A Systems Dynamics View of Tourism Development in Kenya

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ABSTRACT

This paper utilizes a systems dynamics view to examine the development of tourism in Kenya. The haphazard development of ecotourism in many developing countries has resulted in unanticipated effects. It is argued that these negative impacts have resulted from a reductionist view of tourism development. We suggest that a systems dynamics may present better solutions for tourism development through the examination of the total system and the impacts to all relevant stake holders. It is further argued that the balancing of impacts with the goal of benefit maximization while minimizing negative impacts to the community presents the best long term solutions for public policy makers.

INTRODUCTION

Every year, Kenya receives over one million tourists and the majority of these tourists come from Europe and North America (Statistical Abstract of Kenya 2003). Wildlife viewing is at the heart of Kenyan tourism. Filion et al (1992) have suggested that up to 80% of tourists to Kenya, come to observe wildlife. Tourism based on wildlife began in Kenya at the end of the 19th century. The Kenya government established national reserves starting in the 1940’s, with the first national park established in 1947. Sindiyo & Pertet (1984, p. 16) have noted that tourism has “justified the setting aside of about 7.5% of the country’s total area for the conservation of wildlife. Today, Kenya has about 52 protected areas (Sindiga 1995). In recent years, tourism has been one of the leading foreign exchange earners for the country. For example, it has been estimated that an adult male lion in Amboseli Game Reserve, Kenya will during its lifetime earn US $515,000 in foreign exchange (Thresher 1981). It is estimated that ‘one lion is worth $7000 per year in income from tourism and an elephant herd can be valued at $610,000 annually’ (Honey 1999).

It is clear that the potential to generate a lot of economic benefits exist with the development of eco-tourism. However, researchers have noted that there are few examples where there has been successful management of tourism (eco-tourism) on anything approaching a symbiotic basis (Butler 1991, p. 207). In many cases, the “cart is before the horse” (Wallace, 1992, p. 2), that is visitation and tourism have preceded appropriate management and planning. This is especially true in developing countries such as Kenya where the push for foreign exchange earnings has resulted in haphazard planning. This has resulted in tourism that has had negative impacts on the environment, wildlife and the people of the regions where eco-tourism has been developed. We begin this section by providing an overview of eco-tourism development in Kenya. In our paper we illustrate some of the negative impacts that have resulted from the haphazard development of tourism and we illustrate how a systems dynamics view might resolve some of the current dilemmas facing Kenyan tourism. By utilizing the systems view we provide some suggestions for public policy makers as well as tour developers.

ECO-TOURISM DEFINITION

Many researchers use the terms eco-tourism and nature tourism interchangeably. For our purposes, we shall distinguish between these two concepts. Consistent with Valentine (1992), nature tourism is seen as tourism that is “primarily concerned with the direct enjoyment of some relatively undisturbed phenomenon of nature”. This type of tourism lacks any conservation motives (Hvenegaard 1994). To be termed eco-tourism, nature tourism must enhance or maintain some natural system (Farrell and Runyan 1991). Ceballos-Lascurain (1987 in 1991) were among the first to coin the term and they define eco-tourism as: “that segment of tourism that involves traveling to relatively undisturbed or uncontaminated natural areas with the specific object of admiring, studying and enjoying the scenery and its wild
plants and animals, as well as any existing cultural features (both past and present) found in these areas.” (p. 25). Eco-tourism is environmentally sound and sustainable tourism which may secondarily include viewing nature (Miller 1978). Eco-tourism usually refers to nonconsumptive natural history-based and/or wildlife related recreation activities such as bird watching, wildlife watching, nature photography, whale watching, botanical study and wildlife treks or safaris (Duffus and Dearden 1990, Whelan 1991). The above definitions of eco-tourism emphasize the dependence on nature for certain types of activities. Other definitions of eco-tourism have centered on the individuals who are engaged in this type of tourism. These researchers have defined eco-tourism as “an activity which is characterized by first-world country citizens visiting natural sites in the poorer countries in the tropics’ (Laarman and Durst 1987). In 1991, the Eco-tourism Society added an ethical component to the definition of eco-tourism and they defined eco-tourism as: “purposeful travel to natural areas, to understand the culture and natural history of the environment, taking care not to alter the integrity of the ecosystem, while producing economic opportunities that make conservation of natural resources beneficial to local people”(p.1). This definition was subsequently shortened in 1993, when the Eco-tourism Society defined eco-tourism as: “responsible travel to natural areas which conserves the environment and improves the welfare of local people (Western 1993). This is the most popular definition of eco-tourism and we adopt this definition in our subsequent discussions.

