

Economic Development and Cultural Change among the Okavango Delta Peoples of Botswana

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In *Botswana Notes and Records*, Vol. 30, Pp. 27-44, 1998

Development in Botswana

In many ways, Botswana has had one of the most intense, and most successful, economic development experiences among sub-Saharan nations in the post-colonial era. This development has largely depended on mining and cattle, and has been extractive and export driven (Valentine 1993). Recently, due to concerns regarding the diminishing returns of extractive industry, environmental costs, and the vulnerability of the cattle industry to both importers' decisions and disease, tourism has played an increasingly important role in planning for Botswana's economic future (Lilywhite and Lilywhite 1991). Many other developing countries both in sub-Saharan Africa and elsewhere also see tourism as a sustainable and clean way to earn foreign exchange as well as provide relatively large numbers of skilled and unskilled jobs and infrastructural development (Hitchcock 1991, Young 1995).

Economic development is often evaluated in terms of the resultant benefits to national level statistical indicators such as GDP, employment, education, and poverty figures. Less attention has been paid to the costs of economic development and the variable impact, both positive and negative, on different groups. Indigenous peoples and other minority groups may experience a higher level of negative effects of development because part of their experience with development is often integration into national level political, economic, and social institutions. Because they are starting at a lower level of development, this integration can effectively bring them into these national level institutions at a secondary status (Woodburn 1997). In many areas, indigenous and minority peoples occupy remote areas. As transportation and extractive technology have improved, it has become more cost effective to conduct exploration and resource extraction in these areas. The issues of land tenure that arise from these operations are among the major concerns facing indigenous peoples at the close of the 20th century (Young 1995).

Lastly, because indigenous peoples and other minority groups often have different languages, cultural histories and traditions, and subsistence economies from those embodied in national institutions, economic development can bring rapid, unanticipated, and detrimental change in each of these areas (Hitchcock 1997).

Studies of the impact of economic development on indigenous people tend to focus on macro-level political and economic change or the ways in which household living standards, attitudes, and values are affected by development. Less attention, however, has been paid to the interplay between children's socialization, economy, and the strength of cultural traditions. This paper is a case study of two communities in the Okavango Delta, examining how economic development in the form of nature tourism (also referred to as ecotourism) impacts the acquisition of traditional skills and knowledge by children. Traditional skills and knowledge are crucial components of cultural life and ethnic identity.

Moreover, it is widely recognized that indigenous peoples often have skills and environmental knowledge that are not duplicated elsewhere and are recorded nowhere except in the people themselves (Alvard 1995; Godoy 1994; Hill and Hurtado 1995; Liebenberg 1990; Stander, Ghau, Tsisaba, #oma, and Ui 1997). In many ways, cultural continuity depends on the transmission of these

skills and knowledge to children at appropriate ages. By focusing on the mechanism by which this transmission becomes changed and/or disrupted, we can improve our understanding of the costs and benefits of economic development in terms of the preservation of traditional skills and knowledge and the cultures of indigenous peoples.

The Study Population

The Okavango Delta peoples consist of five ethnic groups, each with its own ethnic identity and language (Bock 1993, 1995). They are Hambukushu (Mbukushu, Bukushu, Bukusu, Mbucuschu, Ghuva, Haghuva), Dxeriku (Dceriku, Diriku, Gceriku, Giriku, Niriku), Wayeyi (Bayei, Bayeyi, Bakoba), Bugakwe (Kxoe, Kwengo, Barakwena, G/anda) and Xanekwe (Gxanekwe, //tanekwe, River Bushmen, Swamp Bushmen, G//ani, //ani). The Hambukushu, Dxeriku, and Wayeyi are all Bantus who have traditionally engaged in mixed economies of millet/sorghum agriculture; fishing, hunting, and the collection of wild plant foods; and pastoralism. The Bugakwe and Xanekwe are Bushmen who have traditionally practiced fishing, hunting, and the collection of wild plant foods, Bugakwe utilized both forest and riverine resources while the Xanekwe mostly focused on riverine resources. The Hambukushu, Dxeriku, and Bugakwe are present along the Okavango River in Angola and in the Caprivi Strip of Namibia, and there are small numbers of Hambukushu and Bugakwe in Zambia as well. Within the Okavango Delta, over the past 150 years or so Hambukushu, Dxeriku, and Bugakwe have inhabited the Panhandle and the Magwegqana in the northeastern Delta (Barnard 1992, Tlou 1985). Xanekwe have inhabited the Panhandle and the area along the Boro River through the Delta, as well as the area along the Boteti River (Barnard 1992). The Wayeyi have inhabited the area around Seronga as well as the southern Delta around Maun, and a few Wayeyi live in their putative ancestral home in the Caprivi Strip (Larson 1988). Within the past 20 years many people from all over the Okavango have migrated to Maun, and in the late 1960's and early 1970's over 4,000 Hambukushu refugees from Angola were settled in the area around Etsha in the western Panhandle. Small numbers of people from other ethnic groups such as Ovaherero, Ovambanderu, and Batawana now live in parts of the Okavango Delta, but since the majority of the members of those groups live elsewhere and the habitation is recent they are not included in the Okavango Delta peoples. There are also several Bushmen groups represented by a handful of people. These groups were decimated by diseases of contact in the middle part of this century, and most of the remaining members have intermarried with the Xanekwe.

