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Impacts of tourism on support for conservation, local livelihoods, and community resilience around Maasai Mara National Reserve, Kenya

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ABSTRACT

The tourism enterprise-based approach to conservation can diversify livelihood opportunities in and around protected areas while incentivizing conservation support and building community resilience. However, the use of tourism as a tool for integrated conservation and development (ICD) has produced mixed results, underscoring the need for adaptive management that accounts for local context. We used a mixed-methods approach to examine how individual and community-level involvement in tourism influenced support for conservation, reliance on the natural environment, and perceptions of governance and community resilience in communities around Maasai Mara National Reserve, Kenya. During January 2017, we surveyed households in three communities (n=197) with varying levels of tourism involvement and conducted focus groups with village elders (n=28). Individuals and communities who engaged in tourism-related livelihoods expressed stronger support for conservation and reduced reliance on the natural environment. Links between tourism and environmental, social, and economic resilience varied. Results suggest the presence of a tourism sweet spot where moderate levels of tourism facilitate alignment of conservation and community development goals. Communities that achieve equitable access to and engagement in tourism and associated benefits may be more resilient and better positioned to capitalize on linkages between tourism-based livelihoods and biodiversity conservation.

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Introduction

Natural resource conservation and tourism-based community development, once viewed as opposing forces, are increasingly embraced as synergistic and compatible goals (Alpert, 1996;

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Ferraro & Hanauer, 2014; Oldekop et al., 2016; Stronza et al., 2019; West et al., 2006). The tourism enterprise-based approach to conservation, inspired by the concept of integrated conservation and development (ICD, Newmark & Hough, 2000), is thought to incentivize support for conservation within local communities by providing jobs in tourism or other alternative livelihoods that replace more destructive and extractive traditional livelihood activities (Fennell & Weaver, 2005; Salafsky et al., 2001; Sene-Harper et al., 2019; Wright et al., 2016). Recent research by Naidoo et al. (2019) and others highlight the various mechanisms through which protected areas (PAs), integrated with tourism development, can positively increase household wealth, income generation, and other material benefits (Mbaiwa & Stronza, 2010; Stronza et al., 2019; Stronza & Pégas, 2008). The ICD approach can also increase the resilience of communities (Holladay & Powell, 2013; Jamaliah & Powell, 2018; Powell et al., 2018) by reinforcing positive linkages between livelihoods and biodiversity conservation (Stone & Nyaupane, 2016, 2018).

However, some research evaluating the effectiveness of ICD through tourism has revealed mixed or even negative outcomes for local communities. Potential pitfalls of tourism-based ICD projects include unequal distribution of economic benefits (Coria & Calfucura, 2012; Stronza et al., 2019), emphasis on indirect benefits that do not directly impact the lives of local residents (Munanura et al., 2020), and poor governance that prevents local involvement in tourism planning and decision-making (Coria & Calfucura, 2012; Powell et al., 2018; Sabuhoro et al., 2021). ; Weak linkages between tourism and biodiversity can also detract from conservation goals (Kiss, 2004; Salafsky & Wollenberg, 2000; Stone & Nyaupane, 2016), often resulting in further degradation of natural resources as park-proximate development spurs human population growth (Karanth & DeFries, 2011). These problems are compounded when tourism enterprises do not align with cultural norms and traditions (Nyaupane & Thapa, 2004; West et al., 2006), or when training opportunities are absent and capacity for local engagement in the tourism industry is low (Aref & Redzuan, 2009).

In their assessment of enterprise-based conservation strategies that succeed and fail, Salafsky et al. (2001) highlighted one consistent component of success: an adaptive management process that enables communities and industry partners to systematically test assumptions and learn from results as projects unfold. Tourism-based ICD approaches can work, but positive outcomes depend on a thorough understanding of local context, perceptions, and norms (Salafsky et al., 2001). Our study sought to test the efficacy of tourism-based ICD around the Maasai Mara National Reserve in Kenya, a region where wildlife tourism is a critical economic driver. Following recommendations by Stronza et al. (2019), we used a mixed-methods approach in three different communities, each with varying levels of tourism development, to explore the impacts of tourism involvement on four key outcomes of ICD: local support for conservation, reliance on the natural environment, and perceptions of inclusive governance and community resilience (Campbell et al., 2010; Marcus, 2001). Because communities consist of groups of individuals that collectively define community trajectories and experiences, both individual and collective perceptions matter. Therefore, following suggestions by Ban et al. (2013), we examined these relationships based on an individual's direct involvement in the tourism industry (individual level) and levels of tourism engagement within the broader community (community level). Specifically, this research sought to answer the following research questions about the tourism enterprise-based conservation model in the Maasai Mara:

Q1: How does tourism involvement at the individual level influence support for conservation, reliance on the natural environment, and perceptions of local governance and community resilience (environmental, social, and economic)?

Q2: How does tourism involvement at the community level influence support for conservation, reliance on the natural environment, and perceptions of local governance and community resilience (environmental, social, and economic)?

Literature review

Theoretical basis of integrated conservation development through tourism

In the context of protected areas, the premise underlying ICD is based on several assumptions about tourism development (Fennell & Weaver, 2005; Sene-Harper et al., 2019). First is the assumption that tourism provides alternative livelihood opportunities for local communities living within or adjacent to the PAs. Second, that these alternative livelihood opportunities will be more financially beneficial than traditional livelihood opportunities (thus alleviating poverty). Third, that these financial benefits will incentivize local communities to forego traditional and often more extractive practices, ultimately reducing reliance on the natural environment for livelihoods. And fourth, that local communities will recognize that the protected area and its resources are the attractant (or destination) that ultimately drives tourism, and that future economic benefits from tourism depend on the conservation of these resources. These conditions and assumptions, although often not explicitly acknowledged, stem from the application of Rational Choice Theory, which suggests that individuals are “rational actors” and that decision-making (in this case, support for or opposition to tourism and protected areas) is driven by the desire to maximize utility (typically economic gain) to the individual performing an action (e.g., Herrnstein, 1990).

However, research has repeatedly demonstrated that human decision-making in a conservation context is not only driven by the desire to maximize individual utility, but also by a host of other considerations related an individual's broader social-ecological environment (Ban et al., 2013). For instance, individual actions may be influenced by external constraints and extrinsic motivators (Ajzen, 1991; Ryan & Deci, 2000), personal identity (Stets & Burke, 2000), and values (Stern et al., 1999). Additional factors emerging from higher levels of social structure, including social norms (Chen et al., 2009; Stern et al., 1999) and various forms of social (Pretty & Smith, 2004) and community capital (Stone & Nyaupane, 2016), also impact individual and collection action. The tourism-conservation link is therefore affected by both the rational choices of individuals and aggregated perceptions and behaviors of individuals that operate at the community level (Waylen et al., 2010). Together these forces interact to influence public support for tourism and protected areas and, ultimately, the efficacy of ICD projects.