There have been several frameworks of ecotourism that have been developed and the most comprehensive framework of eco-tourism was developed by Fennel and Eagles (1990). This framework consists of three interrelated components, the visitor, the service industry and the natural resource tour. Although this framework made a significant contribution, its overall weakness stems from the fact that it does not incorporate the attitudes of the local people. More recent research has examined the impact of eco-tourism on the local people and we review some of this literature with a specific focus on the Kenyan context.

ECOTOURISM STUDIES OF KENYA

When a tourism destination becomes very popular with tourists, the location can exceed visitor carrying capacity, and the location may lose its appeal and this could in turn threaten the conservation of wildlife. Whelan (1991, p. 11) notes that the ecological carrying capacity of an area is ‘reached when the number of tourists and characteristics of tourists start to affect the wildlife and degrade the system’. A 1996 article in the Economist magazine examines the compatibility of mass tourism with wilderness degradation. In this article, the authors pose an important question “Is mass tourism compatible with preservation of wilderness? Experience in some of those other countries suggest an uneasy fit. In and around the Masai Mara, Kenya’s most famous reserve, the number of beds available for tourists has jumped sevenfold over the past five years. Many complain that this has spoiled the sensation of wilderness. Often the most visible herds migrating across the plains are neither zebra nor wildebeest, but minibuses. Their tracks crisscrossing the park, have caused significant erosion. And research in the reserve has shown that some animals are changing their behavior in response to the disturbance. Lions now hunt late at night, to avoid the evening tourist rush-hour. Cheetahs, which are notoriously highly strung, have become less active altogether under the stress.”

As early as 1984, research by Sindiyo and Pertet noted the deterioration of the national parks. Sindiyo and Pertet note “with increased traffic in the parks, drivers tend to take their vehicles to all parts, thus destroying the habitat” It has been noted that animals in the parks are experiencing harassment because of some tourist behaviour. “The species mostly affected are carnivores and in particular lion and cheetah which because of their diurnal habits attract visitors. It is not uncommon to see several mini-buses surrounding a pride of lion or a cheetah with the result that often these animals are prevented from making a kill through tourists’ interference.” (Sindiyo and Pertet 1984).

IMPACT ON THE LOCALS

As the population of Kenya has continued to grow there has been an increase in conflict between the locals and the tourism industry. This is due to the fact that the people in the areas where the land has been set aside have not derived meaningful benefits from the conservation efforts and indeed as documented by several researchers the communities
have born substantial costs. A 2006 article by Roselyn Okech notes that the local communities are significantly vulnerable to the deleterious effects of tourism development. For example, when the national parks were developed, there was no consideration of the social-economic, cultural, political and ecological realities of these regions (Lusigi, 1978, p. 81) and there was no regard for the livelihood of the African communities (Graham 1973, Lusigi, 1978). The communities living near the protected areas often get little economic benefit from those tourist activities (Okello, 2005). In fact, the communities where the national parks were developed resent these wildlife sanctuaries because the locals were displaced from their native lands and were excluded from utilizing the natural resources for their livelihood (see the case of the Maasai in Kenya, Okello 2005, p. 568). Dapash and Kuday (2005, p. 5), have indicated that the tourism industry in Kenya is now responsible for widespread and growing environmental and cultural damage, including contributing to forest depletion, water pollution, soil erosion, habitat destruction, wildlife harassment, economic exploitation, and cultural degradation of indigenous communities. The collective activities of many tour operators and lodges are unsustainable and degrade natural systems, particularly in and around the parks and wildlife reserves.” They further note that “while tour operators profit, the Maasai and the wildlife that they protect --- the very essence of the tourists’ African experience – rarely profit financially or otherwise from contact with the tourists.” (Dapash and Kuday 2005, p. 6). The Maasai, a nomadic people of Kenya have had on-going conflicts with the governments, the park authorities and large ranchers. In his study of the wildlife conservation in Kenya, Akama (1993) found that the local people bear most of the costs of wildlife conservation with 90% suffering wildlife property damages, forgone opportunity costs of not cultivating the land. Further the locals had little or no direct influence on decision-making processes and institutions of wildlife conservation. In his study, 80% of the respondents indicated that there was a bad relationship between park management and the local community. A disturbing finding of this research was that the locals viewed the elimination of wild animals and eventual human settlement in the national parks as solutions to local food shortages. These findings are alarming and necessitate some new policies with regards to tourism development. There is now some new research that is suggesting some new ways of developing eco-tourism in Kenya with the goal of maximizing benefits to the communities while resulting in the minimal amount of damage to the communities. It is evident that in order for eco-tourism to thrive in Kenya, the Kenya Wildlife Service must initiate alternative wildlife conservation policies and programs that ensure that wildlife will play a positive role in the life of those sharing the land with the wildlife. Omondi (1995) has suggested some ways of integrating wildlife conservation with human needs such as: community wildlife-damage-control, compensation for loss, sharing of tourism benefits with local people, conservation education, and local participation in wildlife conservation policy. Other researchers have called for the development of community wildlife sanctuaries (Okello, 2005) and diversification of tourism through the development of non-wildlife based tourism such as cultural tourism (see Ondimu 2002).

