies, and they have special places where their rain medicines are kept. Many of these places are considered sacred sites, and people attach great significance to them, thinking that if they are disturbed, it will lead to a reduction in rainfall and a drop in surface and ground water availability.

Surface water sources in Botswana, in the center of southern Africa, generally have the following characteristics: (1) The largest sources occur where demand is presently low, (2) The catchment areas of most large sources are partly outside the country, (3) The water bodies have high rates of evapotranspiration (up to 2 meters or more per annum), (4) The availability of water is related positively to rainfall, which is highly variable in space and time, and the size of the catchment area. In Botswana, as in other parts of the world, there are differences in water use by sector, as well as in the pattern of water use. The livestock sector is a major consumer of water, as is the urban sector. Rural people tend to use less water than those in towns and cities. Women spend more time collecting and dealing with water than men, but male-dominated industries (e.g. mining) tend to utilize substantial amounts of water.

In Africa, as elsewhere, the causes of increased water usage and water scarcity are related to population growth, population concentration, the diversification of human activities, and to development itself, which helps to increase incomes and improve infrastructure. This, in turn, leads to increased water consumption (Adams 1992). There is an urgent need to integrate the administration of water resource use at various levels. The water laws provide for some protection, but regulations sometimes overlap, and they are not always enforced. At the international level, greater efforts need to be made to resolve transboundary water management disputes without having to resort to expensive legal cases, and more efforts should be made to involve civil society and local communities in decision-making regarding transboundary water management.

According to United Nations projections, by 2025, a fairly sizable proportion of the population in some African countries will not have sufficient water to meet their basic needs. Even at present, the water use of a substantial number of people in southern Africa is below the Basic Water Requirement (BWR) of 50 liters per person per day (Gleick 1998:45, 252, Tables 2.1 and 5). As a consequence, governments of southern African states are considering a variety of strategies to promote water conservation, reduce wastage, expand water availability, and bring about more sustainable use of water.

The implementation of some of these strategies, especially on transboundary rivers, poses some risks. As this case study will show, there have been transboundary water disputes in southern Africa between states sharing a river basin. Some of these disputes have arisen over plans for dams or water extraction facilities. In other cases, there have been boundary disputes involving islands in international rivers, as was the case between Botswana and Namibia over Sedudu (Kasikili) Island in the Chobe River, which was decided by the International Court of Justice on December 13, 1999 in Botswana's favor (Murphy 1999). This peaceful resolution of a boundary conflict was an important step toward reducing tensions between the two countries and it served as a model for the handling of other transboundary water disputes in Africa.

In the region that makes up the Southern Africa Development Community, there are 52 international river basins in an area that together covers some 10,028,182 square kilometers. For purposes of this case study, international river basins are defined as those river basins that are shared by two or more countries. Virtually all southern African states share one or more basins with other states, with the exception of the island states of Mauritius and the Seychelles, and 70 percent of the surface water of the region is shared between two or more countries. Even those areas where the populations have sufficient access to water have their problems. This was the case, for example, in the flood plain of the Limpopo River in southern Mozambique in the early part of 2000, when hundreds of thousands of people were forced from their homes because of the massive amounts of water coming down the river and overflowing the river banks.

The riparian ecosystems of southern Africa generally support large numbers of people and the soils, plants, and animals upon which they depend. Given this situation, it is crucial that efforts be made to maintain as much as possible the natural flow of these water systems. One of the ways in which rivers have been treated in the southern Africa region is that they have been dammed, and in some cases large-scale water transfer schemes have been created. There are nearly 30 dams on the Orange River alone, and some of the largest reservoirs in the region are to be found on the Orange and on the Zambezi Rivers (for a discussion of the positive and negative aspects of dams in Africa, see Scudder 1989; Hitchcock and Bond 2001; McCully 2001; World Commission on Dams 2000).

The international river basin that I have chosen to focus on here is the Okavango River. The Okavango River can be considered a major international river because of its size, its sizable flow, the numbers of countries that share its waters, and the fact that it is governed by an international river commission, the Permanent Okavango River Basin Water Commission, or OKACOM, established in 1994.