Conditions that support ICD through tourism

As ICD initiatives and global tourism centered on protected areas grow in popularity, researchers are beginning to identify conditions and programmatic approaches that may simultaneously lead to improved support for conservation and poverty alleviation (Balmford et al., 2015; Naidoo et al., 2019; Stone & Nyaupane, 2016, 2018). Rural communities around protected areas are often considered resource dependent. Defined by reliance on a narrow range of natural resources, this dependence can threaten sustainability and lead to social and economic stresses within livelihood systems (Adger, 2000). When tourism in an area increases, the growth can create new economic opportunities and alternative occupations that replace activities which might produce more lasting environmental damage (Sene-Harper et al., 2019; Weaver & Lawton, 2007). If carefully planned and implemented, tourism could therefore support ICD by diversifying livelihoods and decreasing local residents' reliance on the natural environment (Mbaiwa & Stronza, 2010), ultimately fostering support for protected area management (Badola, 1998; Kideghesho et al., 2007).

In the context of global protected areas, support for conservation is frequently measured as local support for the nearby park and the associated park management policies (Black & Cobbinah, 2018; Larson et al., 2016; Scherl & Edwards, 2007). If local residents object to park management policies, conflict results and conservation goals are compromised (Faasen & Watts,

2007; Rastogi et al., 2012; Sene-Harper et al., 2019). Public support for parks is often linked to perceptions of and support for tourism and tourism-related benefits, especially when residents recognize the park as a critical tourism resource (Gadd, 2005; Kideghesho et al., 2007; Walpole & Goodwin, 2001). Support for conservation-centered policies and park management practices may therefore be strongest in communities where the tangible benefits of tourism for local residents are most evident (Naidoo et al., 2019).

Support for conservation can also be strengthened when local residents feel they have a voice in local governance and decision-making processes. Perceptions of local empowerment and involvement, key components of political capital, are frequently associated with support for conservation and tourism around protected areas (Stone & Nyaupane, 2016). While the value of inclusive and collaborative governance of natural resources has been acknowledged for some time (Berkes, 2017), the concept of inclusive tourism development has only recently gained traction (Scheyvens & Biddulph, 2018). Such approaches typically ensure that local residents, many of whom have been historically marginalized, are included in the production and consumption of tourism. Inclusive tourism development provides unique pathways to social integration and advancement (Scheyvens & Biddulph, 2018), which can in turn strengthen support for key tourism resources (e.g., protected areas) and ICD initiatives (Muganda et al., 2013).

In addition to benefits that accrue to individuals, perceptions of community-level benefits yield important insights regarding the potential sustainability of tourism efforts. As global change accelerates, tourism is increasingly viewed as a strategy for enhancing resilience, or a community's capacity to adapt and respond to change (Cheer & Lew, 2017; Lew et al., 2016). Within the context of nature-based tourism, resilience has several components (Holladay & Powell, 2013, 2016). Environmental resilience refers to a community's ability to maintain its ecosystem productivity and function (Adger, 2000; Gunderson, 2000); it accounts for factors such as naturalness, control of infrastructure development, ability to withstand drought and other stressors, and maintenance of biological diversity (Holladay & Powell, 2013; 2016; Jamaliah & Powell, 2018). Economic resilience relates to the variety, quality, and range of economic opportunities community members are able to access (Adger, 2000; Holladay & Powell, 2013; Holling, 2001). Communities highly reliant on one resource are vulnerable to severe economic losses when external forces impact that particular resource (Thomas & Twyman, 2005). Diversity of livelihood options, through market integration, can therefore provide communities with expanded economic security (Adger, 2000). Social resilience stems from factors such as social trust, networks, collective learning, and equity (Adger, 2000; Pelling & High, 2005). Social capital is a key element of resilience, enabling local residents and institutions to connect and foster links between the ecological and social components of local systems (Berkes, 2009; Holladay & Powell, 2013).

These dimensions of resilience relate to the natural, financial, and social aspects of the Community Capitals Framework, which has been used by Stone and Nyaupane (2016, 2018) to understand linkages between biodiversity conservation and community development. Most scholars agree that enhanced community resilience is key to the long-term success of communities and conservation, especially in and around protected areas (Berkes & Ross, 2013). However, there is some debate about the extent to which tourism, a market driven phenomenon, can influence different dimensions of resilience (Amir et al., 2015; Bec et al., 2016; Cheer & Lew, 2017).

Conditions that threaten ICD through tourism

Despite optimism surrounding ICD through tourism, others have argued that integrated conservation and tourism-based poverty alleviation has many potential pitfalls to implementation that negatively impact both conservation and development outcomes (Agrawal & Redford, 2006; Salafsky et al., 2001). For example, Kiss (2004) found that ICD efforts focused on providing alternative livelihoods (often linked to tourism) were somewhat effective at reducing poverty,

but largely failed at reducing threats to biodiversity or enhancing conservation efforts. Too often, ICD projects that emphasize tourism quickly morph into mass tourism operations that jeopardize environmental sustainability (Stronza et al., 2019; Weaver, 2001). In cases where ICD projects with a tourism emphasis have been deemed successful, that success has often taken a long time to achieve. For example, Baral et al. (2007) described how an ICD project in Nepal over-emphasized economic development activities in early stages, only achieving a tenuous balance with conservation about a decade after initiation.

Even when tourism effectively supports conservation goals, development outcomes and social benefits may be compromised (Stronza et al., 2019). In many tourism enterprise-based approaches to conservation, local residents are merely spectators who have little direct involvement or influence in either the tourism industry or management of the protected area on which it depends (Coria & Calfucura, 2012; Karanth & DeFries, 2011; Munanura et al., 2020; Nyaupane & Thapa, 2004). These disparities often result in inequitable distribution of tourism revenue and other economic incentives (Coria & Calfucura, 2012; Eagles et al., 2002) that are exacerbated by low levels of tourism-related training and capacity building in host communities (Aref & Redzuan, 2009; Munanura et al., 2020). In some cases, local voices are excluded in planning and decision-making processes (Berkes, 2004; Stone & Nyaupane, 2016). This can lead to tourism products and management outcomes that do not adequately reflect the cultural norms and traditions of local communities (West & Carrier, 2004). For all of these reasons, many ICD projects cited as success stories have actually done little to improve the well-being of local residents or alter their conservation-related attitudes and behaviors (Kiss, 2004). Consequently, numerous questions remain surrounding the capacity of tourism to serve as a facilitator, or inhibitor, of conservation and community development (Stronza et al., 2019; Wilkie et al., 2006).

