



Protected areas, wildlife-based community tourism and community livelihoods dynamics: spiraling up and down of community capitals

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ABSTRACT

Participation in wildlife-based community tourism within and around protected areas is seen as a tool to link biodiversity conservation and community livelihoods improvement. However, there is a deficiency of frameworks currently used to understand complex and dynamic relationships that exist among conservation, tourism and development. The community capitals framework is adopted to assess these linkages from a systems-thinking perspective in which community capitals' stock and flow, explained by a community's participation in tourism determines the direction of change. Results of the Chobe Enclave Conservation Trust in Botswana indicate that all community capitals are interdependent and play a dynamic role in shaping the spiraling of community livelihoods. Participation in tourism led to both the spiraling up and down of community capitals. The spiraling up of community capitals is explained by increased livelihoods and diversification options facilitated by increased tourism income. The spiraling down is explained by the heightened human-wildlife conflicts and fragile wildlife-livestock co-existence, which led to livestock diseases, loss of beef market and the ecosystems' fragmentation through the introduction of veterinary fences. Thus, the spiraling of community capitals is explained by the transformation of one stock of community capital to another in a systems-thinking dynamics fashion.

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Introduction

Protected areas (PAs) planning entails addressing two partly competing and overlapping goals: preserving biodiversity and improving community livelihoods. Resolving potential conflicts between these two goals is particularly challenging at the intersection of natural heritage and economic development (Karanth & DeFries, 2010). Not only are competing goals involved, but professionals including protected area managers, community development planners, tourism operators, marketing specialists and paradigms of management often conflict (McCool, 2009). Even though protected areas are a popular strategy for managing biodiversity conservation, their contribution to livelihoods improvement and sustainable development remains contested (Mascia, Claus, & Naidoo, 2010; Mearns & Lukhele, 2015; Stone & Nyaupane, 2014).

Promoting alternative livelihoods options within and around protected areas through tourism is an obvious management opportunity to reduce pressure, but such attempts have mixed results (Kiss,

2004). As a management intervention tool, the introduction of wildlife-based community tourism around protected areas is currently one of the future growth areas, particularly as leisure time, mobility, environmental awareness, and the desire to visit pristine and relatively unspoiled landscape increase (Bushell, Staiff, & Eagles, 2007).

For wildlife-based community tourism to be an effective conservation tool, increased understanding of its socio-ecological implications is required. When tourism is used to strengthen conservation, tourism becomes an essential component of the processes needed to implement the Conventions on Biological Diversity and other agreements concerning natural and cultural heritage (Steiner, 2002). There is a general consensus in the literature that community livelihoods improvement can help biodiversity conservation goals and vice versa (Adams et al., 2004; Nyaupane & Poudel, 2011; Stone & Nyaupane, 2016a), which guides Integrated Conservation Development Projects (ICDPs) in developing countries. ICDPs aim to meet social development priorities and conservation goals. Nevertheless, they have also been criticized for their lack of efficiency and direct benefits to biodiversity conservation (Ferraro & Kiss, 2002; Kiss, 2004). However, relationships between community livelihoods, tourism and conservation are dynamic and complex, and there is no single framework to examine these relationships (Nyaupane & Poudel, 2011). In view of this debate, many case studies have indicated that the relationships between livelihood and conservation (e.g. Salafsky & Wollenberg, 2000; Stone & Nyaupane, 2016b); tourism and livelihood improvement (e.g. Croes & Vanegas, 2008; Harrison, 2008; Stone & Nyaupane, 2014); and conservation and tourism development (e.g. Budowski, 1976; Cater, 1994; Nyaupane & Thapa, 2004) are complex, locally specific and fail to incorporate changing community needs. Therefore, further research is required to understand outcome of these differing and changing relationships.

This paper uses the community capitals framework (CCF) as a theoretical underpinning to explore whether the introduction of tourism in a wildlife management area (WMA) adjacent to a protected area has led to conservation and community development outcomes. The paper analyzes wildlife-based community tourism using the CCF as a dynamic framework in which community capitals development or lack thereof can be explained by a community's participation in tourism determining the direction of change. The research is based on the Chobe Enclave Conservation Trust (CECT), next to Chobe National Park (IUCN category II) in Botswana.

The next section briefly reviews the existing literature, followed by the theoretical framework, and then the methods, findings, discussions and conclusion.

Protected areas and community dynamics

The United Nations Environment Program's latest Protected Planet Report 2016 (UNEP-WCMC and IUCN, 2016) shows that there are 217,155 protected areas throughout the world, covering an area of 34,411,944 km². These sites have been created by all countries of the world and are managed through special rules for conservation objectives (Anderson, 2012). However, conservation methods are evolving, responding to social and economic changes as well as advances in natural and social sciences research (Janishevski, Noonan-Mooney, Gidda, & Mulongoy, 2008). The evolving approaches to conservation have presented challenges on how best to practically incorporate social and economic components (Chape, Blyth, Fish, Fox, & Spalding, 2003).

The introduction of economic activities such as tourism in protected areas is believed to provide linkages between biodiversity and community livelihoods in many ways. Tourism provides a market to sell goods and services produced by communities to tourists who visit protected areas (Scheyvens, 2007). Through the provision of markets for local goods, tourism can potentially facilitate the maximization of supply/demand linkages and minimize leakages (Ollenburg & Buckley, 2007). The revenue generated through income and taxes from the tourism industry can benefit locals by investing in local infrastructure such as roads, water supplies, electricity, education and health (Scheyvens, 2007). Nevertheless, tourism may not only bring positive outcomes as the extant literature shows negative environmental and socioeconomic consequences (see Mbaiwa, 2017; Mbaiwa & Stronza, 2010).

Literature indicates some conceptual frameworks that endeavor to understand the complex relationships among tourism, conservation and development. For instance, Budowski (1976) developed a framework to explain the relationship between tourism and conservation. According to Budowski, three potential relationships may occur between nature conservation and tourism: conflict, coexistence and symbiosis. Cater (1994) proposed four possible links between environment and development: win/win, win/lose, lose/win and lose/lose. Salafsky and Wallenberg's (2000) conceptual framework comprises three scenarios: no linkage, indirect linkage and direct linkage. Nyaupane and Poudel (2011) developed a framework that shows three-way linkages among conservation, community and tourism. In view of these models, the first scenarios, symbiosis, win/win and direct linkage are the ideal relationship among tourism, conservation and community livelihoods. However, these frameworks are based on simple static concepts and fail to capture the complexity and dynamic nature of the relationships. To understand the linkage narrative, it is important to connect it to systems-thinking perspectives.