Given the range occupied by these groups and the recent scientific interest in the Okavango Delta, there has been surprisingly little anthropological work done among any of the Okavango Delta peoples. Larson (1963, 1966, 1970, 1971, 1977, 1980, 1988, 1992, 1995) conducted fieldwork among the Hambukushu and Wayeyi from the 1950's to the 1970's, and Heinz (nd) worked with the Xanekwe in the 1960's and 1970's. Cashden (1979, 1985) and other members of the New Mexico Kalahari Group conducted research among the Boteti River Xanekwe in the 1970's. Unzicker (1996) has worked as a missionary among the Etsha Hambukushu.

There has been some work with members of these groups in Namibia. Winkler, Kirchengast, and Christiansen have published a number of papers on the physical anthropology of the Kavango peoples of Namibia, whom they identify as members of the Kwangali, Mbunza, Giriku (sic), Sambyu, and Bukusu (sic) tribes (Christiansen, 1991; Winkler and Kirchengast 1994, 1995; Kirchengast and Winkler 1995). Fisch (1977) and van Tonder (1966) both worked among the Hambukushu in the Caprivi Strip. There have been a number of linguistic studies of Hambukushu and Dxeriku people on behalf of the South African and Namibian governments and missionary organizations, and recently Brenzinger has conducted a linguistic study of Bugakwe (1997).

The current study has been ongoing since 1990, and represents over five years of fieldwork by the author and his associates (Bock 1993, 1995, 1998). The study focused on the cultural ecology and

household and family economy of the Okavango Delta peoples, using the diversity among the ethnic groups as a natural laboratory to examine the ways in which participation in different subsistence regimes affected family composition, children's activities, and children's skill and knowledge acquisition. The study took place in two communities, one where people were engaged in traditional economic pursuits, and one where people were engaged in wage labor in the tourism industry. At the time of the study, neither community had a borehole, school, or clinic. Water at both communities was drawn by hand directly from a river source. Both communities received sporadic visits by healthcare workers.

The traditional community, numbering about 200 residents, is located on the eastern side of the Okavango Panhandle, midway between Mohembo and Seronga. Settlement is stratified by ethnic affiliation. From north to south over a span of about eight kilometers, there are Bugakwe, Wayeyi, Dixeriku, Hambukushu, Dixeriku, and Xanekwe homesteads. Many of the Bugakwe and Xanekwe also maintain a hut in the village proper for convenience in attending kgotla meetings or other dealings with the government such as obtaining a hunting license, passport, or to visit the healthcare workers in case of illness. The Hambukushu are central both literally and figuratively. Thimbukushu, the Hambukushu language, is the lingua franca. Many Dixeriku speak Thimbukushu at home, and many of the younger Wayeyi, Xanekwe, and Bugakwe are more comfortable with Thimbukushu than with their own languages. Very few women and children have any competence in Setswana, the national language. The headman is a Mumbukushu, the Hambukushu own the vast majority of livestock in the community, and have the largest agricultural fields. The Dixeriku are next in terms of both livestock and size of fields, followed by the Wayeyi. No Bugakwe have livestock or agricultural fields. Most Xanekwe have fields and are accomplished farmers, but among all the Xanekwe there are only four head of cattle which severely limits their ability to plow large fields. The most common crop is mahongo, a drought resistant type of millet. Because people are dry farming about five km. from the community on the edge of the mopane veldt, crop yields even in a good year are low, about 200 kg/hectare, which is very close to the average for dry farming in Botswana (Peters 1984). Because the yield is so low, even the most dedicated farmers are not able to grow enough to be self-sufficient and all depend on fishing and the collection of wild plant foods.

At the time of the study, there was virtually no cash economy. There was no store in the community, and people using remittances or proceeds from the sale of cattle to purchase consumer goods needed to go to Shakawe (80 km.) or Seronga (50 km.). Motor vehicle traffic was very sporadic prior to 1994, with vehicles seen an average of one every two weeks.

As in many parts of Botswana (Mueller 1984) male migratory labor has been an important component of the local economy. Until the 1980's, most men spent an average of four years in the South African mines. While this practice was nearly universal, it is important to note that this means men spent the vast majority of their productive lives in the community. At the time of the study, 8 of 41 men (19.5%) were working outside the community, either in mining, the tourism industry, or as laborers in Maun.