Methods

To examine the effects of tourism enterprise-based conservation around a protected area, we explored the linkages between tourism involvement, conservation support, reliance on the natural environment, and community resilience in the Maasai Mara National Reserve, Kenya. Following recommendations by Stronza et al. (2019), we used a mixed-methods approach in three different communities, each with varying levels of tourism development, to explore the impacts of tourism on conservation and community development at multiple scales.

Study site

The Maasai Mara National Reserve (MMNR) in Kenya is a world-renowned protected area that has global significance because of its concentration of flora and fauna, including charismatic predator species such as lions, leopard, cheetah, and hyenas. MMNR serves as a centerpiece for tourism in Kenya, leading to a high volume of tourists in the reserve (Kenya Tourism Federation, 2012). In 1984, a section of the Reserve was designated to provide watering points for local communities and their livestock, creating the present conservancy lands north and west of the present MMNR (Allen et al., 2019). Today this area known as the Mara Triangle is managed by the Mara Conservancy, while the remainder of the Reserve is managed by Narok County Government. In a conservancy setting, local residents can become members, and then use shared land, receive a portion of community benefits (often monetary), and participate in the management process.

MMNR is part of the Mao ecosystem, which includes the Mao forest, rivers, agricultural land and savannahs. Most wildlife populations are facing a significant decline of up to 70% (Ogotu et al., 2011), prompting concern among conservationists regarding future management (Kenya Tourism Federation, 2012). In addition to ecosystem degradation, there has also been an increase

in human-wildlife conflict around the reserve (Hallo et al., 2011; Ndegwa Mundia & Murayama, 2009). The Maasai people have inhabited the region around MMNR for centuries and have traditionally adopted a nomadic pastoral lifestyle that supports the long-term viability of rangelands. Recently, the Maasai have adopted a more sedentary agro-pastoral lifestyle characterized by more permanent homesteads (Ogutu et al., 2009). This shift has resulted in increased reliance on the land around MMNR, threats to natural resources, and conflicts with wildlife (Allen et al., 2019). Fencing of land, large-scale agriculture (e.g. wheat farming), and tourism development (e.g. safari camp resorts) that draws on scarce water resources and exacerbates resource exploitation all fuel additional conservation-related conflict around the reserve (Ogutu et al., 2011; Serneels & Lambin, 2001).

We selected three communities surrounding MMNR for participation in this study based on the presence of tourism in each location (Figure 1). Talek experiences high levels of tourism involvement relative to other local communities due to its geographic proximity to the reserve and its role as a major access point (or gate) for tourists. There are several lodges within close proximity to Talek that provide tourism-related employment opportunities. Aitong is located farther from the reserve near several community conservancies (e.g. Mara North Conservancy and Olare Orok Conservancy). Many community members in Aitong are also members of these conservancies and have access to conservancy land. Community members in Aitong are generally less involved in the tourism industry than their neighbors in Talek, but tourism-related employment opportunities still exist. Loita is located farthest from MMNR and is surrounded by forested land, providing a slightly different ecological setting than its neighboring communities. Due to its more remote location and limited access to passable roads, community members in Loita have the fewest tourism-related opportunities among the three communities. All three communities are heavily reliant on agriculture and livestock and members of all three communities experience frequent interactions and conflicts with wildlife.

Data collection

Surveys of residents (quantitative)

We conducted surveys in January 2017 in the three community areas around the MMNR: Talek (high tourism presence), Aitong (moderate tourism presence), and Loita (low tourism presence). Within each of these community areas, we systematically sampled at least 50 homesteads (bomas). Research assistants began data collection at randomly selected points within each community to ensure appropriate geographic representation. From those points, when approaching each boma from the road (or access point), the first dwelling encountered was used as a starting point. From there, every third dwelling (every second if the boma was small) was approached for participation in the study. We targeted 50 bomas per village to ensure that a sufficient number of diverse community perspectives would be represented; 81 households were surveyed in the Loita area, 56 in the Aitong area, and 60 in the Talek area, resulting in a total of 197 responses from individuals in different households across the three communities. The most senior member of each household (as identified by residents) was selected to participate in the study. Research assistants from Maasai Mara University, who were knowledgeable of the local setting and conversant in Swahili and Maa (the traditional local language), administered the surveys orally due to low literacy rates in the region. Prior to data collection, they received training pertaining to appropriate data collection processes and techniques, sample selection, and ethical considerations from the project team.

Conversations with village elders (qualitative)

We also conducted qualitative focus groups with participants identified by community members as “elders,” or local leaders (7 in Loita, 8 in Aitong, and 13 in Talek). Focus group meetings took

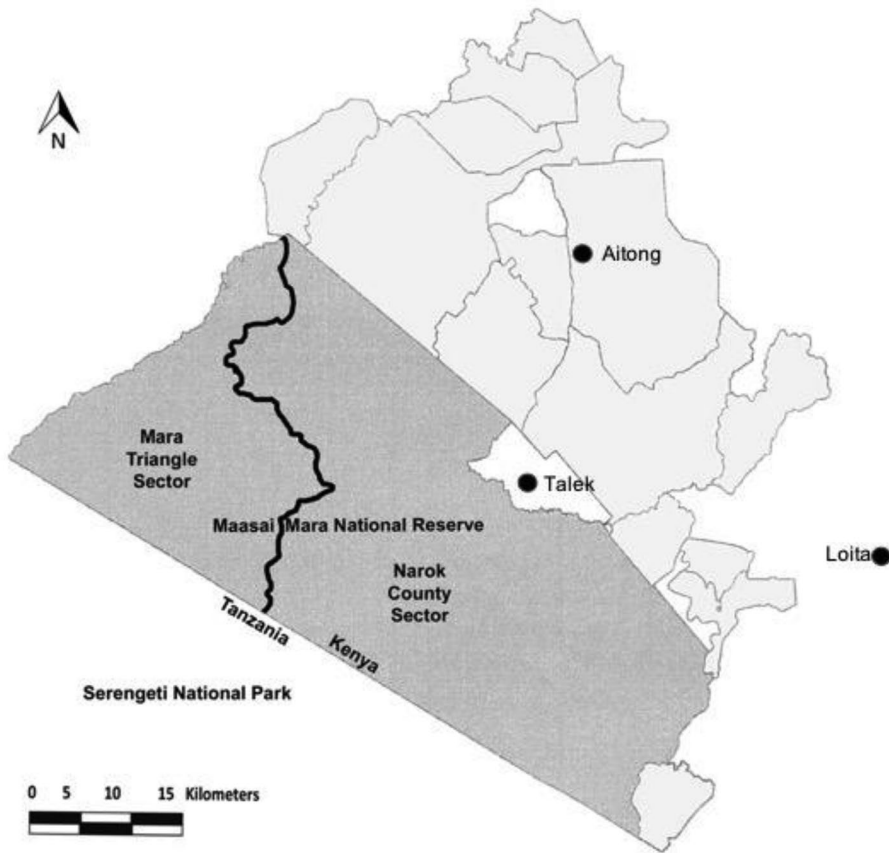


Figure 1. Map of Maasai Mara National Reserve (MMNR), Kenya, and surrounding area. Dark grey shading represents MMNR and light grey shows the surrounding conservancies. Locations of communities included in the study are indicated by black dots.