The Okavango River has both material and symbolic value to the people who live along its banks and who utilize it periodically. On the one hand people depend on the

river for water and other natural resources and ecological functions, while on the other the river and the sites along it have tremendous ideological significance to the populations involved. Historically, there were cases of conflict over access to areas along the river. Some riparian resources were considered open to anyone, notably water for drinking. But other riparian resources were restricted, notably certain kinds of trees along the river, firewood, medicinal herbs, thatching grass, and some species of bush foods (e.g. mmilo, Vangueria infausta) (Campbell 1976; Roodt 1994). Aquatic resource conservation strategies of the people who used these rivers included (1) having some areas of the river off-limits at all times, (e.g. sacred sites), (2) having certain areas along the rivers off-limits during specific times of the year (e.g. grazing resources along the banks in the rainy season), and (3) placing taboos (social or jural restrictions) on the use of certain species of plants or animals.

Knowledge of rights concerning riverine land and resources is maintained assiduously by those individuals who deal with land and resource management. This knowledge, which some people identified as being in essence “indigenous knowledge,” was passed down from one generation to the next. In some cases, the information was provided to young people during initiation ceremonies. Eventually, people were able to build up what they considered to be a kind of “mental map” of riverine regions. This cognitive map included not only resource areas and places of historical and cultural importance but also areas where specific resources could be found.

As several informants in southern Africa put it, the socioeconomic values of riparian resources are determined by local people. It is those people who have the rights to utilize them, conserve them, give them away, barter them, or sell them. In the recent past, there were rumors to the effect that people who had inherited rights to sections of the Okavango River and its tributaries had agreed to transfer those rights to non-local people, including large-scale cattle owners or safari companies, in exchange for cash. The numbers of large cattle owners and safari companies in the Okavango region have increased over the past 30 years. At the same time, more land has been set aside for conservation purposes. These changes are part of a set of processes that are linked to increased rising populations, expanded development, environmental degradation, and conflicts over land use.

Overall, the Okavango, like other southern African rivers, represents a resource nexus that has both costs and benefits. The river is viewed as providing crucial buffering resources in the semiarid northern Kalahari ecosystem. It serves as a kind of emergency area to which people can repair during periods when there were serious resource shortages in other areas. At the same time, it can flood areas where people are living, and people sometimes get diseases (e.g. bilharzia, schistosomiasis) during the course of their using the river.

In drought periods, the populations along the river expanded considerably, and resource conflicts intensified. There were traditional means employed to resolve these conflicts, but sometimes the traditional authorities were unable to deal with the matters, and the conflicts intensified, sometimes resulting in feuds and open combat. The establishment of new forms of governance in southern Africa has gone some way toward helping to alleviate some of the pressures that lead to these periodic outbreaks of conflict.

It should be noted that the Okavango Delta and the Okavango River have long been of interest to planners and government development agencies in southern Africa. As early as 1859 James Chapman, an early explorer of the northern part of Botswana, suggested that irrigation schemes might be developed south of the Okavango Delta and north of Lake Ngami. a large-scale irrigation and water transfer scheme was proposed by E.H.L. Schwarz in 1919. A.L. Du Toit proposed an irrigation scheme that included the Botletle (Boteti) River, Mababe Depression, and Lake Ngami in 1926. In 1955 J.H. Wellington proposed that Popa Falls on the Okavango River be developed for hydroelectric purposes. In 1963 B.G.A. Lund suggested constructing a canal that would link the Zambezi and Okavango river basins.

In the late 1960s, Professor D.C. Midgeley recommended transferring water from the Okavango Delta to Pretoria in South via eastern Botswana. Smaller-scale proposals for water resource development in the southern Okavango Delta were made by the United Nations Development Program (see Botswana Society 1976) and by the firm Snowy Mountains Engineering, working as consultants for the government of Botswana (see Scudder et al 1993 for a summary of these proposals).

In 1996, an issue arose between the governments of Namibia and Botswana over the use of the waters of the Okavango River. In June, 1996, the government of the Republic of Namibia (GRN) decided to extract water from the Okavango and to transfer the water by pipeline to the Eastern National Water Carrier at Grootfontein which would, in turn, transfer water to the Windhoek area in central Namibia. Windhoek, the capital of Namibia, had less than an 18-month water supply and was facing a continuation of the serious drought that had affected much of southern Africa at that time.