Moving forward in addressing this complexity, there is a need to overcome the development of and reliance on simplified models of complex systems in order to derive ideal types of outcomes and an overreliance on a limited set of research methods to study social and environmental systems as is common in the social sciences (Ostrom, 2010). Analytical approaches that are consistent with a holistic approach that encourages human development at multiple levels are needed (Opschoor, 2004). Not all such systems are successful; therefore, there is a need to understand factors associated with both failure and success (Ostrom, 2010), as they are connected through loop-feedback mechanisms that serve the system.

In view of this debate, the question that ought to be asked is: are linkages between conservation, tourism and community livelihoods well understood from a systems-thinking perspective? However, scholars such as Berkes (2010) caution that understanding a problem from a complex systems-thinking approach takes time, requiring a shift in focus from a simple static concept to a more dynamic concept.

Based on the system-level perspectives, the contribution of this paper is to analyze wildlife-based community tourism in the context of a CCF as a dynamic framework in which community capitals' stock and flow explained by a community's participation in tourism determines the direction of the strengthening and/or lack of community capitals.

Community capitals framework: systems lens

Flora, Flora, and Fey (2004) developed the CCF as a useful and integrative approach to analyze and understand dynamics within rural communities. Capital is defined as "a resource that can be used, invested, or exchanged to create new resources" (Flora et al., 2004, p. 1). The CCF consists of seven types of capitals: natural, cultural, human, social, political, financial and built (Emery, Fey, & Flora, 2006) and is summarized in Table 1.

Regardless of how poor communities may seem, they have some inherent resources that when used carefully could improve their well-being as well as the environment in which they are situated (Flora et al., 2004). Healthy sustainable community conditions are reached when there is a balance among community capitals (Flora, 2004). An imbalance in community capitals results when there is an emphasis on one form of capital over others, leading to a process whereby other forms of capitals become decapitalized, and the economy, environment or social equity can easily be compromised (Flora et al., 2004).

A healthy community reinforces connections and relationships (social capital), respect for and inclusion of cultures (cultural capital), access to different levels of power (political capital), sustainable use and care of communal natural resources (natural capital), sustainable harnessing of natural resources to meet economic needs (financial capital), developments or investments in local skills and knowledge (human capital), and infrastructure (built capital). Therefore, Serageldin and Steer (1994) suggest that we should think of sustainability in terms of patterns in the accumulation of, and substitutions among different types of community capitals. Failure to have a balance among all seven

Table 1. Summary of community capitals.

Capitals	Descriptions
Social	This is the networking account. It includes the close bonds between and among family and friends, communities, groups, organizations, networks and trust in the community, the sense of belonging, and bonds between people. It can influence, as well as be influenced by, the stock and flows of other capitals.
Human	This is the human resource “people” account. It includes leadership capabilities, knowledge, wisdom, information and skills possessed by the people who live in the community.
Natural	This is the environmental account. It includes the resources that exist in the natural world. Some of which may include but are not limited to; the soil, lakes, natural resources, nature’s beauty, rivers, forests, wildlife and local landscape. Communities work with these resources to meet livelihoods’ needs.
Financial	This is the financial account. It includes the resources related to money and access to funding, wealth, charitable giving, grants.
Physical/ built	This is the building and infrastructure account. It includes houses, schools, businesses, clinics, libraries, water systems, electrical grid, communication systems, roads, transportation systems, etc.
Cultural	This is the account for community cultural resources. The way communities view the world. Culture defines the traditional ways of doing and being – habits and attitudes. It includes dances, stories, heritage, food and traditions, and also values and connections to the spirit. Cultural capital is also a resource to attract tourism.
Political	This account represents power and community connections to people who have power. Communities draw upon this resource when they unite to solve a controversial issue. Political capital is built by making connections with political and community leaders both inside and outside the community. It also refers to the ability of people to find their own voice and to engage in actions that contribute to the well-being of their community.

Sources: Aigner et al. (2002); Emery et al. (2006); Flora et al. (2004).

capitals may render the system unsustainable. Bebbington (1999) also argues that sustainable development can be thought of in terms of changes in the overall stock and changing composition of these seven types of capitals. If “development” implies an overall increase in the capital stock, the relative “sustainability” of that development depends on the substitutions that occur among the types of capital (Serageldin & Steer, 1994).

In the context of tourism, some scholars prefer certain community capitals over others to determine the accomplishment of tourism development. For example, Bebbington (1999) and Jones (2005) favor social capital founded on the understanding that trust and reciprocity soften teamwork through reduced transaction costs as communities no longer have to spend time monitoring the behavior of others, thus building confidence to invest in group undertakings. Other researchers, such as Boggs (2001) and Portes (2000) argue that the existence of social capital in a community is not a given if other forms of capital are overlooked. Boggs (2001) and Jones (2005) argue that tourism destinations need to be understood as packages of accommodation, restaurants, transport (physical capital), attractions (natural or cultural capitals), functioning in a tourism-friendly atmosphere (political capital), supporting investment prospects (financial capital) and motivated by knowledge-based abilities (human capital) that need harmonization and cooperation (social capital) as vital to success. Communities’ participation in tourism development in a substantial manner is determined by all community capitals (Macbeth, Carson, & Northcote, 2004).

Alkier and Roblek (2015) call for a holistic framework for the development of a sustainable touristic model in understanding tourism’s contributions to community livelihoods and conservation. However, their proposed framework consists of only three elements of natural, social and economic capitals, disregarding the other four forms of capitals. Giampiccoli, Saayman, and Jugmohan (2016) in their valuable development of frameworks for the understanding of community-based tourism contributions to community livelihoods propose four models: external collaboration, service collaboration, partial association and full association models. The Sustainable Livelihood Framework (SLF) also offers a systems-thinking approach to analyze community livelihood. The SLF posits that communities harness capitals at their disposal in pursuit of livelihood strategies and outcomes (Sseguya, Mazur, & Masinde, 2009). Nevertheless, the SLF has inadequacies regarding the number of capitals (Baumann, 2000), as it only presents five capitals – natural, physical, human, financial and social capitals.