place at a neutral location within the community and lasted approximately 120-180 minutes each. Participants were informed of meeting times and locations by research assistants, who were members of the community and familiar with local social networks and procedures. The questions for the focus groups were designed to complement the household surveys and directed the conversation towards key research objectives and constructs. Each focus group was led by a Kenyan researcher who was conversant in Swahili and Maa. Each focus group session was voice recorded and observed by three additional researchers who noted non-verbal conversational points of tension (Creswell & Creswell 2007).

Questionnaire & instrument development

To understand the socio-economic characteristics of our focal communities, our questionnaire gathered demographic information such as age, gender, income, number of adults and children in the home, education, and years in community. To assess individuals' potential involvement in the tourism industry, we asked participants to describe how they primarily make a living (with tourism as one of the options) and if they derive any income from tourism. We also asked participants to respond to this statement: "I rely on tourism for my livelihood." Individuals who indicated livelihoods linked to tourism (i.e., high tourism involvement) were coded as the

“tourism” group. Individuals who indicated weak or no livelihood linkages to tourism were coded as the “no tourism” group. This information also helped to validate our selection of the three different villages based on level of local involvement in tourism, indicating the proportion of residents in each community who were heavily reliant on the tourism industry. We then used subjective high (Talek), medium (Aitong), and low codes (Loita) to approximate the level of tourism involvement at the community level. To evaluate perceptions of tourism in each community, we also assessed residents’ *attitudes towards tourism* through a series of seven questions pertaining to the impact of tourism in the area (Table S1). This scale was adapted from Holladay & Powell (2013) and used a Likert-type scale of 1 (strongly disagree) to 5 (strongly agree).

With respect to key dependent variables, we assessed individuals’ support for conservation using questions pertaining to support for MMNR (*PA support*, 3 items, Table S1) and support for conservation policies related to wildlife management (*conservation policy support*, 3 items, Table S2). Though based on approaches utilized in previous research (Larson et al., 2016; Walpole & Goodwin, 2001), all items related to policy support were developed specifically for this study and assessed using a scale of 1 (strongly disagree) to 5 (strongly agree). Survey respondents were asked to rank their *reliance on the natural environment* for resources such as fire wood, water, building materials, fruits and vegetables, and household supplies on a scale of 1 (not at all reliant) to 5 (highly reliant, Table S3). We assessed broader beliefs about the inclusivity of local environmental *governance* using 5 items, adapted from Holladay and Powell (2013), on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree, Table S2).

Perceptions of community resilience were measured using scales developed and tested by Holladay and Powell (2013, 2016) and Powell et al. (2018). These scales were selected because they were designed to assess perceptions of community resilience specifically in a nature-based tourism context. The scales focused on *environmental resilience* (4 items), *economic resilience* (4 items), and *social resilience* (5 items, Table S4). All community resilience scales were assessed using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Focus groups with village elders covered the same themes as the survey instrument, with the facilitators asking questions related to each construct to direct the conversation. For example, to gain insight into the role tourism plays in communities we asked, “What types of impacts do you see in the community from tourism in the area?” To gain insight into perceptions of environmental governance in communities we asked, “How much input are you able to provide to the county government about decisions that are going to impact your community?” For more details about the focus group questions, see Table S5.

Data analysis

Surveys of residents (quantitative)

We analyzed quantitative data using IBM SPSS statistical package version 25. After data cleaning, we followed recommendations by Jackson (2005) and used a Principal Component Analysis (PCA) to examine scales used to measure key constructs. Through this process we developed psychometrically-sound index scores with the most parsimonious list of survey items. Items with factor loadings less than 0.4 were eliminated, and reliability analyses confirmed Cronbach’s alpha values of 0.6 or greater (Tables S1-S4). Frequency distributions and descriptive statistics were calculated for all variables. To compare dependent variables (e.g., support for conservation, reliance on the environment, and perceptions of local governance and community resilience) reported by individuals with tourism-linked livelihoods to those not involved in tourism, we conducted a series of independent-samples t-tests with family-wise error rate adjusted using the Bonferroni correction. To facilitate interpretation of mean comparisons, we calculated the *Cohen’s d* measure of effect size for each statistically significant result: small (0.2), medium (0.5), or large (0.8, Lakens, 2013). We then used a factorial ANOVA to examine relationships among

key dependent variables and individual tourism involvement (tourism or no tourism) as well as community tourism involvement (high, medium, or low). We examined interactions between individual and community-level tourism involvement for all dependent variables using Tukey’s post hoc comparisons. Finally, we conducted separate one-way analysis of variance (ANOVA) to determine if there were significant differences in key dependent variables among communities with varying levels of tourism presence (high, medium, or low). In all ANOVA tests, we used partial eta squared to assess effect sizes for significant findings.

Conversations with village elders (qualitative)

To analyze the focus group data, conversations were translated and transcribed by a Kenyan researcher. Following transcription, three researchers analyzed qualitative data by conducting an independent analysis of the transcripts using a priori themes to determine how comments supported or refuted our quantitative findings (Wisdom & Creswell, 2013). Coded themes corresponded to the quantitative variables measured in the survey (e.g., attitudes toward tourism, support for conservation, perceptions of local governance and community resilience). Next, each researcher compared notes to identify sources of variation until consensus was reached in our interpretation of the data. Any discrepancies were addressed by referring to original transcripts and contexts. Participant quotes as well as researchers’ interpretation of the quotes were reviewed and agreed upon by the three researchers to ensure that overall synthesis of focus group conversations accurately represented the collective sentiments expressed during the sessions.

Results

Surveys of residents: Individual and community level analysis

Across the entire survey sample, the mean age of respondents was approximately 39 years old (slightly higher in Aitong) and respondents had lived in their community an average of 29 years (slightly lower in Aitong, Table 1). The sample was majority male (59%). On average, respondents had attended 5.8 years of primary school. Households contained an average of four adults and four children, with the most children residing in households in Aitong (Table 1).