The initial proposal of the Namibian government was to do an Environmental Impact Assessment (EIA) only in Namibia. It was pointed out by the government of Botswana and various environmental organizations, however, that the EIA should examine downstream impacts of the water extraction project as well. The government of Botswana contended that the extraction of water from the river by Namibia could reduce flows into the Okavango Delta, and it noted that the Delta was a major wetland that supports sizable human and wildlife populations and that it is an important tourist destination. The result could potentially be complicated, it was argued, for the Delta and its inhabitants.

For its part, the government of Botswana in the 1980s had proposed the establishment of a major water project in the southern portion of the Okavango Delta, the Southern Okavango Integrated Water Development Project (SOIWDP). This project was opposed strongly by local people, and the project was suspended after a review was done by a team of experts working with the IUCN (World Conservation Union) (Scudder et al 1993). The government of Botswana had agreed to an independent review of the project, something that set a major precedent, since it was the first time that a national government had asked out outside agency to conduct a review of a major water development project. A set of alternatives was provided by the IUCN consultants that emphasized the exploitation of groundwater, the diversification of local economies, capacity-building of local institutions, and community involvement in the management of the Kwando and Okavango Wildlife Management Areas (Scudder et al 1993).

One of the trends in the Okavango region in Namibia and Botswana is toward greater privatization. In Botswana, dozens of safari camps have been established in the Delta and in the Savuti area in the past two decades and tourist visits to the region have increased substantially. Similar kinds of efforts were being made in Namibia, which had a number of safari camps and tourist hotels as well as local enterprises. This was true until 1999, when the conflict between the Angolan Government and UNITA, a liberation group under the direction of Jonas Savimbi, spilled over into Namibia, and there was an attack on the regional capital of East Caprivi, Katima Mulili, in August, 1999. Refugees fled across the border into Botswana, and the Caprivi area was unsafe for tourists, some of whom were attacked and killed. Now, with the signing of a peace agreement between the Angolan government and UNITA in April, 2002, there is a chance that tourism and business ventures will again flourish in the Caprivi Strip and in northern Botswana and that local people will be able to get on with their lives.

2. The Okavango Basin

The Okavango Basin is the fourth largest international river basin in southern Africa, and the Okavango is the largest river in the region that does not empty out into an ocean. Estimates of the Okavango Basin area range from 320,000 (Stanley Consultants 1995:2-13) to 570,000 sq km (Pallett 1997:73) and 586,000 to 721,277 sq km (World Resources Institute and Worldwatch Institute 1998:2-26). The main river in the catchment is the Kavango, or, as it is called in Angola, the Rio Cubango. The Kavango River rises in the southern Angolan highlands, flows southeastwards some 650 km to Namibia, where it forms the border of Namibia and Angola for some 350 kilometers. The river then turns southwards, crosses the Caprivi Strip region of Namibia, a distance of 60 km, and then flows into Botswana, where it supplies the Okavango Delta. The major tributary of the Kavango River in Angola is the Rio Cuito, and the catchment for the two rivers together is some 120,000, nearly all of which is in Angola.

The Okavango River flows during the summer months, and in the fall the waters rise, supplied by earlier rainfall in Angola. The floods in the Okavango River supply the resources for a vast complex of waterways, reedbeds, floodplain, and islands that makes up the Okavango Delta in Botswana. The Okavango catchment can be divided roughly into three different zones:

- (1) the Angolan region, which contains numerous tributaries that which feed into the Okavango River; the confluence of the Rio Cubango and the Rio Cuito is a permanent swamp;
- (2) the middle section, in which the Okavango flows in a narrow alluvial plain up to 6 km wide along the Namibian-Angolan border and then crosses the Caprivi Strip, and
- (3) the so-called Panhandle region in Botswana, where the river spreads out, emptying eventually into the Okavango Delta, one of Africa's largest inland deltas, where it dissipates.

Mean annual runoff at the mouth of the Kavango River is 11,000,000 cubic meters per annum. Water inflow to the Okavango Delta ranges from 7,000,000 to 15,000,000 cubic meters and averages 10,000,000 cubic meters per annum. The vast majority of this inflow (97%) is lost to evapotranspiration and seepage. The long-term outflow of the Delta is estimated to range from 253-345 MCM/year (Scudder et al 1993:7).