Of the 120 children, at any one time about 20 attended school. Of these, 15 attended primary school about 30 km. away, making the walk through the bush home on Friday afternoon and returning to board at school on Sunday. Five children attended junior secondary school in Seronga or Shakawe, and returned home infrequently. Children spent a great deal of time in productive labor, the type of labor depending upon the economic orientation of their family. Children from all the ethnic groups spent a good deal of time fishing and collecting wild plant foods for their own consumption. In general, children ranged far from their homes, although potentially dangerous wildlife such as elephant, buffalo, leopard, crocodiles, hippos, and venomous snakes are common.

Among all but the Bugakwe, an important type of labor for girls and women was processing mahongo into flour. The grain is pounded using a mortar and pestle, then sifted using a basket. The procedure is repeated several times, so that the outer shell is removed, followed by the inner shell, leaving the ground kernel. This type of grain processing is commonly done by females throughout

sub-Saharan Africa and many other parts of the world, and is probably one of the most common and important labor activities performed by girls and women in agrarian communities worldwide (Hanna 1986). In this community, no girl younger than eight was observed processing grain. At age 12, an average of 40 minutes per day was spent processing grain, at age 15, 50 minutes per day, at age 18, 60 minutes per day, peaking at age 30 when women spent an average of 97 minutes per day processing grain. The time allocation to grain processing then declines to 38 minutes per day by age 50, and continues to decline into old age.

The second community is located on the Boro River on the southwestern side of Chief's Island. Its 200 inhabitants are about evenly divided between Xanekwe, Wayeyi, and Hambukushu. Until the mid-1960's many Xanekwe along the Boro and Jao Rivers were semi-nomadic hunter-gatherers, foraging from a central location for several years before relocating. Although subsistence hunting was an important component of their economy, from the early part of this century until the late 1960's trade in animal skins was also an important means of acquiring consumer goods. Informants report that there were several periods wherein the Xanekwe practiced both agriculture and pastoralism, although foraging remained the major portion of their subsistence economy. In the mid-1960's the first safari camps in the area attracted Xanekwe from all over the Boro/Jao region. The establishment and subsequent expansions of the Moremi Wildlife Reserve were further impetus for both migration of the Xanekwe and establishment of more safari camps in this area. Subsequent to the concentration of Xanekwe in the area, Wayeyi from the Jao area who had historically traveled through and hunted in the area began arriving searching for jobs. Finally through the 1980's many more Wayeyi and Hambukushu from the Panhandle and northeastern Delta arrived.

By the mid-1980's, there were four camps in the immediate area serving tourists on "photographic safaris" and one hunting camp. The community had been spread over an area between two camps about three km. apart, but in 1984 people concentrated in the current village. During the period 1995-7, the Northwest District Council and the Tawana Land Board encouraged people who were still living in isolated extended family settlements or near safari camps to relocate to what has now become the main village.

The community is located within a concession area, and is adjacent to the Moremi Reserve. No domesticated animals are permitted, although there are dogs, cats, goats, and chickens kept in the village. It is common to encounter potentially dangerous wildlife in close proximity to the village. Elephants, buffalo, and venomous snakes are frequently seen in the village proper, while elephants, crocodiles, and hippos are regularly encountered when collecting water. Lion spoor is often found in the village.

The settlement pattern of this community, while also stratified by ethnicity, is much more compact than the traditional community. Over a 500 m span north to south are Xanekwe, Wayeyi, and Hambukushu. This community has experienced a great deal of political division, and the headman, a Xanekwe, spends his time either at his extended family homestead adjacent to a hunting camp several km. away or in Maun. During the time of the study the community was also involved in a labor dispute with the operator of the two camps which provide most employment, and in protracted negotiations regarding their "community area."

Virtually all adults worked for two of the tourist camps. Men were employed as guides, taking international tourists in their dugout canoes (mekoro) and then walking through the Moremi Reserve observing wildlife. Women were employed as cooks, waitresses, and custodial staff in the tourist camps. The tourist camps are approximately 2 km. from the village, and employees commuted by walking, wading, and mokoro depending on the flood stage. Almost all food was purchased from one of the local "vendors", although some families had very small gardens, on the order of 50-100 m². In addition, net fishing by men was common certain times of the year, and game meat was available during hunting season as part of the community's agreement with the hunting concessionaire.

Of the 108 children, all children over the age of seven (81) attended school in Maun or other

communities. Schoolchildren returned to the community only over the school holidays, and because transportation was difficult the visits were usually short. Children spent virtually no time in productive activities, although young children (under 10 years old) collected palm nuts and corms at certain times of the year. These food items, however, are "snack" items as opposed to the subsistence quality of children's foraging in the traditional community. Younger children were largely confined to the village proper due to the lack of adult caretakers during work hours and the perceived risk from wildlife.