Contrary to the SLF, the CCF has two additional forms of capitals – political and cultural. Niehof (2004) and Baumann (2000) strongly recommend political and cultural capitals consideration to understand livelihoods dynamics. Adding cultural and political capitals incorporate meaning through which communities are organized culturally and politically, hence livelihood organization is placed in context (Lima & d’Hautesserre, 2011). The addition of cultural and political capitals fills gaps in the SLF, leading to a better understanding of power and access to power as well as highlighting the relevance of local knowledge and traditions (Gutierrez-Montes, Emery, & Fernandez-Baca, 2009). Moreover, in terms of the scope and inclusiveness, the CCF widens the lens to better understand the local context and its connection to the wider world by focusing on assets related to the seven community capitals (Gutierrez-Montes et al., 2009). In line with systems-thinking approaches, the CCF highlights interdependence, interaction and synergy among the capitals, as the use of the assets in one capital can have a positive or negative effect over other capitals (Gutierrez-Montes et al., 2009). Furthermore, the loss or degradation of assets within one capital will negatively affect one or more capitals because when one of the community capitals is severely affected or depleted, the health and sustainability of the community are compromised (Emery & Flora, 2006). Consequently, the CCF presents a more comprehensive framework than the SLF. Comprehensive approaches theoretically represent a promising shift toward a more inclusive, integrated and effective set of strategies (Mace, Norris, & Fitter, 2012) in assessing tourism contributions to conservation and development (Stone & Nyaupane, 2016b). Stone and Nyaupane further argue that the adoption of an inclusive and multi-indicator approach in assessing tourism performance provides the utility to improve the understandings of PAs, tourism and development linkages.

The CCF offers a methodology to evaluate community and development exertions from a systems perspective by recognizing assets in each capital (stock), the kinds of capital invested (flow), the relations among the capitals and results across capitals (Emery et al., 2006). Nevertheless, while the CCF is fairly robust in applying the systems-thinking approach, there is a realization that capitals overlap; strong leadership can sometimes be classified as human, social or political capital; cultural capital can sometimes be seen as human or natural capital (Stone & Nyaupane, 2016a). In the context of this paper, the CCF is used to understand the flow among the capitals as a result of the interaction between protected areas, tourism and community livelihoods, and how the impacts of this flow affect the system. To operationalize this framework, capital flow or lack thereof will be assessed on whether it brings any positive or negative development to the relationship among protected area, tourism and community livelihoods. Any tourism activity that contributes to the positive buildup of any form of community capital will be attributed to the spiraling up of community capitals, but if it is deficit or negatively affects capitals, this will be ascribed as a contributing factor to the spiraling down of community capitals.

Methods

Study area

The CECT is a community institution comprising of the five villages of Mabele, Kavimba, Kachikau, Satau and Parakarungu (see Figure 1). CECT is run by a Board of Trustees from these member villages. The villages are located on a belt that runs along the Chobe Basin forming an enclave, hence the name. The villages are located in a buffer zone, which is divided into two controlled hunting areas (CHAs): (1) used for hunting tourism and (2) used for photographic tourism. Nevertheless, hunting tourism in Botswana was banned in 2014. The decline in wildlife population numbers has been cited as the main factor that led to the ban (Mbaiwa, 2017).

The inhabitants of the five villages are the Basubiya tribe who predominantly depends on both subsistence pastoral and arable farming complemented with tourism wages for those who are employed in the tourism establishments. The estimated population of the Enclave community is 4128 (Kachikau: 1356, Kavimba: 549, Mabele: 773, Parakarungu: 845, and Satau: 605) (Botswana,

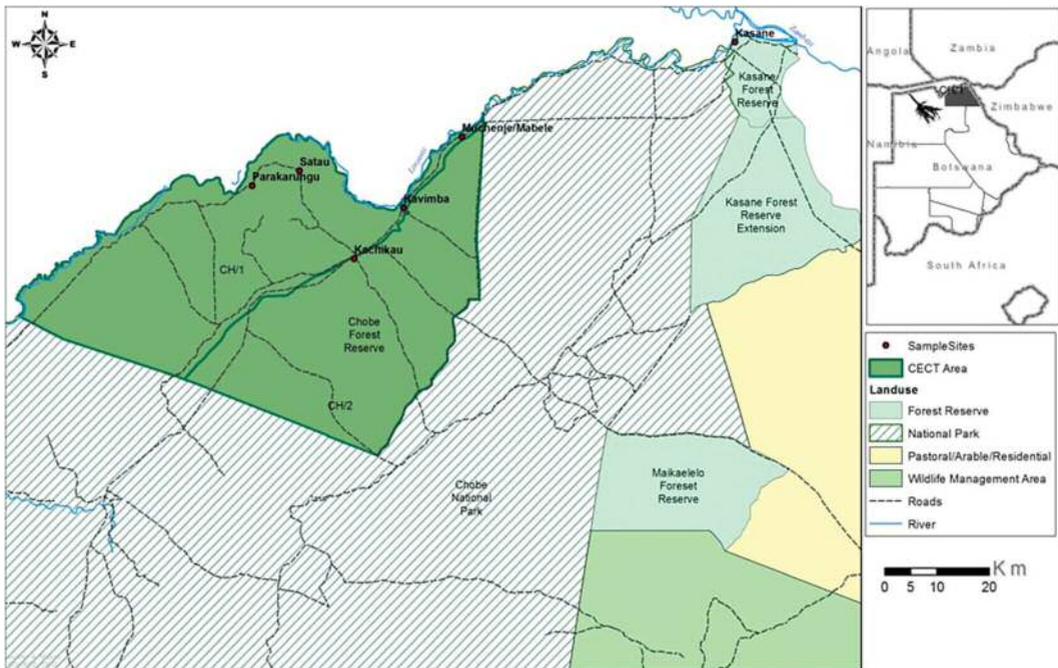


Figure 1. Study area.

2011). The CECT community practices a mixed economy founded on three main domains: subsistence livestock rearing, crop production and tourism employment. The CECT cattle population is estimated at around 9000 (Stone, 2013). The local soil is dry, sandy and has poor crop yields mainly due to the arid desert environment. Community-based tourism started in 1989 with the formation of CECT, run by a board of trustees elected from each participating villages. Two members are elected by a general membership from each participating village and village chiefs are *ex officio* members. Altogether, there are 15 board members on the board of trustees. The CECT owns CHAs 1 and 2 (see Figure 1), a community lodge, six tractors, a brick molding workshop, two camping sites and two administrative offices.

Data collection

Qualitative methods were chosen to provide a detailed understanding of community experiences with wildlife-based community tourism practiced adjacent to the park. Conceptualizing the park and its local communities as a socio-ecological system is anticipated to provide rich descriptions of the impacts of tourism by identifying interactions between two major components, the park and the community. The use of qualitative data collection methods informed by the CCF provides a novel way of capturing complexities and ensuring considerations of the multiple, interacting scales influencing community-level impacts are captured (Strickaland-Munro, Allison, & Moore, 2010).