The Okavango Delta of northwestern Botswana is a large inland delta or alluvial fan consisting of about 6,000 square kilometers of permanent swamp and between 7,000 and 12,000 square kilometers of seasonally inundated swampland (McCarthy 1993:283). Sometimes referred to as "the jewel of the Kalahari" (Ross 1987), the Okavango is a vast flood plain that supports a rich variety of plant and animal life (Botswana Society 1976; Lanting 1993; Lee and Lanting 1990). The Okavango Delta was designated as Ramsar's first Wetland of International Importance. At 68,640 square kilometers, it is the largest Ramsar site in the world, according to the Ramsar Convention Bureau.

The Okavango Delta, the largest of its kind in Africa, is considered to be highly significant, both from the standpoint of its geomorphology and hydrology and its biological and cultural richness and the significance of some of the development and conservation activities that have been undertaken there (Scudder et al 1993; Hitchcock 1999; Hasler 1999). Not only does it contain over 1,100 different species of plants and 65-70 species of fish, but it also supports a wide variety of large and small faunal species, some of which, including the sitatunga (Tragelaphus spekei) are rare (Ross 1987; Lanting 1993).

3. Countries Involved: Angola, Namibia, Botswana, Zimbabwe

The percentages of the Okavango catchment in each country are as follows: Angola (28%), Namibia (30%), Botswana (39%), Zimbabwe (4%) (Stanley Consultants 1995:4-11)

4. Basin Agreement

In September, 1994, Angola, Namibia, and Botswana signed an agreement to create the Okavango River Basin Water Commission (OKACOM).

5. Regional Institutional Structure

A Trilateral Permanent Water Commission (TPWC) that includes Angola, Namibia, and Botswana was proposed in 1994 in order to provide advice on environmentally and socially sustainable development of Okavango River waters. The Permanent Okavango River Basin Commission involving Namibia, Angola, and Botswana deals specifically with the Okavango River Basin.

6. National Administrative Structure

6.1. Angola

In Angola, the water directorate in the Department of Agriculture is responsible for overseeing water resources. The management of water resources in the Okavango has been a subject of discussion in Angola, as has the possibility of developing a new dam on Cunene River, the Epupa Dam (for a discussion of the controversy over this dam, see Corbett 1999; Harring 2001).

6.2. Botswana

In Botswana, the Department of Water Affairs in the Ministry of Mines, Minerals, and Water Affairs is the main agency responsible for water. Mines arrange their own water supplies which are subject to the provisions of the Water Act or, in the case of the copper and nickel mine, they get their water from the Water Utilities Corporation (WUC), the agency that is mainly responsible for water in urban areas. The legislation that relates to the WUC is the Water Utilities Corporation Act. Other relevant legislation includes the Aquatic Weeds (Control) Act and Orders, the Boreholes Act, the Waterworks Act, the Town Councils (Public Sewers) Regulations, the Mines and Minerals Act.

In the rural areas, it is the District Councils in Botswana that oversee water supply. In some situations, such as in the livestock and agricultural sector, water provision is the responsibility of the Ministry of Agriculture. Some non-government organizations also work in the area of water supply, one example being Lutheran World Federation (LWF), which works in northern Kgalagadi District in conjunction with Maiteko Tshwaragano Development Trust (MTDT) at Zutshwa, south of the Matsehng Villages.

6.3. Namibia

The department in Namibia that is responsible for administering the Water Act of 1956 is the Department of Water Affairs (DWA). Rural water supply development is done by the Directorate of Rural Water Supply. Water in the agricultural sector is overseen by the Ministry of Agriculture, Water, and Rural Development. There is a Division of Hydrology in the Directorate of Resource Management in MAWRD that deals with the administration of the Water Act.

As is the case in both Botswana and Angola, water development is also done by private sector operators, including borehole drilling companies. Municipalities in Namibia also deal directly with water, ensuring that water is reticulated and that there are adequate waste disposal facilities.

7. Administrative Structures at the District Level in the Riparian States

7.1. Angola

The Okavango River flows through southeastern Angola, where there are a number of districts that have high potential for irrigated and flood-recession agriculture. Initial surveys in this area indicate that the region could provide important agricultural and economic development opportunities in the future. The district administrations in the region are in need of assistance, both technical and financial.