When examining results at the individual level, engagement in tourism was generally associated with higher scores on key dependent variables (Figure 2). Pooling data across all communities and comparing scores via t-tests, we found that individuals whose livelihood was linked to tourism in some way reported higher scores for *attitudes towards tourism* ($t=7.85, p<0.001$), *PA support* ($t=3.52, p=0.001$), *conservation policy support* ($t=4.17, p<0.001$), and perceptions of *economic resilience* ($t=3.81, p<0.001$) than individuals who were not engaged in tourism

Table 1. Summary of demographic attributes of local residents surveyed in low (Loita), moderate (Aitong), and high (Talek) tourism communities surrounding Maasai Mara National Reserve, Kenya (n=197).

Demographic Variables	Low (Loita) (n=81)		Mod (Aitong) (n=56)		High (Talek) (n=60)		Total (n=197)	
	M	SD	M	SD	M	SD	M	SD
Age	37.4	12.86	44.0	14.79	37.3	10.30	38.6	12.67
Years in community	35.2	14.20	12.2	8.26	29.3	17.15	28.9	16.96
Gender (% Male)	63.9	–	62.5	–	51.7	–	59.3	–
Education (years attended school)	6.9	7.52	4.3	6.11	4.9	6.15	5.8	6.92
How many adults (over 18) live in household	3.9	2.42	3.9	1.74	3.6	2.00	3.8	2.15
How many children (under 18) live in household	3.4	2.20	5.0	2.96	4.2	3.54	4.0	2.89
Percentage of community involved in tourism	28.4	–	41.1	–	56.7	–	40.6	–

(Table S6). We observed few differences based on individual engagement in tourism for *reliance on the environment*, and perceptions of *governance, social resilience, and environmental resilience* (Figure 2, Table S6).

Factorial ANOVA results revealed that community-level effects of tourism were also significant and more variable than relationships at the individual level (Table 2). For every dependent variable except *environmental resilience*, the community effect was significant. In many cases interactions between the individual and community-level tourism variables were also significant (Table 2), underscoring the need to consider potentially different associations between tourism and conservation at multiple scales. To better understand the influence of community context on the dependent variables, we explored specific differences in perceptions among the three different communities based on their level of involvement tourism.

Only 28 percent of respondents in Loita indicated any involvement in tourism. The percentage of respondents involved in tourism in Aitong (41%) and Talek (57%) were higher, supporting the

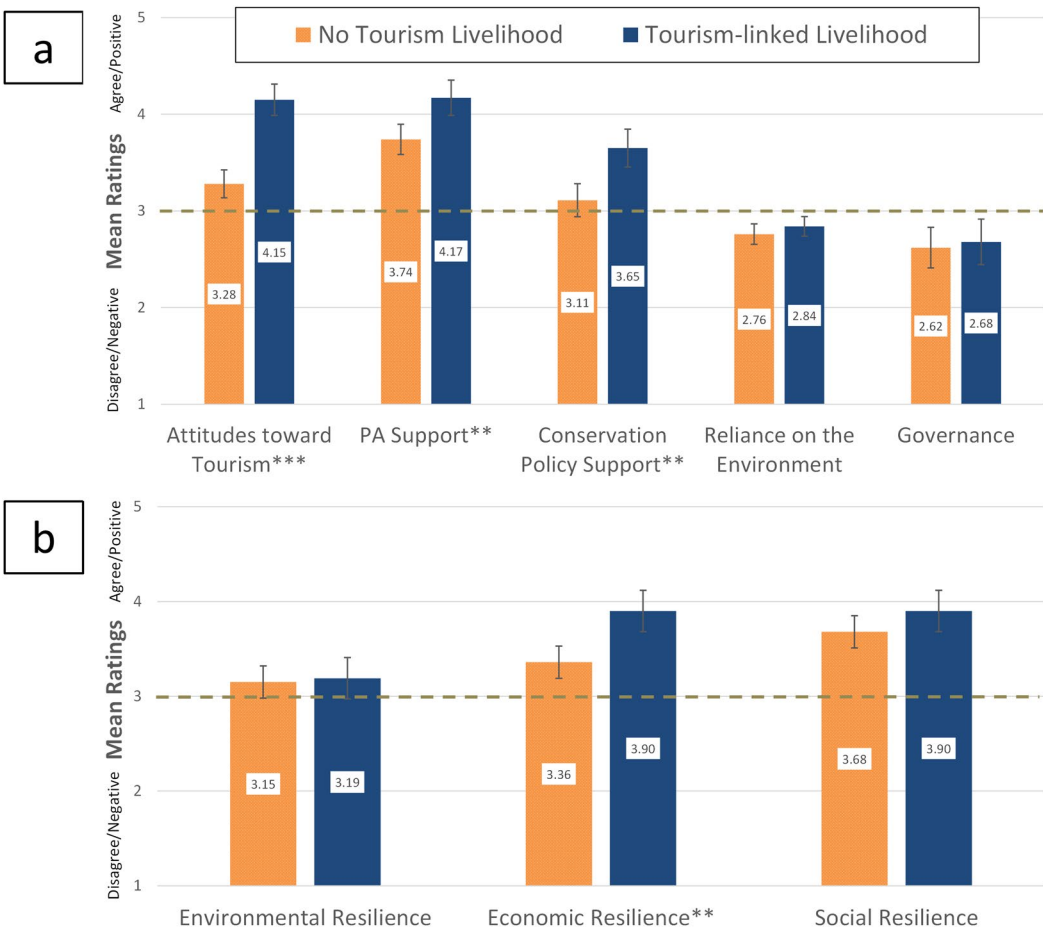


Figure 2. Mean ratings (with 95% CI) for key dependent variables for two groups of survey respondents around Maasai Mara National Reserve, Kenya: individuals with livelihoods not linked to tourism (n=102) vs. individuals whose livelihood is directly or indirectly linked to tourism (n=86). Dependent variables in (a) include attitudes towards tourism, support for the protected area (MMNR), support for general wildlife conservation policies, reliance on the natural environment, and perceptions of inclusive local governance. Dependent variables in (b) include perceptions of environmental, economic, and social resilience. Mean ratings on all scales ranged from 1=Strongly Disagree (or negative) to 5=Strongly Agree (or positive). **, *, and *** denote statistical significance of t-test comparing mean scores at $p < 0.05$, 0.01 , 0.001 , respectively; **, *, and *** also correspond with effect sizes described by Cohen's d as small (0.2), medium (0.5), or large (0.8).

Table 2. Results of factorial ANOVA showing positive associations among individual and community-level involvement in tourism and key dependent variables in communities around the Maasai Mara National Reserve, Kenya (n=197).