The research made use of both primary and secondary data sources. Primary data collection strategies used included interviews with household heads and key informants. Forty-two household heads and 16 key informants were interviewed with the number of participants guided by the attainment of theoretical saturation (Patton, 1990). Household heads comprised 22 females and 20 males. A household list (used for income distribution) from CECT was used to select households for interviewees. Key informants included five village chiefs, five village development committee (VDC) chairpersons, two CECT board members, one each from photographic safari company, Department of Wildlife and National Parks (DWNP), Department of Veterinary Services and Chobe National Park. The

interviewee-selection process was guided by purposeful sampling. Purposeful sampling was chosen to ensure the selection of information-rich cases whose study could illuminate the questions under study (Patton, 1990). The interviews were conducted in English or *Setswana* (local language). For those who speak English, interviews were conducted in English, while for others, *Setswana* was used. A digital audio recorder was used to record the interviews. Some of the questions asked included: What are the benefits and challenges you have accrued as a result of your participation in community-based tourism? What changes have you seen in your life that were brought by tourism development in your area? How do you relate Chobe National Park to community-based tourism?

Secondary data sources included journals, published books, unpublished reports, CECT management plans, CNP reports, government policy documents, Internet sources and audited CECT financial and assets reports.

Data analysis

The data were transcribed verbatim from an audio recorder to provide a detailed record of the actual interaction between the interviewers and interviewees. Data in *Setswana* were translated to English. Data were stored and managed as a Word document to facilitate analysis. A modified grounded theory analysis approach (Padgett, 2008) was employed to analyze data. It is vital to note that, due to the exploratory nature of this research, grounded theory methods were only used to analyze data and not to create theory; hence it is considered “modified” (Padgett, 2008). The transcripts were first read several times to get a sense of the data, and in the process a codebook was developed consisting of code categories, which were defined to help to consistently and systematically code all transcripts. As suggested by Denzin and Lincoln (2000), the fundamental task associated with coding is marking texts, building codebooks and identifying themes. The code development process was guided by content analysis (Glasser & Strauss, 1967), and “open” coding guided the development of coding. The idea is to become grounded in the data and to allow researchers to identify dominant themes that can explain the phenomena from the texts (Glasser & Strauss, 1967).

Themes development was facilitated by the memo technique, a widely used method for recording relations among themes (Bernard, 2006). The seven capitals provided by the framework facilitated group-like codes that fall under each capital. Key-words-in-context and repeated word counts were used to help the researchers identify general patterns and make comparisons across texts. Thereafter, focused coding was applied to winnow down the codes (Charmaz, 2006) and align group-like codes into themes. After grouping like codes into a set of themes, the next step was to identify how themes were linked to each other, guided by the conceptual framework as recommended by Miles and Huberman (1994).

Strategies for rigor and to enhance trustworthiness were employed; data collection triangulation approaches were used (i.e. secondary data sources, purposeful samplings). Data auditing was also made use of as the second author examined the data analysis procedure and findings to verify the data analysis to reduce any potential bias. The researchers adopted a spirit of openness and documented each step taken in data collection and analysis (Lincoln & Guba, 1985). This involved noting decisions made during data collection, coding and analysis.

Findings

The genesis of tourism adoption: from ad hoc to wildlife co-management

Results from household interviews indicate that the development of Chobe National Park, a natural capital host in terms of wildlife resources, marked the foundation of land-use conflicts between CECT villages and government conservation agencies. Due to their lack of political capital, the community displayed their resentment by detonating fires and illegally hunting natural capital in the Chobe National Park, which was perceived as being inconsistent with biodiversity

conservation goals. In response to these conflicts, the government enacted several policy instruments that reorganized community capitals. The Wildlife Conservation Policy of 1986 introduced community WMAs, and the Tourism Policy of 1990 facilitated the participation of communities in natural resources co-management. However, these policy instruments alone failed to change community capitals to adopt desired wildlife management and participation in tourism. As a consequence, to encourage community participation, CECT was formed in 1992. To facilitate community participation in wildlife management, WMAs were created between Chobe National Park and the CECT community. WMAs were further subdivided into CHAs and leased to communities by the Chobe Land Board. Through the advice from the DWNP, CECT community gets wildlife user rights for both areas. Furthermore, community participation in tourism was facilitated by the Eco-tourism policy of 2002 and Community-Based Natural Resource Management Policy (CBNRM) of 2007. Through these policy guidelines, the commercial utilization of wildlife resources became a possible source of income generation for CECT.

The government, through the DWNP, works with CECT and is responsible for allocating community wildlife quotas. The community has the jurisdiction on whether to hunt or sell the quota to safari hunting companies. Participation in wildlife-based tourism requires communities to comply with a number of government regulations. Therefore, the community had to establish institutions in order for them to have meaningful public participation in decision-making. For instance, the CBNRM policy requires the formation of a community-based organization (CBO) guided by a constitution. For the community, it is both costly and complicated to meet all the necessary government requirements by themselves due to deficits in many forms of capitals. Due to inadequate financial, human, social and political capitals in the early days of CECT, assistance from the DWNP and NGOs such as Kalahari Conservation Society and Chobe Wildlife Foundation bridged the social and political capitals deficits by organizing and helping the community form CECT.

Community financial deficit was bridged by the help of donors such as United States Agency for International Development (USAID) and African Wildlife Foundation. Donor funds were used to engage experts to develop the constitution, land-use and management plan, and training CECT board and staff to enhance the human capital needed to conduct the community's business. According to the DWNP, a considerable amount of time was spent in building community social capital through consultations and mobilization before tourism activities could be executed as community cultural resistance (cultural capital) was high. Interviews with DWNP officials reveal that there are no shortcuts taken when forming a community institution:

We spent two years, and this is quite amount of time, to consult and mobilize the community to buy-in the idea of forming a community-based organization that can manage wildlife resources as a business that can improve their livelihoods. (DWNP Officer in Kasane)

Interviews with the DWNP further show that social capital deficits in the form of hostilities, mistrust and suspicions by the CECT community reinforced by human-wildlife conflict and poor relationships with the park staff were highlighted as extenuating factors attributed to poor cooperation in forming CECT.

The tourism industry requires business skills (human capital) which CECT did not possess. This capital deficit led to a spiraling down in the community's participation in tourism. In view of this deficit, capacity building has been recognized as an important aspect for CECT to participate in tourism, mainly where the community becomes engaged in different activities for which they lack suitable skills and knowledge. To bridge this human capital deficit, results indicate that CECT board and staff received training support focused on governance, leadership, conducting meetings, business and financial management, and understanding joint venture arrangement. As one of the CECT board members mentioned:

Without the training workshops organized by IRCE for us, we could have not afforded to form and run CECT as this proved to be needing special skills that we did not possess. (CECT board member)

All trainings were made possible through the outsourcing of services of an international NGO: Institutional Reinforcement for Community Empowerment (IRCE), funded by USAID. The external funding and training services improved the community capitals deficits.