7.2. Botswana

The Okavango Panhandle and the Okavango Delta fall in the North West District of Botswana (Ngamiland), one of 10 districts in the country. The North West District is 109,130 square kilometers in size. The North West District has long recognized the importance of natural resources to its economic, social, and political well-being. The Tawana tribe, the main ethnic group occupying the district, established a tribal game reserve at Moremi in the late 1950s, one of the first of its kind in Africa.

A fairly sizable proportion of the district's land has been designated either as game reserve (3,600 sq km, or 3.3%) or Wildlife Management Areas (19,100 sq km, or 17.5%), areas in which wildlife and habitat conservation and tourism are to be the primary land uses. In addition, some of North West District's land is considered State Land (17,640 sq km, or 16.2%), some of which has been allocated for use by the Ministry of Agriculture (e.g. as veterinary camps for livestock).

The district land use plan indicates that 61,840 sq km (56.7% of the district) has been zoned communal, land which is under customary tenure and which can be allocated to people for residential, arable, grazing, and residential purposes. Two areas of North West District covering 6,950 sq km, or 6.4% of the district have been designated as commercial land which can be leased out to individuals and groups who then have de jure leasehold rights over that land in exchange for a rental payment to the district land board (the Tawana Land Board).

The land use zoning by North West District authorities acknowledges the region's special environmental qualities by setting aside large areas in which the primary land use is to be the utilization of natural resources (Okavango Community Consultants 1995). There were four Wildlife Management Areas (WMAs) zoned in the North West District land use plan: (1) Kwando, (2) Okavango, (3) Ngamiland State Lands, and (4) G/wihaba (Quihaba). After 1989, the WMAs were subdivided further into Controlled Hunting Areas (CHAs). Some of these Controlled Hunting Areas have been zoned for community use. The idea behind having Community-Controlled Hunting Areas was that these units, if they were controlled by a single institution such as a company or a community trust, would theoretically lead to better natural resource management and greater economic returns to local people.

7.3. Namibia

The Okavango River flows along the northern border of the Kavango Region of Namibia and forms the boundary between Kavango and Caprivi Regions. To the east of the Okavango river is the West Caprivi Game Reserve. The eastern boundary of this reserve is the Kwando River, another international river shared by Namibia, Botswana, and Angola. West Caprivi forms the western portion of the Caprivi Region, one of Namibia's 13 regions defined by a Delimitation Commission in 1992. West Caprivi is part of one political constituency, that of Mukwe, which is named after the headquarters of the Mbukushu chief west of the Okavango River. Administration of the region is in the hands of the Ministry of Lands, Resettlement, and Rehabilitation and the Ministry of Environment and Tourism.

Like Botswana, Namibia has established community-based natural resource management projects in what are known in Namibia as conservancies. Conservancies are areas of communal land which have conservancy councils and which are registered officially with the Namibian government. In these areas, communities can lease out safari hunting and ecotourism opportunities to companies or alternatively manage the wildlife resources themselves. As of early 2002, there were 14 conservancies in Namibia, 4 of which were in the Caprivi Strip and one of which, Nyae Nyae, was on the Botswana-Namibia border which saw population exchanges between it and a community trust area in Botswana, Cgae Cgae (/Xai/Xai). These community trusts and conservancy councils are an outgrowth of the movement toward decentralized community-based natural resource management in Botswana and Namibia, and some of them have been relatively successful both in terms of promoting and achieving development and conservation goals.

8. Some Socioeconomic Characteristics and Challenges of the Okavango Basin

In the mid-1990s it was estimated that approximately 100,000 Namibians gained their livelihood from the Kavango River (Stanley Consultants 1995:4-11). The overall population density for the Okavango Basin is approximately 3 persons per square kilometer. In Botswana, there are some 29,000 people in the Okavango Delta itself, some of whom are relatively heavily dependent on the water and other resources associated with the Kavango (Scudder et al 1993). In West Caprivi, Namibia, there were 4,411 people according to the 1991 Namibian population census.