Patterns of parental investment

Anthropologists (Munroe, Munroe, and Shimmin 1984; Whiting and Whiting 1975, Edwards and Whiting 1980), demographers (Caldwell 1982), economists (Rosenzweig 1990), biologists (Low 1989), and psychologists (Slaughter and Drombowski 1989) have all attempted to explain the variation in children's socialization, activities, and productivity across and within societies. Common to these approaches is the recognition that the type of resources available and their distribution are critical factors in determining the types of skills needed to successfully extract resources within a given environment. Resources that are more difficult to extract will require a higher level and/or more types of skills than those easier to extract. For instance, game animals are a resource that is relatively one of the most difficult to extract. To be a successful hunter, especially using traditional technology such as bow and arrow, requires high degrees of skill in crafting the tools, tracking the animals, approaching the animals, and being able to accurately deliver the projectile. These skills take many years to develop, and in most foraging societies, men do not become proficient hunters until their mid-20's (Hill and Kaplan 1988, Lee 1993). Many agricultural activities such as planting and weeding require very low levels of skill (Caldwell 1982, Reynolds 1991), and young children can be sufficiently skillful to contribute their labor in a productive fashion.

Within a household economic unit decision makers such as parents are faced with a set of problems related to skill acquisition by children. Even in an economy where most resources are difficult to extract and require a high degree of skill, there are still some tasks that young children can do such as carrying water or firewood. Yet, when children are performing those tasks they are not acquiring the skills to be a successful adult. There is a trade-off between immediate productivity and skill acquisition which is used for future productivity (Bock 1995). In a traditional community, such as that described above where the economy is mixed and people are living marginally, these are difficult and crucial decisions. Moreover, it is important to note that parents are usually making these decisions across a sibship of several children of different ages in the context of limited resources. What is best for one child may not be what is best for the parent, concerned with the entire sibship. While the child might want to spend most of his or her time acquiring skills, the parent may need that child's labor now to support other children (Trivers 1972, Parsons and Goldin 1989).

Theories have been developed independently in microeconomics and evolutionary biology to predict how parents will manipulate the time allocation of their children in terms of the trade-off between immediate productivity and skill acquisition. Both of these theories predict that the level of investment in terms of material resources used for growth and development and training in terms of skill acquisition will vary based on the expected returns to the parents. The theories differ in the currency of the expected returns. While economists value the returns in terms of resources accrued to both child and parent, human behavioral ecologists have measured the returns in terms of reproductive fitness or the number of descendants in succeeding generations. In an attempt to integrate these two perspectives Kaplan and his associates (1994; Kaplan, Lancaster, Bock, and Johnson 1995a, 1995b) created a model of the optimal allocation of investment in children within sibships in terms of embodied capital, the total investment in physical development and skill acquisition such as formal education. Testing this model on a population in the United States, they found that as skill requirements for employment have increased through time, parents are concentrating resources in fewer, better educated children. Competition in the labor market is

increasing the difficulty of extracting resources and parents are responding by investing more heavily in the skill acquisition of their offspring. In a prior study of the traditional community (Bock 1995) it was shown that the pattern of time spent in different productive activities by children was dependent upon the skills of each child in a sibship, which are largely dependent on age, as well as the overall pattern of labor availability within a household. A major determinant of school attendance in that community, for instance, is the availability of substitute laborers. When parents cannot increase their overall productivity by using the labor of a child, and if they have sufficient resources to afford school attendance, they will send that child to school where he or she is committed to skill acquisition at the expense of any immediate productivity. Similarly, children in that community are less likely to perform a productive task if there are substitutes who are better at that task. The net effect is that the labor of the household is organized primarily to maximize return, and children's free time, used for self support or skill acquisition in the form of play, is inversely related to the marginal value of their labor.

Children's socialization and training

Children's socialization, training, and cultural inculcation are greatly dependent upon their time allocation to different activities (Munroe et al. 1984, Whiting and Whiting 1975). Education, whether traditional or formal, play, performance of different tasks, singing, dancing, accompanying parents while they perform tasks, and many other activities all contribute to children's socialization, but the overall pattern of time allocation to all these activities determines children's exposure to acquiring skills and knowledge. The theory outlined above predicts that the pattern of children's time allocation is based on parental manipulation of that time so as to maximize returns to the parent, and that parents will be influenced by factors such as economy, family composition, and future expectations.