To bridge the lack of social capital, development of networks and partnerships with two tourism companies to undertake both hunting and photographic tourism were formed. These business partnerships have improved the community's financial capital. Results indicate the revenue is reinvested into human capital through the hiring of trained and competent professionals: the manager, accountant and community liaison officer to manage CECT. Revenue generated from tourism has also been invested in physical assets including lodge, camp sites, shops and tractors to diversify and generate more revenue.

Improved livelihoods and diversification dynamics

In profiling traditional livelihood activities that were carried out in the study area before the introduction of wildlife-based tourism, results indicate that key traditional livelihoods were crops and cattle farming, fishing, subsistence hunting and gathering, all dependent on natural capital. Crops and livestock farming were the main livelihood activities, supplemented by the hunting and gathering of wild resources. After the commencement of tourism, livelihood activities changed to include the sale of wildlife quota, sub-leasing of the community's photographic concession area and employment in tourism establishments. Due to its proximity to the Chobe National Park, CECT villages have very high densities of natural capital in the form of wild animals, which significantly increases the value for trophy hunting and photographic safaris.

Wildlife-based tourism has supplemented traditional livelihoods and has diversified the community's livelihood options. Results indicate a reduction in the collection of veld products and poaching. To illustrate this point, one interviewee highlighted:

We now formally work, unlike before..... CECT, lodges and safari companies have employed us, we get paid, so we do not have time to hunt and collect veld products because we can buy better food and other household utensils which we could not afford before we engaged in tourism activities. (Household interview)

This comment indicates a positive development in the reduction of the exploitation of natural capital. Furthermore, indications are that reported poaching statistics in the CECT community are lower compared to the areas that are not part of CECT (see Table 2). While the CECT area consists of five villages with a population of 4500, non-CECT areas include Kasane, Kazungula, Lesoma and Pandamatenga villages with a population of 9008, 4133, 613 and 1798, respectively (Botswana, 2011).

Participation in tourism by CECT is a collective action that harmonizes the role of park and community livelihoods in resource use, building community capitals and enhancing the vitality of natural capital. Through the collective action by CECT communities, mutual trust exists between the community and government, which has resulted in low rates of reported illegal hunting, suggesting a positive relationship between tourism and Chobe National Park.

As more people are employed in tourism establishments, interviewees reported that they are able to buy more and better food, improving their food diet and security. However, results also indicate

Table 2. Poaching and related offences 2001–2012.

Offence	Number of cases CECT area	Number of cases non-CECT area
Hunting during closed season	02	23
Hunting without license	17	34
Hunting protected animal	03	17
Hunting partial protected game	05	18
Hunting and capturing game	01	09
Unlawful possession of government trophy	10	21
Total	38	122

Source: Compiled from Kachikau and Kasane Police stations' case registries.

Table 3. Wild plants less frequently used due to the influence of tourism.

Species	Family	Local name	Use
<i>Cleome gynandra</i> L.	Capparaceae	Rothwe	Food/vegetable
<i>Amaranthus thunbergii</i> Moq.	Amaranthaceae	Thepe	Food/vegetable
<i>Corchorus olitorius</i> L.	Malvaceae	Delele	Food/fruit
<i>Azanza garckeana</i> (F. Hoffm.) Exell & Hillc.	Malvaceae	Morojwa	Food/ fruit
<i>Nymphaea nouchali</i> Burm.f.	Nymphaeaceae	Tswii	Medicine
<i>Ximenia americana</i> L.	Ximeniaceae	Moretologa	Food/fruit and medicine
<i>Hyphaene petersiana</i> Klotzsch ex Mart.	Arecaceae	Mokolowane	Alcohol beverage
<i>Sclerocarya birrea</i> (A. Rich.) Hochst.	Anacardiaceae	Morula	Food/fruit and alcohol beverage
<i>Grewia flava</i> DC.	Malvaceae	Moretlwa	Food/fruit
<i>Vangueriopsis lanciflora</i> (Hiern.) Robyns ex R.D. Good	Rubiaceae	Mmupudu	Food/fruit
Unidentified sp.		Mokgothwane	Food/vegetable

Source: Authors' fieldwork.

that the availability of cash (financial capital) has resulted in spending money on alcohol by some community members, which is perceived as a negative impact of tourism. A safari company owner interviewed highlighted that tour guides sometimes come to work drunk. Two village chiefs also noted a proliferation of traditional home brewing due to the demand partly explained by the availability of financial capital generated by tourism. A concern was raised by one VDC member when he said:

Sometimes at the end of the month when people get their salaries we get disturbed and are unable to sleep due to the loud music played from the home brew outlets. They even now sell modern beer since they afford refrigerators to keep beer cold. (A VDC member)

Before tourism, results indicate the community relied heavily on natural capital. A total of 17 wild plant species used for food, beverage, handcraft making and medicine purposes were reported (see Tables 3 and 4). The increase in the use of plants for handcrafts is linked to meet tourists' demands while the decrease in the use of plants gathered for food is linked to the availability of better diets due to cash availability from tourism. Mechanized farming, facilitated by tractors bought with the revenue obtained from hunting quotas, has intensified farming and increased crop yields and cultivated land. Intensified agriculture has also led to the production of traditional home brews made from sorghum corn and not from wild plants sap, as was previously the case.

Tourism has reinforced the use of certain plant species, used mainly for basket weaving and carving, and reduced the reliance on certain species previously used as sources of food. Table 3 summarizes wild plants that have been reported to be used less, while Table 4 shows plants that are on the rise due to the influence of tourism. While tourism development has reduced the dependency on certain plant species for food, it has also increased the use of other species mainly for souvenirs.

The availability of financial capital from tourism has also led to the adoption of modern housing, which forms part of the community's physical assets. This development is evident by the CECT's investments in brick molding and subsidizing the price of cement bricks. Household heads attributed their adoption of modern housing to the durability of the materials, such as concrete, windows and

Table 4. Wild plants frequently used for basket weaving and carvings.