The major difficulties facing some of the communities in the Okavango region today include remoteness, low to moderate incomes, and, for some insecurity of land tenure. a substantial portion of the population of the West Caprivi region of Namibia, southeastern Angola, and northern and western Ngamiland in Botswana lives well below the poverty datum line (PDL).

The human inhabitants of the Okavango region support themselves through a combination of strategies, including foraging, fishing, agriculture, livestock-raising, and wage labor. An important production system in the Okavango Delta is flood-recession (molapo) agriculture. In the past, local people engaged relatively extensively in hunting and they sold meat to people in Maun, Botswana and other major villages. An important source of income for people in the Okavango region is the sale of firewood, thatching grass, poles, and palm leaves which are used for making baskets.

Access to natural resources such as fish, thatching grass, palms (for baskets), and wildlife in the Okavango region is not necessarily completely equitable. As Skjonesberg and Merafe (1987:16) note, "Generally fishing grounds are open to everybody, but territoriality seems] to develop in areas that have been fished by certain groups or families." Thus, while the productive resources (fish, water, vegetation) of the Okavango

region were considered common property resources, groups and communities did lay claim to specific areas where they foraged and carried out agricultural and other kinds of activities.

The West Caprivi region of Namibia, which is 5,715 square kilometers in extent, contained approximately 6,600 people in the mid-1990s. The ethnic composition of the region is relatively homogeneous, with two San (Bushman) groups (Kxoe and Vasekele) and one Bantu-speaking group, the Mbukushu, residing there. The estimated population of Kxoe is 4-6,000 while the population of Vasekele (also known as !Xu) is 300-400 in West Caprivi. Most of the Vasekele, who came originally from Angola and number approximately 6,000 in Namibia, are found in Tsumkwe District West (formerly West Bushmanland) in the Otjozondjupa Region and what used to be Ovamboland (primarily in Omusati and Oshana Regions).

Many of the Mbukushu had left the West Caprivi area in the 1940s because of an expansion of tsetse fly (*Glossina morsitans*). Subsequently, some of them were moved westwards by the South West African administration after the game reserve was declared in 1963. Since independence in 1990, the government of Namibia has allowed Mbukushu and other groups to return to West Caprivi, with some of them settling close to the Okavango River. Some members of these groups were allocated rights to houses and plots of land in what used to be the large South African Defense Force camp of Omega.

The ethnic composition of the Okavango Delta region of Botswana is somewhat more diverse than is the case for the West Caprivi region of Namibia (Campbell 1976; Scudder *at al* 1993:54-69). The Okavango Delta was inhabited by at least a dozen groups, with others having immigrated to the region over the past several hundred years (e.g. the Mbukushu, who came from the Middle Zambezi region). The population of the North West District stood at 94,194 according to the 1991 Botswana population census. Nearly 30% of the population of Ngamiland resides in Maun, the district capital.

Traditionally, there was only a limited sense of private ownership of water resources. As was the case with land, water sources generally were associated with social units (families, wards). Open surface waters such as rivers and springs were available for domestic use by individuals and groups (Schapera 1943:243-246). In grazing districts, on the other hand, use of surface water in the past was supposed to be confined to the wards granted access to those areas. Individuals belonging to other wards who drove cattle through the grazing areas were allowed to water their animals only after seeking permission from the *modisa* (overseer) or local wardheads. People who water their herds in another group's grazing area run the risk of having their animals confiscated. Trespassing was seen as an infringement on the rights of local grazing resource users.

The digging of wells in grazing districts was a crucial factor in bringing about changes in land management and administration patterns in Botswana (Hitchcock 1990;

Peters 1994). Under Tswana customary law, open surface water was free to be used by anyone who wished. Where water was obtained through the expenditure of capital or labor, as in the case of construction or well digging, people were able to keep their water for personal use. They had to seek permission from grazing district overseers (known as badisa, like the term for herder), but once they had done so, they had de facto access to the land surrounding the water point.

Changes in water technology initiated early in the 20th century served to restructure social relations among the various groups in Botswana. The digging of wells with the aid of dynamite and, later, the drilling of boreholes, led to a shift away from communal access to water resources to a system in which private ownership predominates. Water resources developed by individuals can be passed down from one generation to the next. The only people with rights to these resources are the kin of the person who originally made the investment of labor and capital in developing the water source. There were cases, of course, of conflicts over access to water resources. It was in the best interests of individuals to try and resolve those conflicts, as they had the potential for disrupting social relations at the community or even regional level.