In addition to the types and quantity of labor available in the household, children's activities may also be affected by the safety of the environment and by the time constraints of parents. In a series of papers, Blurton Jones, Hawkes, Draper, and O'Connell (Blurton Jones 1989, Blurton Jones et al. 1989, 1994a, 1994b) have examined the relationship between features of the ecology and children's ability to provision themselves. They found that in addition to the types of resources and the ability required to extract them, the perceived safety of the environment in terms of threat from wildlife were major determinants of differences in children's foraging among the Kalahari Ju/'hoansi and Hadza of Tanzania. Draper and Cashden (1988) found that Ju/'hoansi children in Botswana underwent significant changes in their pattern of interaction with parents and other family members and in their time allocation to productive activities as a result of technological change due to economic development.

Comparison of the two communities

In order to understand the differences between the two study communities in terms of skill and knowledge acquisition we can use the theoretical perspective presented above. Based on this theory we would expect that differences in types of resources available and the difficulty of resource extraction would impact parental manipulation of children's time allocation. This would in turn impact the forms of skill and knowledge acquired by children.

The most obvious change in terms of resources is from the acquisition of resources through collection and production to a cash market economy. It is important to be cognizant of the political economy and history which affect such a transition. In Botswana, the imposition of the hut tax by the colonial government (Tlou 1985) and hunting (Hitchcock 1996) and pastoral (Valentine 1993) policies have all been long acting coercive forces in increasing participation in the cash market economy. These external factors are not the sole motivator for this change, however, and it is at least

equally important to understand the internal motivation of peoples' changing economic orientation. Economists have long recognized that resource stability is a critical factor influencing peoples' economic choices (Rosenzweig 1988, Lucas and Stark 1985). In an arid environment such as Botswana, pastoralism may provide important buffering against environmental perturbation such as drought (Kurosaki 1995). Agriculture provides some buffering and also takes advantage of good rain years, by providing storable resources. Foragers, however, are largely at the mercy of the weather. One can see that within the traditional economic systems, there may be motivation to move from foraging into farming and pastoralism, and that there may be the greatest benefit in pursuing a mixed strategy, though we need to be cognizant of the political economic and historical constraints which may prevent people from acting in their own best interests.

Wage labor may be the most desirable economic pursuit in terms of protection from environmental perturbation. Although the price may fluctuate, food can always be purchased (barring major catastrophe which would most likely affect other economic pursuits as well). In this sense, wage labor is an abundant and stable resource. The labor market in a cash economy, however, may be highly competitive and skill driven, with the effect that while abundant the resource is extremely difficult to extract (Kaplan et al. 1995b). Wage labor may also entail costs separate from skill acquisition and education, such as relocation, separation from family, and living in urban rather than rural poverty. Yet, many people in Botswana and other developing countries are willing to pay these costs and make the transition from traditional economic systems to wage labor cash market economies.

It is important to note that in the wage labor community, there is the very unusual situation that people are using traditional skills, such as those derived from hunting and other bushcraft, to obtain wage labor jobs. These are high paying jobs, guides making an average of P40 per day, and others making between P15 and 25. Typical wages for skilled workers in Maun are around P20 per day. Based on the comparison between wages, it might seem intuitively obvious that parents might want their children to work in the safari industry. All parents were interviewed and, contrary to this expectation, when asked what occupation they wished for their children no one wanted their child to work in the safari industry. Rather, people wanted their children to receive an education and obtain a job in Maun, Francistown, or even Gaborone. The almost universal reason was that life in that area was too dangerous due to the risk from wildlife. Indeed guiding is a hazardous job, with one man killed by a hippopotamus in 1996 and one by a crocodile in 1997. Moreover, the walk to work and to get water are also potentially dangerous activities. One woman in 1997 was trampled by a buffalo on her way to work and was seriously injured. People are, in a sense, willing to pay insurance in terms of lower wages for their children to protect against risk from wildlife. People were, however, less aware of the potential hazards their children faced in urban life from crime, accidents, and disease. The important aspect of this set of parental aspirations is that parents, once in the cash economy, are loathe to see their children leave it.

The obvious difference between the two communities is in the proportion of children attending school. Although neither community has a school, and the wage labor community is farther away from the nearest primary school (80 km.) than the traditional community (30 km.), the wage labor community has universal school attendance. This means that parents are investing heavily in skill acquisition in terms of formal education and the expense of traditional skills and knowledge. Younger children are receiving little investment in terms of traditional skills and knowledge, since parents are working during the day.

To examine differences in traditional skills and knowledge, a series of tests were conducted in each village. These tests consisted of general anthropometric measurements and assessment of strength and general condition; tests of skills at traditional productive tasks such as grain processing, log cutting, water carrying, and mongongo nut processing; and tests of environmental knowledge such as animal identification and behavior. As stated above, grain processing is an important traditional skill for Hambukushu, Dixeriku, Wayeyi, and Xanekwe women and girls. Because of this, it is an interesting example of how the acquisition of traditional skills has changed due to economic

development and participation in a wage labor economy.