Species	Family	Local name	Use
<i>Hyphaene petersiana</i> Klotzsch ex Mart.	Arecaceae	Mokolowane	Basket weaving and carving/furniture
<i>Grewia flavescens</i> Juss.	Malvaceae	Mokgomphatha	Basket weaving
<i>Berchemia discolor</i> (Klotzsch) Hemsl.	Rhamnaceae	Motsentsela	Dye/colorant
<i>Diospyros mespiliformis</i> Hochst.ex A.DC.	Ebenaceae	Mokutsumo	Carving/furniture
<i>Garcinia livingstonei</i> T. Anderson	Clusiaceae	Motsaodi	Carving/furniture
<i>Ficus sycomorus</i> L.	Moraceae	Mochaba	Carving/furniture

Source: Authors' fieldwork.

corrugated roofing iron sheets, instead of traditional huts made from mud, wood and thatching grass, which are not durable. The construction of traditional houses relies entirely on the exploitation of natural resources, thus the shift to modern types of housing reduces dependence on the forest. However, interviews with household heads indicate there is still cultural resistance to make a switch from traditional to modern housing, especially among the elderly who believe modern houses are very hot in summer and cold in winter. For instance, one elderly woman of Kachikau village complained when she said:

Everybody in the village wants to have a modern house... ..However, the modern house does not treat me well... I prefer our traditional houses, as with them, they become cool inside when it is hot outside and warm when it is cold... ..the new houses are unbearable to live in when it is too hot or cold. (Satau woman)

Participation in tourism has also facilitated investments in cultural capital. CECT micro-financed six traditional dance and handcraft-making groups that sell their products to tourists. These cultural groups have heightened the community's sense of belonging and revived the production of traditional arts and crafts. The community has regained its cultural identity. The adoption of tourism by CECT has diversified and increased community livelihoods options and reinforced the community's custodianship over its natural resources.

Fragile wildlife-livestock co-existence

While the adoption of tourism as a livelihood option has resulted in community livelihoods improvement, a process we call capital spiraling up, subsistence cattle farmers bear the brunt of protecting wild animals for the tourism sector, resulting in capital spiraling down. Wildlife resources, in particular buffaloes, continue to frustrate farmers in their quest to sell their cattle to the lucrative European Union (EU) market. The buffalo carries foot and mouth disease (FMD) virus, which is highly contagious and easily transmitted to cattle. This problem has brought some dilemma to both the community and government as to how to secure farmers livelihoods through the beef industry while at the same time safeguarding the tourism sector. Since the recognition of wildlife and tourism as land-use sectors, Chobe district has one of the highest prevalence of FMD in the country. The district has been declared an FMD red zone. This means the district cannot sell its cattle to the EU beef market, which calls for stringent measures meant to control and prevent diseases that are beef prone. For instance, the EU has an FMD beef "stamping-out policy," meaning if there is an outbreak of FMD in an area, all cattle in the area have to be eradicated. The EU does not accept FMD vaccinations as a sufficient control measure, but insists on fences to contain the disease in endemic areas (Scoones et al., 2010).

As a response to the EU's demands, the government passed the Diseases of Animals Act of 1977 that provides guidelines on the prevention and control of animal diseases, the regulation of imports and exports, and the movement of animals and animal-related products (Derah & Mokopasetso, 2005). Consequently, the country is divided into 19 veterinary districts demarcated by criss-crossing fences, each containing one or more disease control zones (See [Figure 2](#)). The "stamping-out policy" has negative consequences on the CECT community as fencing has a detrimental impact on wildlife, as their migratory paths are blocked. As a result of fencing, Boone and Hobbs (2004) reported that 10,000 hartebeest died against the Ghanzi fences in 2003.

The FMD outbreak and its policies heightened farmers losses due to the disease itself killing cattle, and eradication campaigns and as a result restricted EU market access for CECT subsistence farmers, contributing to the spiraling down of community capitals. Rearing cattle on communal land adjacent to parks is no longer productive.

According to one farmer:

Veterinary fences are like paddocks that are created to confine and facilitate the mixing of cattle and wild animals in each locale, we put a lot of effort in vaccinating our cattle, while wild animals are not, do you think we can ever win this battle? (Parakarungu farmer)

Farmers are concerned that mixing cattle farming and wildlife conservation is not a sustainable option. At the same time, the fencing policy negatively affects the natural capital as it devastates migrating populations of wildlife. The need for disease management and control is likely to increase given the predictions for a livestock revolution with global increases in the demand for beef.

Heightened human–wildlife conflicts

Even though the community realizes the benefits of wildlife-based tourism, human–wildlife conflicts are rampant. The mechanization of agriculture means more land is cultivated thereby affecting wildlife passageways and making it easier for wildlife to have access to the community's physical capitals. The heightened human–wildlife conflicts have led to increased killings of the so-called “problem animals” as sustainable mitigation measures are difficult to devise.

According to the Chobe National Park Problem Animal Control Unit, wild animals are physically discouraged from entering plowing fields as well as on livestock predation by constant patrolling and by snaring if they have become difficult to control. The community is allowed to kill these animals if found foraging on crops, preying on livestock, and attacking or killing people. Despite benefits from tourism, problem animals continue to be killed as coexistence is difficult when one's life or economic activities are jeopardized.

Interviews with the Problem Animal Control Unit highlight that there is cooperation in the co-management of natural resources since the commencement of community-based tourism. However, they continue to experience biodiversity management challenges. For instance, should wildlife be added or subtracted from the CECT wildlife quota if problem animals are killed for destroying community livestock or crops? Results indicate that community members prefer to add to their community quota, whereas government officials prefer to reduce the quota, as they feel the community needs to do something to deter wildlife from destroying their property. The hunting Safari Company, CECT's business partnership, shares the community's view that wildlife killed while destroying community property should be added to the quota, as reductions may render the wildlife hunting tourism business less viable.

Discussion: spiraling of community capitals

By embracing tourism as a livelihood option, the community's social and political capitals were not structured to the level that the adoption of tourism could have been of benefit. To overcome this deficit, the community formed CECT, a new institution run by a board of trustees on behalf of the community, which represents a new form of organized social and political capitals. This new development enhances the ability of the local institution to enforce community conservation rules and form networks with related government agencies highlighting the creation of an environment that aids the devolution of power to local communities. The CECT development aids dialogue and community decision-making processes to help strengthen local governance, improving both community social and political capitals. From a systems-thinking point of view, while benefits are realized, costs also set in. For instance, the adoption of tourism not only brings benefits but also costs, which have made the community vulnerable to the loss of some of its livelihoods. The introduction of tourism as a new form of land-use creates human–wildlife conflicts. Human–wildlife conflicts have increased in those places where boundaries have hardened between wild and domestic use of rangelands (Ferguson & Hanks, 2012). Fencing contributes to the decline of traditional livelihood activities, particularly the cattle industry, therefore intensifying the community's vulnerability, contributing to the spiraling down (see [Figure 2](#)) of community capitals.