The rights to use and control water resources in Botswana are somewhat complicated. On the one hand, individuals had the right to use surface water for domestic purposes, while on the other, groups could restrict access to water resources of specific types or in certain places. Wells were owned privately but could be used communally. In order to ensure continued access to water sources, one needed to ensure that positive social relationships were maintained. In times of stress, people called on their alliances in order to ensure access to water. A rule among Tswana and other groups in Botswana is that individuals in dire need of water for themselves or their animals should be granted access to it.

Major shifts in patterns of user rights to water resources came about with the introduction of boreholes. Individuals and groups that sunk boreholes had to invest substantial amounts of capital and labor in this endeavor. Those individuals with the resources to have boreholes dug were able to gain de facto rights over the water and the grazing surrounding the water point. These water points were controlled by the families who developed them, and they could deny other people access to that water and nearby grazing. There were instances in which families or syndicates (groups of cattle owners who invest in a borehole or well) charged other people for rights to use the water. Some chiefs (e.g. Khama III of the Bamangwato) resented this type of action and declared that water must not be sold but rather than it must be given freely or not at all (Schapera 1943:246).

Besides open natural surface waters, wells, and private boreholes, there were also water sources that were available to the public. In the Kgatleng, for example, a chief, Isang, raised money through a levy and had a number of boreholes drilled which were then

made available for use by the Kgatla (Schapera 1943:247, 1970:40-41, 99; Peters 1994). The Bechuanaland Protectorate Administration also had boreholes drilled, mainly in villages. It is important to note that the Resident Commissioner recommended the imposition of certain rules regarding use of the new water points in order to prevent overgrazing (Schapera 1943:247-248, 1970:99). These rules included the stipulation that the chief could establish limits on the numbers of livestock kept at each water point.

Another suggestion was that limits should be placed on the amount of water pumped and the size of water storage tanks. In grazing areas, individuals watering their cattle at tribal or Protectorate Administration boreholes were supposed to pay fees for the privilege (Schapera 1943:244- 248, 1970:99). The money generated was supposed to go to the Tribal Treasury, which then used it to maintain the pumps and to pay for people to take care of the facilities.

Borehole drilling in drier areas of rural Botswana (e.g. the Kalahari) facilitated expansion of the number of livestock that could be kept. It also ensured that water was available year- round, whereas in the past it usually was available only seasonally. The rising numbers of livestock and the reduction of their mobility contributed to a process of overgrazing and environmental degradation. As a consequence, both chiefs and the Protectorate Administration began to call for the privatization of land in order to counteract what they saw as problems of communal land and water access.

A major problem in the livestock sector of Botswana is that although land use planning efforts are expanding both in number and sophistication, the ad hoc drilling of boreholes continues without any real controls being implemented to ensure better range management. Efforts are now being made to coordinate activities between the Department of Water Affairs, the Department of Geological Survey, and the Water Utilities Corporation.

In Namibia, there have been local-level conflicts between Traditional Authorities, local communities, and the government of Namibia. One of the constraints in the West Caprivi community-based natural resource management program has been the limited number of economic enterprises that have been initiated in the region by the government. The two main potential sources of income that have been worked out thus far are (1) sales of crafts to tourists, and (2) a community camp site at Bagani which brings in funds from tourists who pay to camp there and who purchase crafts in a local shop. Sales of crafts made from local natural resources are an important source of income, especially for women, in the Caprivi Region (Terry, Lee, and LeRoux 1994).

The Bagani Campsite, which is known as N//goava, has been the subject of dispute between local Khoe community and the government of Namibia. In 1996, the Namibian government decided to turn the land where the campsite was located into a prison farm to be overseen by the Ministry of Prisons and Correctional Services. This was done in spite

of the fact that the Khoe reportedly had followed all appropriate procedures in applying for Permission to Occupy (PTO) and had sought conservancy status for the campsite area. In 1996, the government of Namibia decided to establish a prison farm on a plot of land that was the site of a Kxoe tourism camp that had been set up in 1995. The conflict between the Kxoe and the government of Namibia over the prison farm has reached the Namibian High Court, with the Legal Assistance Center (LAC) representing the Kxoe. Eventually, the government of Namibia decided not to contest the case, and the Ministry of Prisons and Correctional Services decided to locate the prison farm in another location.