Dependent Variable	Adj. R ²	Individual-level Tourism Involvement		Community-level Tourism Involvement		Interaction	
		F	Part. η ²	F	Part. η ²	F	Part. η ²
Attitudes towards Tourism	0.400	62.50***	0.28	6.60**	0.08	15.24*	0.16
PA Support	0.144	7.63**	0.04	7.16**	0.08	4.08*	0.04
Conservation Policy Support	0.237	9.86**	0.06	12.74***	0.13	6.60***	0.07
Reliance on Environment	0.444	20.03***	0.10	69.58***	0.44	0.64	0.01
Governance	0.143	0.33	0.00	13.65*	0.16	1.10	0.02
Environmental Resilience	0.359	7.86**	0.04	50.70***	0.36	0.53	0.01
Economic Resilience	0.093	11.72**	0.06	0.95	0.01	3.20*	0.04
Social Resilience	0.088	2.16	0.01	9.55***	0.10	1.37	0.02

*, **, *** denote statistical significance of ANOVA F-test for main effects and interactions at $p < .05, .01, \text{ and } .001$, respectively. Significant results indicate tourism involvement at either the individual level [no tourism livelihood = 102 respondents, tourism-linked livelihood = 86], the community level [Loita(low) = 81, Aitong(Moderate) = 56, Talek(High) = 60], or some combination of the two (interaction term) are significantly associated with the dependent variable. Effect size reported as partial eta-square (η^2) with cutoffs of 0.01 = small effect, 0.06 = medium effect, and 0.14 = large effect. Blue cells indicate significantly higher scores reported for individuals/communities with greater involvement in tourism; orange cells indicate significantly lower scores for individuals/communities with greater involvement in tourism; yellow cells indicates mixed results.

low, medium, and high tourism designations that we established *a priori* for each community. *Attitudes towards tourism* also differed across the three communities, with the most positive attitudes in Aitong, the moderate tourism community. Attitudes towards tourism were slightly less positive in Talek and significantly less positive in Loita ($F(2,169)=6.52, p=0.002$, Figure 3a, Table S7).

Support for protected area management was similar in Talek and Aitong, but significantly lower in Loita, the low tourism community ($F(2,187)=8.92, p<0.001$, Table S7). Similarly, *support for general conservation policies* was significantly higher in Talek and Aitong than Loita ($F(2,178)=17.94, p<0.001$, Table S7). These patterns suggested that, at the community level, higher levels of involvement in tourism resulted in stronger support for wildlife conservation policies and stronger support for the Maasai Mara National Reserve, specifically (Figure 3a). *Reliance on the natural environment* was highest in Loita and lowest in Talek; residents in Aitong were also less likely to rely on the natural environment than residents of Loita ($F(2,190)=58.43, p<0.001$, Table S7). Overall, individuals living in communities with higher levels of tourism involvement reported lower reliance on the natural environment to support livelihoods (Figure 3a). Positive perceptions of local environmental *governance* were strongest in Aitong, the moderate tourism community, and weakest in Talek, the high tourism community ($F(2,154)=13.10, p<0.001$, Table S7). Even Loita, the low tourism community, reported higher average governance scores than Talek (Figure 3a).

Environmental resilience was highest in Loita and lowest in Talek, with a large effect size ($F(2,188)=40.40, p<0.001$, Table S7). *Economic resilience* was comparable across all communities, but increased slightly with growing tourism presence, resulting in a significant difference between Loita and Talek ($F(2,189)=2/56, p=0.080$, Table S7). *Social resilience* ratings revealed a pattern that closely aligned with *governance* ratings, with the highest values in Aitong ($F(2,189)=8.07, p<0.001$, Table S7). Overall, individuals living in communities with higher levels of tourism involvement were generally more likely to perceive economic resilience but less likely to perceive environmental resilience (Figure 3b). Perceptions of social resilience were highest in the moderate tourism community (Figure 3b).

Conversations with village elders in Loita (low tourism community)

Discussions with village elders in Loita confirmed that reliance on the environment was high in this region and that natural resource conservation, though important, also created potential