Twenty-six girls from the traditional community and twenty-two girls from the wage labor community between the ages of four and 18, inclusive, were given 500 g of grain, and instructed to process it as they did at home. The girls were free to choose their equipment from an assortment of sizes. Each girl was also given 500 ml of water to use in processing as she desired. Each phase of pounding and sifting was timed, and at the end of the period the product in terms of chaff and flour were weighed, and the amount of water measured. The weight of flour was then divided by the minutes pounded and sifted respectively. These were then converted to energy values of 320kcal/100 g (WHO 1966), so that the amount of kcal/min of pounding and sifting could be calculated.

The results for pounding are presented in Figure 1, and for sifting in Figure 2. The most important feature of these results is that six girls (27%) ranging up to 14 years old were unable to process grain in the wage labor community, while only one five year old girl in the traditional community could not perform this task. Girls able to perform the task from the wage labor community were evenly matched in the pounding component with the girls in the traditional community only until age 10, and after that age had significantly higher returns to time spent pounding. There are two likely explanations for this. First, pounding is more related to strength and sifting to skill (Bock 1995). The girls from both communities did not differ significantly in weight or height.

However, girls from the wage labor community 12 years of age and older were significantly stronger than girls from the traditional community (one-tailed t-test: $p=.0005$, $t=3.63$, $df=30$). Second, many of the older girls in the wage labor community migrated from traditional communities when they were between six and ten years old. This means that the older girls had substantial early experience with grain processing. Moreover, this is a task that is sometimes performed at schools to prepare school meals, and older girls have also had experience there. The sifting results were more dramatic, with the regression of sifting returns on age being significantly higher in the traditional community across all ages. This difference between the two communities was only significant for girls under 12. This means that girls under 12 in the wage labor community were, on average, significantly less skilled at sifting than their age mates in the traditional community. The difference between the two groups' sifting ability reflects the more skill intensive nature of sifting, as well as the age difference in exposure to and experience with grain processing in the wage labor community.

As a whole, these results show that girls under 12 in the wage labor community are far less skilled in all aspects of grain processing than their peers in the traditional community, with many girls unable to produce any usable flour. Girls 12 years of age and older from the wage labor community spent less time pounding than girls from the traditional community and, on average, about the same time sifting per kcal. of flour processed. This may be due to the increased strength of girls from the wage labor community as well as their substantial early experience in grain processing and their continued involvement in grain processing while attending school. Still, the age difference within the wage labor community is profound. Sisters separated only by two years may have much greater variance in their grain processing ability than sisters in the traditional community. From the number of girls unable to process grain at all, it is clear that as the cohort of girls under 12 ages, they will not catch up to their older sisters who had early childhood experiences with grain processing and other traditional activities.

It is widely recognized that peoples' relationship with their environment is a major feature of culture and tradition. Indigenous people often have detailed and unique knowledge of their environment that is contained in experience and oral history (Liebenberg 1990; Stander et al. 1997), and the Okavango Delta peoples are no exception (Campbell 1976, Larson 1980). Moreover, conservationists recognize that rural peoples' knowledge and experience with wildlife are important means to assist in the management of natural resources (Adams and McShane 1992, Fairhead and Leach 1996). In-depth semi-structured interviews were conducted with 40 children aged six to eighteen from each community regarding their knowledge and familiarity of wildlife and the environment. Each child was shown photographs of mammals common to the Okavango Delta, as well as photographs of

crocodiles. He or she was then asked the name of the animal (care was taken to obtain the correct name for the animal in all languages spoken in the area); where it was normally found (swamp, savanna, forest); what kind of food the animal usually ate; if it was usually solitary or in groups; whether it was nocturnal, diurnal, or crepuscular; how best to get close to the animal if one wanted to do so; and whether it was dangerous, and if so, what one should do upon encountering it. Each child was also shown photographs of plants commonly used for food, craftwork, or medicine by the Okavango Delta peoples, as well as photographs of birds used for food, eggs, or to find honey. For plants and birds children were asked the name, what it was used for, and where it could be found. Children's answers were compared with information from highly skilled adults from the communities as well as information found in standard field guides (Cole 1995, Estes 1995, Newman 1989, Ellery and Ellery 1997, Roodt 1993).

Although these data have not been fully analyzed, several interesting results have emerged through preliminary analysis. Children in the traditional community were familiar only with animals, plants, and birds found in their area. Children were quick to say "Mbadi na dimuka" (Thimbukushu for "I don't know") for animals not seen in the general area. Although these children were not used to looking at photographs, they almost always correctly identified animals, plants, and birds found in the general area. Most children spontaneously offered stories of their encounters with animals, and would imitate the noises the animal made or its walk. Older boys, who generally roam farther from the community, were better at identifying animals found farther away in the swamps or mopane veldt. Children were very accurate in their answers regarding animal diets. In fact, several children were able to correctly report the diet of nocturnal animals.