The fundamental difficulty had to do with the indeterminate status of land and the lack of confirmation regarding the status of authority structures (both government and traditional) in West Caprivi. Formally, all of West Caprivi has the status of a Game Reserve (with the exception of the Kwando Triangle), the Game Reserve being divided into core wildlife areas and a "multiple use" area with human settlement and limited agricultural activity (Brown and Jones 1994). The area falls under the jurisdiction of the Ministry of Environment and Tourism, but the de facto situation is that other government ministries or agencies (e.g. Prisons, Agriculture, Lands and Resettlement) have taken the initiative to start projects or to re-arrange settlement in the area. The local institutions have lacked the capacity to negotiate effectively with government agencies, and as a result they have been unable to prevent plans from being made elsewhere without seeking of input and advice from the current residents of the area.

The same lack of jurisdictional clarity applies to traditional authority. The Kxoe and the Vasekele are united under one chieftainship, but this chieftainship has not yet been recognized by the government of Namibia. The Kxoe and Vasekele fall under the authority of Chief Mbambo of the Mbukushu. Efforts have been made to get the government of Namibia to recognize San authorities, something that was agreed upon in principle after discussions about the new Traditional Authorities Act. (Hinz 1995; Thoma and Piek 1997).

There have also been complications arising from decisions about the handling of claims to arable and residential plots in the area. A number of residents of Omega said in 1995 that they were being requested to move out of the former base. What this meant for them was that they would have to leave their homes which they had paid for themselves. Some of the Barakwena and Vasekele had already gone to Bagani, others had moved west to Chetto, Mashambu, and Dodge City, and still others had returned to their former territories in the West Caprivi (e.g. to Xhamxhom or //am//om), and a few had moved south into Botswana. (It should be noted that in November, 1998, some 2-3,000 Khoe and other people from West Caprivi left their homes and moved into Botswana and sought refugee status because of concerns about their future).

Allocations of plots four hectares in size had been made by the Ministry of Lands, Resettlement, and Rehabilitation to people in several West Caprivi sites, including Bagani

and Chetto. While the land was officially demarcated, there was still a question about whether or not the plots had actually been registered in the names of the people who were allocated them. Land for grazing was not provided, causing consternation among local people, some of whom had acquired livestock or were in the process of doing so. To complicate matters further, there have been mixed messages coming from the government of Namibia and the regional authorities as to whether or not people will be allowed to keep sizable numbers of livestock in the game reserve.

Clearly, the land tenure situation is both complicated and in need of clarification. Perhaps the most critical problem facing the people of West Caprivi is what could be described as a "jurisdictional open access" situation. Outsiders are moving in to West Caprivi, and there are few, if any, efforts being made to control the in-migration. Unless there is a resolution to these situations, community-based natural resource management has a dim future in West Caprivi, and the socioeconomic situation of local people there will continue to be problematic.

9. Conclusions

There are a number of lessons that can be drawn from the Okavango River Basin for the water management and development situation in the American West. One lesson is that having local people involved extensively in decision-making regarding land and water use management and planning can have positive effects at not just the local level but at the national, regional, and international levels as well. A second lesson is that water commissions can be useful in resolving conflicts over such issues as benefit sharing, determination of flow amounts and allocation of water to the various parties, and the kinds of developments that can be undertaken in the river basins.

A third lesson is that a regional protocol -- such as the Southern African Development Community Protocol on Shared Watercourse Systems -- can be useful if member states are willing to respect it and to live by its principles such as equitable allocation and resource sharing, ensuring a balance between conservation and development, and having a coordinated approach to utilization and conservation of water. Fourth, it is important to establish functioning and effective river basin management institutions and to seek to harmonize water resource policies between states and to monitor compliance with water resource legislation and agreements. Finally, if transboundary water management and conflict resolution are to be effective, it is necessary to ensure that there is strong emphasis on civility and the implementation of principles of social and environmental justice in all activities involving water resources that are shared between states.

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