All of these efforts of incorporating the local communities’ perspective are all steps in the right direction. However, it is important to note that any new policies that may be implemented will definitely benefit from examining the development of eco-tourism using a holistic rather than a reductionist view. As noted elsewhere, future policy will be beneficial if all of the relevant stake holders to the tourism development are incorporated in the decision. We introduce the system dynamics thinking in this section.

SYSTEMS DYNAMICS

Although systems dynamics has been around since 1950’s when it was developed by Jay Forrester at MIT, many researchers agree that a systems view of the world is still rare (Sterman 2001, p. 24). There are many schools of systems thinking championed by the works of Peter Senge, the Fifth Discipline and for a review of systems thinking see George Richardson (1991). In general systems thinking seeks to understand the world as a complex system. Sterman (2001, p. 9) suggests that the solution to understanding these problems lies in systems thinking i.e. “— the ability to see the world as a complex system, in which we understand that “you can’t do just one thing, and that “everything is connected to everything else.” With a holistic worldview, it is argued, we would be able to learn faster and more effectively, identify the high leverage points in systems and avoid policy resistance. A systemic perspective would enable us to make decisions consistent with our long-term best interests and the long-term best interests of the system as
a whole.” The most common tools that are utilized by system dynamics researchers include among others: a) feedback processes; b) stocks and flows (accumulations); and c) time delays (cf. Sterman 2001)

**Feedback processes:** “All dynamics arise from the interaction of just two types of feedback loops. Positive (or self-reinforcing) and negative (or self-correcting) loops. Positive loops tend to amplify or reinforce what is happening in the system. Chemists call these autocatalytic – self-stimulating processes that generate their own growth. Negative loops counteract and oppose change. For example, the less nicotine there is in a cigarette, the more the smokers must consume in order to get the dose that they need. These processes are self-limiting, processes that create balance and equilibrium.” (Sterman 2001). For any system to be in balance, it must contain both positive and negative feedback loops.

**Stocks and flows:** This refers to the accumulation and dispersal of resources. Sterman (2000, p. 192) notes: “Stocks characterize the state of the system and generate the information upon which decisions and actions are based.”

**Time Delays:** “Time delays between taking a decision and its effect on the state of the system are common and particularly troublesome (Sterman 2001, p. 13). Ignoring the time delays can lead to erroneous decision making and interventions.

We have highlighted some of the problems associated with tourism development in Kenya. The problems have stemmed from the fact that tourism development have not considered the needs of the local community were in many instances unaccounted for. It is suggested that a systems dynamics view would result in tourism development that was beneficial to all stake holders.

**TOURISM AND SYSTEMS DYNAMICS**

The national tourism industry can be viewed as a system comprised of five interconnected sectors:

1. **The natural resource:** This is comprised of the parks, the animals and the plant life contained within them. The natural resource is critical from an economic standpoint as it forms the foundation of the tourist industry, without which the industry would not exist. Creating a sustainable tourism industry necessitates the establishment of effective preservation and conservation policies with regard to natural resources.