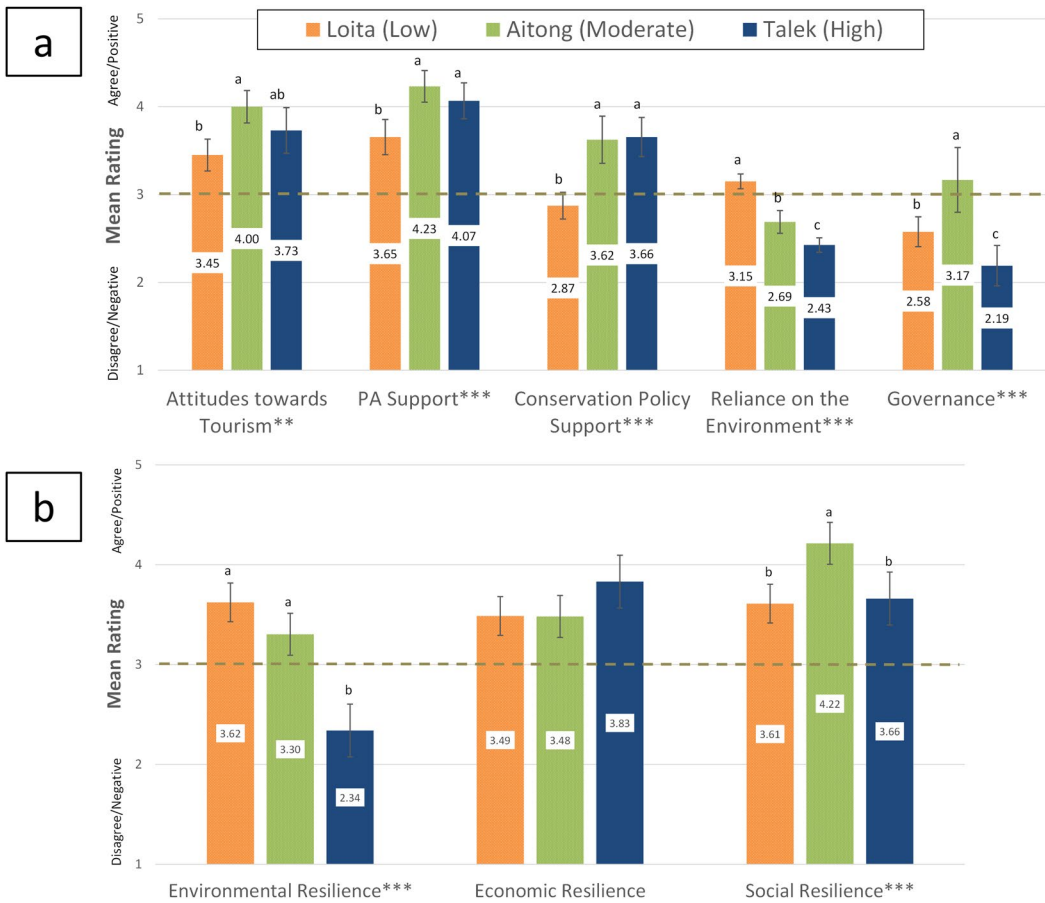


Figure 3. Mean ratings (with 95% CI) for key dependent variables among three communities around Maasai Mara National Reserve, Kenya, with different levels of tourism involvement: Loita (low tourism, n=81), Aitong (moderate tourism, n=56), and Talek (high tourism, n=60). Dependent variables in (a) include attitudes towards tourism, support for the protected area (MMNR), support for general wildlife conservation policies, reliance on the natural environment, and perceptions of inclusive local governance. Dependent variables in (b) include perceptions of environmental, economic, and social resilience. Mean ratings on all scales ranged from 1=Strongly Disagree (or negative) to 5=Strongly Agree (or positive). **, **, and *** denote statistical significance of ANOVA comparing mean scores at $p < 0.5$, 0.01, 0.001, respectively. Different superscripts represent means that are significantly different based on Tukey's post hoc mean comparison tests (similar superscripts suggest no mean difference).

problems. One elder remarked, “the lands here are community lands and we are able to get resources we need from them as a group rather than as individuals. The forest should be held intact.” Because of its location near forested land, Loita is home diverse natural resources and wildlife, resulting in an environmentally resilient community but one with high rates of human-wildlife conflict. The elders explained, “we have a greater number of problems with wildlife here because the forest is here and is healthy.”

With respect to links between tourism and conservation, an elder summarized: “it is understood that from a broad view, wildlife is beneficial. But specifically here, no.” Elders explained that they have relatives in other areas who are working in the Mara, and they can see the benefits for them. However, “the money and benefits that the Mara can provide to some people do not have an impact here.” Yet, there is some optimism that these benefits will eventually reach the area: “We hope that at some point we can be able to benefit the way other people are. That is somewhat keeping people from destroying the wildlife. They want things to stay

the same so maybe they can benefit from it in the future.” Many elders believed the externally-imposed and tourism-centered conservation policies popular elsewhere in Kenya were not effective in Loita: “We do not receive benefits and compensation like other areas do. The policies do not work for us here.”

Conversations with village elders in Aitong (moderate tourism community)

Aitong was unique among the communities we studied because of its involvement in community conservancies. Aitong borders several conservancies, and 86% of the community (including all of our focus group participants) were members of a conservancy. Members of the focus group were overwhelmingly positive about the benefits from conservancies. One elder explained, “Many people here are involved in conservancies and we can have an impact on the land and the wildlife that live with us which is tradition in this culture.” Elders unanimously believed tourism focused on both wildlife and local culture is important for conservation. One participant explained that “Maasai culture is still playing a big role in conservation, everyone is fascinated by Maasai dress and that brings in tourists.”

However, with respect to conservation support, the management of the MMNR and conservancies remained a concern. Elders expressed positive views of conservancies but noted some problems: “revenues are too little and most of the time there are meetings and we are not included so we don’t know what is happening.” Overall, elders acknowledged some social benefits stemming from tourism across the conservancies (e.g., new schools, improved access to water) and claimed to have a voice in some of these decisions, which reflects stronger perceptions of inclusive environmental governance and social resilience in Aitong. Although some resentment existed among Aitong elders, the community was generally supportive of both tourism and the protected area. They were also eager to remain involved in conservancies and conservation decision-making processes.

Conversations with village elders in Talek (high tourism community)

Elders acknowledged that tourism was a key industry in Talek and an important economic driver. As in Aitong, community members credit their rich culture with attracting tourists to the area: “Our cultural values help protect wildlife. It [Maasai culture] is an attraction to tourists and they are bringing in income.” Elders expressed concern that people who are not Maasai are pretending to be in order to benefit from tourism, and they articulated a need for a “protection mechanism for culture” in the community. Many elders also acknowledged that, despite the potential benefits of tourism, local people are rarely employed in MMNR at lodges or in management positions.

Community members in Talek believed that they could benefit more from tourism if the community was more involved in the management of the conservancies and MMNR itself. One elder suggested, “there needs to be a committee that represents the reserve, conservancies, and communities who come together in a discussion like this to make decisions.” Such comments demonstrate the absence of a positive and productive relationship between the community and the county government charged with managing MMNR. Greater involvement in tourism and close proximity to the reserve often exacerbated the negative relationship between members of the community and management authorities. One participant explained, “There is a lot of harassment on the part of the county. There is a fine for cattle in the reserve but rather than giving the fine, the officers are expecting a bribe from us.” Elders in the focus group strongly believed the county government and the Kenya Wildlife Service were more concerned with wildlife than with people. “If someone is killed by an animal they don’t respond – if an animal is killed there are helicopters all over the place.” Levels of frustration with MMNR

management and decision making were noticeably higher in Talek than any of the other communities. One comment captured this sentiment particularly well: “the Mara is dead. The community is not involved. There are too many camps and lodges and population of people and livestock has increased.”

Discussion

Our study of communities around Maasai Mara National Reserve (MMNR), Kenya, explored answers to ongoing questions about the efficacy of tourism enterprise-based approaches to conservation, illuminating the complex relationships between tourism, conservation support, and community resilience at multiple scales (Coria & Calfucura, 2012; Naidoo et al., 2019). Benefits of tourism reported by individuals did not always translate across communities, showing that consideration of larger cultural context is critical when assessing conservation outcomes (Waylen et al., 2010). While our mixed methods comparison of individuals and communities suggested that tourism involvement can generate positive outcomes for conservation, the long-term viability of this linkage may depend on how tourism affects perceptions of inclusive governance and social resilience. Our results revealed several patterns that could help define and inform the role of tourism as an ICD strategy around protected areas.

Tourism as a facilitator of support for conservation

Many studies have established links between local livelihoods and support for conservation (Badola, 1998; Kideghesho et al., 2007; Larson et al., 2016; Mbaiwa & Stronza, 2010). Individuals who are highly reliant on the natural environment may be less likely to support environmental protections and restrictions imposed by authorities because of potential threats to their food and income security (Munanura et al., 2014, 2020). On the other hand, when people see tangible economic benefits from tourism that stem from the protection of wildlife and natural resources, they may be more inclined to support both parks and the policies that govern them (Balmford et al., 2015; Naidoo et al., 2019; Sekhar, 1998). Our study adds to a growing body of literature suggesting that tourism involvement can help to influence local perceptions, fostering a strong environmental ethic and generating more support for protected areas and conservation-oriented policies (Gadd, 2005; Kideghesho et al., 2007; Stronza et al., 2019).