Fencing is seen as one method of controlling livestock diseases by directly halting host/ pathogen traffic, but inevitably protected areas will then be seen as reservoirs of economically extremely harmful diseases that risk a spillover into financially struggling communities (Reisen, 2010). Fencing aids

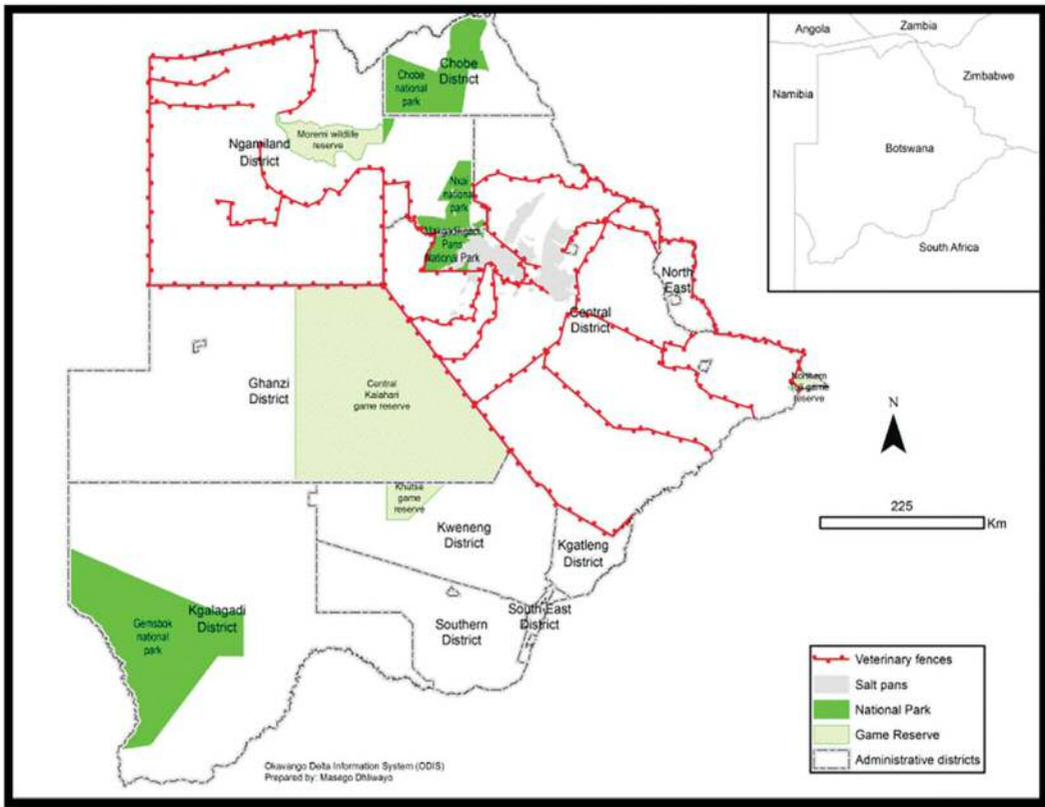


Figure 2. Veterinary fences in Botswana.

the fragmentation of landscapes that surround protected areas and can result in impassable barriers to the dispersal of highly mobile species (Ferguson & Hanks, 2010).

Figure 3 represents a schema that tries to capture a systems-thinking approach to explain the spiraling dynamics of community capitals as the result of participating in tourism development. For example, cultural shows, dances and wildlife quota killings can be presented in the benefits/upward spiral, as they benefit community through income generation. But at the same time, there are concerns around commodification of culture and consumptive killing of wildlife as well as problems associated with photographic tourism, which contribute to the costs/down spiral. The spiraling up and down of community capitals show that tourism brings both benefits and costs to the socio-ecological system.

CEPT's participation in tourism did not directly liquidate biodiversity resources (natural capital) in order to finance agriculture (physical capital) by substituting natural capital for physical capital; instead they used their natural capital stock to create tourism resources that created employment opportunities and in turn create a steady stream of financial capital. Furthermore, employment opportunities have reduced dependency on veld products harvesting, contributing to the spiraling up of both natural capital and community livelihoods. However, tourism has resulted in the high usage of selected plant species for handcraft production to meet tourists' demands. All these stock and flow changes have come about due to the utilization of wildlife resources (natural capital) to improve other forms of capitals: financial gain (financial capital), and building modern houses, shops, tractors and grinding mills (physical capital). This supports Telfer's (2002) assertion that tourism development as a livelihood-diversification tool often leads to a shift or diversification of traditional economic systems to those driven by cash. This study indicates how money generated from tourism

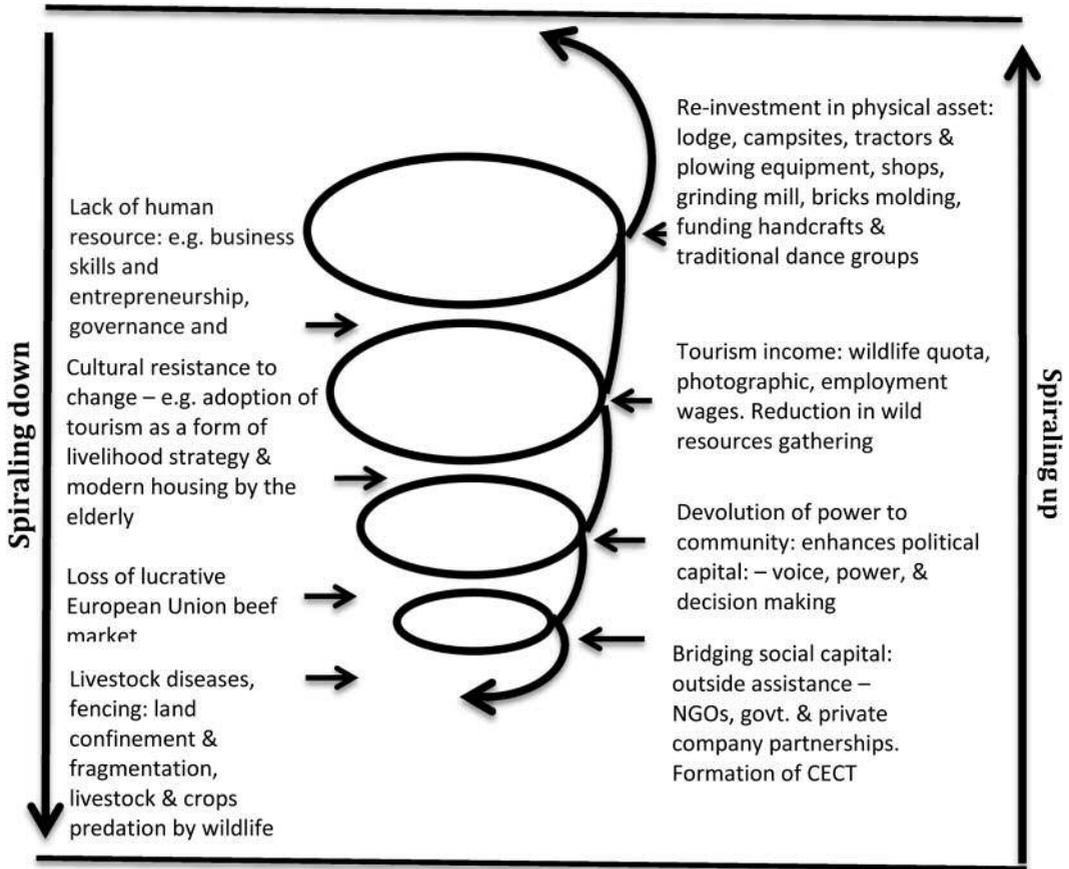


Figure 3. Spiraling up and down of community capitals. Source: Authors.

flows can contribute to the diversification of traditional livelihood activities by impacting different forms of community capitals. In a systems-thinking approach, it is imperative that a sustainable model of development be geared toward necessitating growth in multiple community capitals, by recognizing that one form of capital can be the enabling factor for others or vice versa.