2. **Industry:** the industry comprises the commercial aspect of tourism including hotels, tour operators, travel agents etc. The primary objective of the industry is profitability.

3. **Tourists:** The tourists can be local or foreign in origin. Their primary objective is to enjoy the flora and fauna, take pictures and generally experience the exotic. Foreign and local origin tourists may have differing objectives and sensitivities to monetary cost, insecurity and availability of alternative destinations.

4. **Local Community:** This is comprised of the human community around the tourism destinations. The impact of tourism on the local community will be primarily economic and cultural. Negative impacts may take the form of loss of land due to the establishment of parks. Other impacts are economic losses and damage to property by protected wildlife emanating from the parks. Also, the local community may be priced out of the market for goods and services or land. These impacts may also be seen in the erosion of cultural and social values as a result of exposure to tourist behavior. The locals could experience the imposition of alien consumption patterns due to dominance of tourist consumption patterns over those of the local community. Positive impacts may take the form of job creation in the hotels, parks and other tourist areas. Other positive impacts may come from increased investment in the local economy.

5. **Government:** This sector comprises both local and national governments. The main objective of the national government may be to secure the maximum tax and foreign exchange receipts from tourism. As such the interests of the national government may thus align more closely with those of the tourism industry as opposed to those of the local community.

**STOCKS, FLOWS AND FEEDBACK LOOPS IN THE TOURISM SYSTEM**

“Much of the art of systems dynamics modeling lies in discovering and representing the feedback processes and other elements of complexity that determine the dynamics of a system” (Sterman, 2001. p. 17). One objective of this
paper is to explicitly identify important stocks, flows and feedback loops within the extant tourism system. It is recognized that thousands of such feedback loops, stocks and flows will exist in the real world system. However, it is posited that the systems dynamics can be understood and accurately represented through modeling of a smaller subset of key relationships.

STOCKS

Three principal stocks can be readily identified within the tourist system:

1. The number of tourists. The overall level of tourist visits is a key factor in achieving the goals of key sectors within the system, in particular the government and industry sectors. As stated before the goal of government is to maximize foreign exchange and tax receipts, while the goal of industry participants is to maximize economic benefits such as profitability and earnings from tourism. Both goals can be achieved by maximizing the number of tourists who visit the particular destination. As noted elsewhere, the Kenyan government has developed the eco-tourism industry and tourism plays a significant role in the economy and generates needed foreign exchange (Statistical Abstract of Kenya 2003). Further, every year, the number of tourists as well as available hotel beds has continued to increase (Statistical Abstract of Kenya 2003).

2. The state of the natural resource is represented by the number and availability for viewing of animals, and the quality of the physical environment. Increasing the stock of natural resources may well be a goal of government and industry, though perhaps more so of the government. If the natural resource is well conserved then the number of animals will continue to increase and the physical environment will not be destroyed.

3. The net benefits of tourism accruing to the local community. As has been noted previously the local community, in many instances, bears many of the costs of tourism while reaping few of the benefits (Okello, 2005; Koch, De Beer, Elliffe et al, 1998). The effects of inadequate planning in Kenya have been documented elsewhere, therefore, the following discussion focuses on how various policies might impact the outcome of the eco-tourism development.

FEEDBACK LOOPS

It is proposed that policies directed at attaining desired levels of each of these stocks will establish and impact the various feedback loops between them. For example government sectors’ goal of maximizing foreign exchange earning, may lead the government to pursue policies designed to attract increasing numbers of visitors to national tourist destinations. Such policies that seek to maximize the stock of tourists will set up positive feedback loops as the number of tourists increases. These self-reinforcing loops will, absent any external adverse shocks, lead to ever increasing numbers of tourists until the carrying capacity of the natural resource (and indeed the industry sector as well) is met and exceeded.