Children were also very accurate in their perceptions of danger from wildlife, and knew what course of action to take if encountering potentially dangerous animals on land or in the water. Plants commonly eaten or utilized were also quickly and accurately identified by most children. The same held true for birds, with children able to relate stories of being approached by honey guides. Many children also demonstrated how they were able to call a honey guide.

This is in marked contrast to the wage labor community. Children were easily segregated by school attendance. Younger children who had not attended school could name very few animals, even those animals which were seen frequently. Older children, in contrast, could name many of the animals, but when questioned said that they had learned about them in school. Schoolchildren, however, were very inaccurate regarding their knowledge of the behavior of animals they could identify.

While children were generally correct in assessing the potential danger of predators, elephants, hippos, and buffalo, many children also thought that antelope were to be avoided because "they could spear you," and one ten year old girl thought giraffe would chase her and bite the top of her head. Children were accurate about the appropriate response if encountering elephants, hippos, buffalo, or crocodiles, all commonly encountered around the village. Surprisingly, children almost universally were incorrect regarding the appropriate response to encounters with lions or leopards, although these predators are present in the immediate area. Children were unfamiliar with most plants and birds except the ones most commonly utilized in the area. Although honey guides are common, children were unfamiliar with them.

The most important impression from these results, corroborated by several years experience observing children in both communities, is that children in the traditional community have an intimate and regular interaction with the natural environment. Their experiences and knowledge are shaped by the pattern of utilization and characterized by familiarity and easy recall. The natural world is part of home. In contrast, the children from the wage labor community are oriented to urban life, even when visiting the community.

Children's knowledge of the environment is shaped by their formal education, and the animals and plants, although in extremely close physical proximity, are idealized and remote. These children have access to professional guides in their own parents, and live next to one of the world's great

wildlife reserves, but neither children nor parents are interested in investing in the acquisition of this traditional knowledge. In addition, parents, spending their days at work in the tourist camps, do not have the time to take their children into the bush and teach them about the environment.

Conclusion

The Okavango Delta peoples are now experiencing the effects of Botswana's impressive gains in economic development, and like indigenous peoples worldwide are finding that these gains bring great challenges. This paper provides important insights into the mechanisms by which the Okavango Delta peoples are encountering substantial cultural, political, and economic change. Children, as the truism says, are the future, and important factors in cultural change are children's experiences and the types of skills and knowledge they acquire. The theoretical perspective driving this research is valuable in illuminating the complex interplay between economy, family, and culture.

A critical point emerging from this study is the stunning rapidity of cultural change. Children from the same ethnic groups separated by a few years and a few kilometers are having radically different lives resulting in major differences in the types of skill and knowledge that are embodied within them. It is important for decision-makers in government and elsewhere to be aware that these changes are quick and largely irreversible. The costs and benefits of economic development policy need to be evaluated with this in mind. In addition, indigenous peoples and others affected need to be apprised of the potential changes so that they may provide input, or at the least discuss and implement appropriate responses. Indigenous peoples also need to be able to preserve their traditional skills and knowledge, or to include these in formal education curricula at schools their children attend. One aspect not discussed in this study is language. With the loss of skills in their own language, children often lose access to knowledge that resides in older people. Language is as important a traditional skill as any discussed above.

In Botswana and many other places in the developing world, the HIV/AIDS pandemic will further exacerbate problems of loss of traditional skills and knowledge. Many of the most knowledgeable and skillful people may die. As parents are lost, children will no longer experience many aspects of their traditional lifeways. Ntozi (1997) shows that the HIV/AIDS epidemic in Uganda has resulted in decreasing educational opportunities as more children are taken in by their extended families. Caretakers have no more resources or time to invest, but are faced with having to provide investment to more children out of the same budget. An even less attractive alternative is if children find themselves in institutions where their cultural tradition is in the minority. There may also be added impetus to join cash market economies to pay for treatment and related expenses. These aspects of the pandemic need to be considered in developing strategies for the preservation of these culturally specific skills and knowledge.

Most people both inside and outside government in Botswana would probably agree that the benefits of economic development outweigh the costs. It is clear, however, that by understanding the process of cultural change, these costs can be ameliorated.