Participation in tourism has contributed to the devolution of power to CECT and rewarded the community with the spiraling up of community livelihoods reinforcing the social-ecological relationship with the Chobe National Park. The creation of CECT to participate in tourism has brought the five villages together promoting cohesion and unification, hence contributing to social capital building. The political capital building is evident as the five villages through CECT can make decisions on how to use the funds generated from tourism. CECT's investments in its social capital by collectively and collaboratively forming a CBO lowers the transaction costs of working together and facilitates cooperation in the co-management of natural resources. The resultant spiraling up of a community's livelihoods give people incentives to invest in collective activities that build social cohesion, trust and networking, ultimately building the community's confidence in resource management. In line with Goldstein's (2009) reasoning, this is a dynamic process, as collaboration becomes widespread, new possibilities come into focus beyond solving the original problem.

The spiraling down of some community capitals is a response of a system explained as negative outcomes of participation in tourism that need adaptive management remedy so as to systematically harmonize the flow of assets from one capital to another. However, there are challenges of governance in a world of complexity and uncertainty (Berkes, 2010). For example, different interests of

CECT communities pose a challenge. Farmers' interests as well as farm production are not stagnant, and the process may not be consistent with wildlife resource co-existence. This may be explained by more conservation costs incurred by farmers as wild animals wander and destroy their crops and livestock.

The relationship between protected areas, tourism and community livelihoods is dynamic, change is inevitable. Therefore, the inevitability for change can be analyzed by locating trends and going through a learning process vis-à-vis the system on which tourism and community livelihoods operate to devise adaptive management mechanisms. This is in line with Farsari's (2012) assertion that sustainability concerns managing and adaptation. Therefore, systems-thinking approaches should guide research to develop conceptual models that are geared to support sustainable tourism policies.

This paper has tested the utility of CCF as a framework through a case study. While the study tried to organize community elements under each form of capital and assess their dynamics, there is a realization that capitals overlap; strong leadership can sometimes be classified as human, social or political capital; cultural capital can sometimes be seen as human or natural capital. Nevertheless, this is consistent with the systems-thinking approach, which avoids the discrete or disconnected analysis of "cause and effect" approach.

While the CCF generates a wide range of interesting and salient questions to do with the interactions among capitals, some criticisms are leveled upon it. These include questions to do with trade-offs and/or conflicts among capitals, as well as complementarities. For example, to what extent do high levels of social capital encourage high levels of human capital, or substitute for them? Do low levels of social capital inhibit the accumulation of human capital? Conversely, do high levels of human capital encourage or undermine social capital (Schuller, 2001)? Further, as Solow (2000) indicates, we cannot build an aggregate measure of some of the capitals. Physical, financial, human and natural capitals measurable forms (quantification) can easily be devised, while social, cultural and political capitals may not. The framework is context-dependent (Schuller, 2001) creating difficulties in its applicability when it comes to attempting to aggregate it across levels of differing population densities and economic activities.

Conclusion

This study used the CCF to assess the relationships among protected areas, tourism and community livelihoods using multidimensional concepts and nonlinear causation with the focus on all community capitals as indicators of change. The early protected area management regime was dominated by managers who were solely concerned with preserving the ecosystem (natural capitals) while neglecting human needs and/or social issues (financial, social, political and human capitals), thus contributing to community natural capital alienation from other community capitals. This scenario further exacerbates community capitals' spiraling down as it inhibited community development.

Before participation in tourism, community capitals were not fully utilized though the community had abundant natural capital in the form of wildlife resources; the resource could not be transformed to benefit other forms of community capitals. That is, the natural capital flow was technically "locked" and prevented "asset flow" to transform other community capitals. Consequently, the wildlife resource stock piled and could not be harnessed but rather accumulated to the extent that it became a burden to the same community as it destroyed the community's physical asset. To benefit from the abundant natural capital, other forms of capitals needed to be enhanced first (e.g. social and political capitals) by forming CECT as a community representative institution that can spearhead the community's participation in tourism. The establishment of CECT created the community decision-making body, voice and transformed community participation and governance of natural resources. This development led to the recognition of CECT as an important stakeholder in the CNP management, consequently fostering some positive linkages. The linkage through tourism participation further influenced the natural capital stock hosted by the CNP to flow and influence other community capitals. The use of the natural capital in the form of wildlife quotas provided financial capital, which was

used to buy community physical capitals in the form of tractors, camp sites, lodges, handcrafts, performing groups, cement brick molding and better houses further improved community livelihoods. The realization of the financial and physical capitals created direct linkages with the CNP. Therefore, we can conclude that a community's participation in tourism linked the community livelihoods with the CNP. The shift from traditional livelihood to tourism activities shows the dynamism of culture and socioeconomics influenced by community capitals' stocks and flows. The sustainable use of abundant natural capital on which nature-based tourism depends provides essential asset flows for other community capitals.

When all forms of capitals are invested in, communities tend to understand the cost of living with conservation. For instance, communities do not have to accept crop and livestock destruction as being inevitable, but instead they come to understand their needs to be a constant realignment that they can accept and live with.

In conclusion, the use of the CCF as a systems-thinking approach reveals that many difficulties that surround communities and protected areas today are complex, involve multiple stakeholders, and reveal that past actions taken in an effort to alleviate the problems worsened the situation. The broader viewpoint of systems thinking in understanding tourism, community livelihoods and protected areas linkages constructs the thoughtfulness necessary for better long-term solutions than the traditional "cause and effects" approaches that contributed to the problem in their endeavor to seek solutions. For example, people were separated from protected areas because they were viewed as a threat to biodiversity conservation, henceforth alienating natural capital from other forms of community capitals. One of the fundamental benefits of systems thinking is its capability to discern well with these complex social-ecological relationships and to advance our thinking to the level at which we devise mitigation measures directed to difficult situations marked by complexity and multi-interactions relationships and the absence of instantaneous apparent solutions.

Disclosure statement

No potential conflict of interest was reported by the authors.

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