This eventuality will then lead to a decrease in the natural resource stock, through adverse events such as overcrowding, littering, modification of animal behavior due to tourist harassment and competition amongst tourists to view game etcetera. (Okello, 2005). At the same time increased numbers of tourists beyond the carrying capacity of the local community sector will lead to a decrease in net benefits of tourism accruing to that sector. This may occur through increased conflict between tourists, the tourist industry and government on the one hand and the local community on the other. Tourist cultural values and the services the tourists demand of locals, such as sex tourism, may clash with local cultural norms and practices, fueling additional conflict.

Such adverse events as discussed above will establish negative self-correcting feedback loops in the sectors that have exceeded their carrying capacity. In the examples given above the negative feedback loops will serve to reduce the numbers of tourists arriving at the destination as the natural resource degrades and the local community becomes less hospitable.

The critical aspect of policy making that aims at sustainable and beneficial tourism outcomes is to recognize the patterns of feedback loops that arise from policy, and their effect on the various stocks.
TIME DELAYS

Amongst the most difficult aspects of modeling such a tourist system is modeling the effect of time delays on the dynamics of the system. It is likely that policy actions aimed at correcting aspects of the system will experience delays in time between when the action takes place and when its effect is observed in the system. As such it is imperative to time actions correctly if the desired effects of policies are to be obtained. For example policy interventions to reduce the numbers of tourists are essential before carrying capacity is reached. However, early intervention would have undesirable effects as would late intervention.

DISCUSSION AND CONCLUSION

The dynamics of the tourism system are a product of the interaction of the activities of the stakeholders comprising each sector. The actions of stakeholders within each sector will be driven primarily by their own self interested attempts to maximize their share of the benefits and minimize their share of the costs emanating from the tourism system. At various times the interests of different sectors will coincide and diverge, leading to either concerted or disconcerted action across sectors.

The development of tourism in Kenya provides us with some useful insights into the state and development of eco-tourism. Due in large part to massive state efforts to attract tourists to Kenya, the number of tourists visiting Kenya increased from under one hundred thousand in the 1960s to close to one million annually by 2003 (Statistical Abstract of Kenya, 2003). This increase was achieved through substantial investment in parks, hotels and marketing efforts. Indeed, it has been documented that East Africa has one of the highest densities of wildlife and national parks. Initially the government was able to generate a lot of positive returns from the tourists. However, over a period of time, there has been serious adverse effects on the local community around the parks, and in the parks themselves on the animals. Locals have found themselves in competition with the park animals for grazing and farm land, with farmers often killing elephants that entered their farms and destroyed their crops. A systems view suggests that over a period of time the destruction of the parks will result in fewer tourists visiting the country which will ultimately affect the revenues generated from increased numbers of tourists. As such the government must carefully monitor the number of tourists and type of tourists in order to avoid overcapacity.

The director of the Ecotourism Society of Kenya has recently described the experiences of the Maasai people where the Maasai have been taking their cattle into areas that were now sold because these areas have historically been grazing, as well as watering grounds, for their livestock. There are also many instances where the locals have been harmed and have had property destroyed by the animals without compensation, which results in the locals resenting the animals. As the population of animals increases then the government must find better ways of dealing with escaped animals in order to minimize damage to the community. Researchers have called for the establishment of community wildlife sanctuaries as a way to increase community involvement in the development of eco-tourism (Okello 2005). Ultimately, in order for eco-tourism development to be valued by the local community, the community must derive benefits from tourism.

It is taken as axiomatic that the goal of public policy with regard to tourism outcomes is to maximize system wide benefits while minimizing system wide costs and assuring an equitable distribution of the costs and benefits amongst the sectors. In order to achieve these desirable public policy outcomes it is necessary to understand the interaction between the sectors that comprise the tourism system. It must be realized that the outcomes of the system as a whole are dependent upon the various feedback structures established within the system. Therefore achieving beneficial public policy outcomes will depend on establishing beneficial feedback structures between the different sectors. As such, Kenyan policy makers would benefit from the utilization of a systems dynamics modeling since systems dynamics modeling enables us to understand the system as a whole composed of a number of interconnected and interdependent parts.

We have demonstrated the usefulness of the systems dynamics in examining the tourism development. Future research should attempt to simulate the complexities represented by the development of eco-tourism in any destination. Certainly, it is clear from our application of systems dynamics that the development of eco-tourism in Kenya could benefit from an examination of all the complexities inherent in the system.
REFERENCES