Acknowledgements

The author would like to thank the Office of the President for permission to conduct this research in Botswana. The people of the study communities showed us a great deal of generosity, hospitality, and cooperation over several years of research. I thank all of the people involved in the data collection, especially Kaetira Ndjarakana and Sara Johnson. Funding was provided by the L.S.B. Leakey Foundation; a Mellon Fellowship in anthropological demography at the Health Transition Centre, National Centre for Epidemiology and Population Health, Australian National University; the Graduate School and the Department of Anthropology at the University of New Mexico; the

James A Swan Fund of the Pitt Rivers Museum, University of Oxford; and a National Science Foundation grant to Henry Harpending and Jeffrey Kurland. Generous donations of materials and services were provided by Island Safari Lodge, Drotsky's Cabins, Okavango Tours and Safaris, Lodges of Botswana, Delta Air, Mack Air, Air Botswana, DHL Worldwide Express, British Airways, Air France, Citizen of America, Mercury Marine of Australia, Codan Pty, and Alan and Kathy Johnson.

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Figure 1. Pounding returns for girls ages 4 to 18 compared for the traditional and wage labor communities. Each point is the energy value of grain processed per minute of time spent pounding for one girl (open squares represent girls from the traditional community, and solid diamonds those from the wage labor community). Linear regressions fit to both samples were significant. The regression equation for the traditional community (solid line) is $y = 1.0919x - 4.2893$ ($n=26$, $R^2=0.52$, $p=.0001$). The regression equation for the wage labor community (dashed line) is $y = 1.9145x - 8.5619$ ($n=22$, $R^2=0.49$, $p=.0001$). The two groups are significantly different from one another only for girls 11 years of age and older (one-tailed t-test: $p=.05$, $t=1.71$, $df=23$).

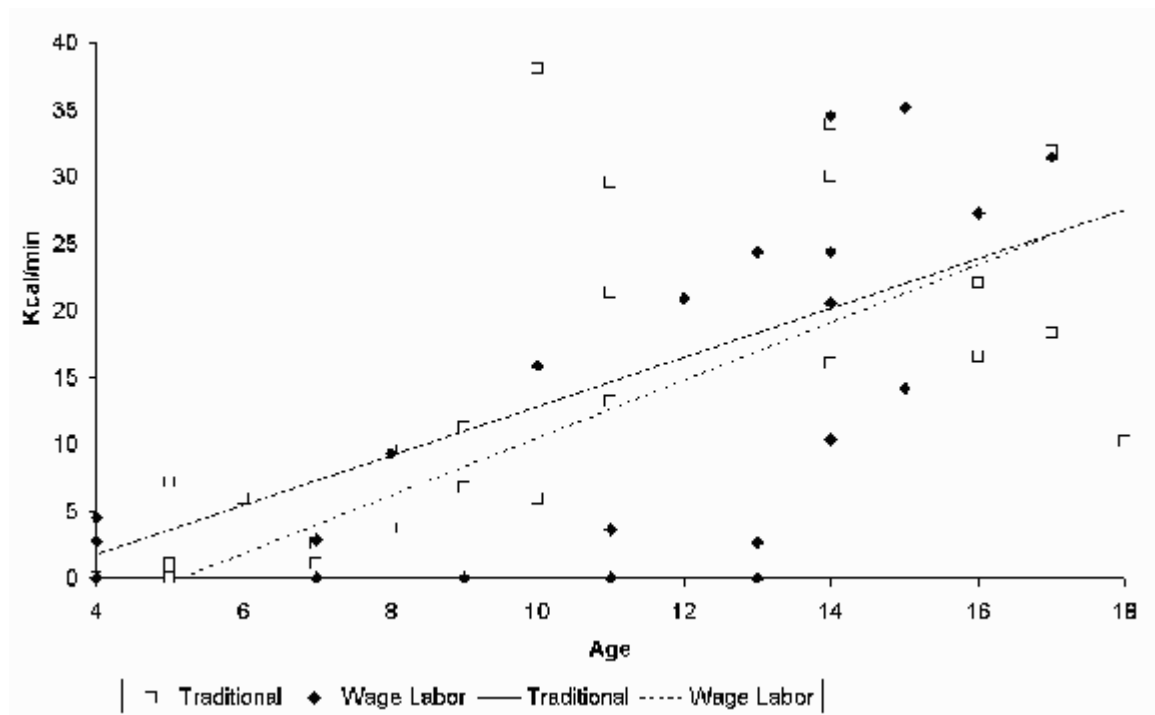


Figure 2. Sifting returns for girls ages 4 to 18 compared for the traditional and wage labor communities. Each point is the energy value of grain processed per minute of time spent sifting for one girl (open squares represent girls from the traditional community, and solid diamonds those from the wage labor community). Linear regressions fit to both samples were significant. The regression equation for the traditional community (solid line) is $y = 1.835x - 5.5441$ ($n=26$, $R^2=0.47$, $p=.0001$). The regression equation for the wage labor community (dashed line) is $y = 2.1587x - 11.109$ ($n=22$, $R^2=0.48$, $p=.0001$). The two groups are significantly different from one another only for girls 11 years of age and younger (one-tailed t-test: $p=.033$, $t=1.95$, $df=17$).

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