We found that individuals whose livelihoods were directly linked to tourism were significantly more likely to support conservation policies than those who were not dependent on tourism. We also observed stronger support for conservation-related policies (i.e. policies related to wildlife management or wildlife damage compensation) in communities experiencing higher levels of tourism. Support for MMNR itself was similar and generally positive across all communities. These collective results illustrate the positive conservation impacts that tourism can have at the individual and community level, especially when the tourism-conservation linkage supports development goals (Oldekop et al., 2016; Stone & Nyaupane, 2016). Results also align with other research showing that strong public support for parks and protected areas may persist even when positive impacts on local livelihoods are not evident (Martin et al., 2018; Walpole & Goodwin, 2001).

Tourism as a sustainable livelihood strategy

We found that in communities where the presence of tourism was stronger, individuals tended to be less reliant on the natural environment. Our findings support previous assertions that tourism, when used as an alternative livelihood option, may represent a potential strategy for

decreasing reliance on the natural environment by increasing access to other economic opportunities (Nyaupane & Poudel, 2011; Salafsky et al., 2001; Stronza et al., 2019; Stronza & Gordillo, 2008). By reducing pressure on natural resources within a protected area, tourism-focused livelihoods have the potential to build support for biodiversity conservation - a vital theme in livelihood-linkage frameworks (Nyaupane & Poudel, 2011; Salafsky et al., 2001).

Positive attitudes towards tourism in both Loita and Aitong, where reliance on the natural environment remains high, indicates individuals in these communities believe tourism has the potential to improve livelihoods. Communities where positive tourism attitudes are present may be good candidates for expanded tourism development. However, as other researchers have noted (Lele et al., 2010; Sene-Harper et al., 2019), tourism cannot be assumed to work equally across a protected area. Disparities in factors such as access, resource quality, and infrastructure affect the competitiveness and potential of a tourism destination. Therefore, tourism should not be viewed as the only enterprise-based alternative livelihood strategy (Salafsky et al., 2001). A large proportion of residents in all our study communities around MMNR (including Talek, the high tourism community) continue to rely on traditional occupations (e.g., agriculture, livestock) for sustenance. Acknowledging local needs and priorities and effectively leveraging those rural livelihoods alongside tourism can help to enhance resilience and reduce community vulnerability (Mbaiwa, 2011; Powell et al., 2018; Sene-Harper et al., 2019; Wright et al., 2016).

Although tourism may decrease direct reliance on the environment for natural resource extraction and use, tourism development relies heavily on effective management of wildlife-rich protected areas that support high-quality nature-based tourism opportunities (Balmford et al., 2015; Joshi et al., 2017). Protected areas with high levels of biodiversity that are managed for biodiversity protection tend to attract more visitors and generate more revenue (Chung et al., 2018). However, extreme visitation levels also lead to higher levels of resource degradation (Cheer et al., 2019; Larson & Poudyal, 2012). If tourism in a region is not managed in a sustainable way, the linkages between tourism and biodiversity conservation may backfire, leading to negative outcomes (Skibins et al., 2016). As a result, the value of tourism as a form of ICD should not be taken for granted.

Tourism as a mechanism for enhancing community resilience

The concept of resilience, which is typically viewed as a positive indicator of community function and future conservation success, is increasingly recognized as a critical outcome of sustainable tourism (Berkes & Ross, 2013; Cheer & Lew, 2017; Jamaliah & Powell, 2018; Powell et al., 2018). Components of community resilience identified in the tourism literature (Cheer & Lew, 2017) generally align with previously identified themes of tourism-conservation linkages such as community capitals (Stone & Nyaupane, 2016, 2018) and local empowerment and capacity building (Nyaupane & Poudel, 2011). Examining relationships between tourism involvement and resilience at the individual and community level, we found that tourism was associated with resident perceptions of community resilience in multiple ways. At the individual level, individuals with direct links to tourism-based livelihoods reported higher mean scores on all components of community resilience, and significantly higher social resilience scores, than individuals not involved in tourism.

However, when considering aggregated perceptions of resilience at the community level, different patterns emerged. Mean scores pertaining to economic resilience showed no major differences across communities. This supports earlier findings that, although tourism is an important source of income and revenue generation for certain individuals in park-proximate communities, it is rarely the only livelihood strategy fueling local economies. In many cases, a more diverse suite of job opportunities outside of the tourism sector may foster greater economic diversity and resilience (Adger, 2000).

Environmental resilience was highest in the low tourism communities, and many elders in Loita acknowledged the strengths of their unique natural environment and their traditional connection with the landscape. In the other communities, participants described the damage that heavy, tourism-based resource exploitation produced in the Mara's unique ecosystems. Such "overtourism" threatens the social and ecological resilience of park-proximate communities around the world (Cheer et al., 2019), and illustrates how linkages between tourism-centered livelihoods and conservation can break down and generate negative outcomes if tourism is not effectively managed (Larson & Poudyal, 2012).

Social resilience and perceived inclusivity in local environmental governance, which reflect collaborative capacity and local engagement with and control over decision-making processes, are typically key predictors of conservation success (Armitage et al., 2009; Bennett et al., 2019; Berkes, 2004). When present, these factors also help to fuel local empowerment through tourism (Boley et al., 2014; Stronza et al., 2019). We found that individual involvement in tourism yielded few differences in perceptions about social resilience and local environmental governance. However, at the community level, both of these factors were more prominently recognized in Aitong, the moderate tourism community. According to elders in Aitong, community conservancies played an important role in this process, providing an opportunity for community input and increasing support of management decisions. Other studies underscore the value of local empowerment and engagement in decision-making with respect to conservation and tourism development (Boley et al., 2014; Scanlon & Kull, 2009; Snyman, 2012). In fact, community-driven interventions often create the most positive direct linkages between tourism and conservation (Nyaupane & Poudel, 2011; Stronza et al., 2019).

Despite sharing some positive sentiments regarding tourism and conservation efforts, elders in all communities still craved more opportunities for input and engagement in decisions related to MMNR and tourism development. These concerns were most pronounced in Talek (the high tourism community), mirroring governance index ratings and suggesting the influx and inequitable distribution of wealth linked to tourism was exacerbating power disparities and fracturing traditional community processes. In Loita, the low tourism community, elders knew that other communities around MMNR were receiving benefits from tourism and they were hopeful that similar opportunities would open for them in the future. Similar situations where tourism thrives but only a small portion of local residents derive benefits and/or have access to tourism-related opportunities have fueled conflicts in other contexts across many continents (Bruyere et al., 2009; Karanth & DeFries, 2011; Larson et al., 2016; Lee & Jamal, 2008). Around MMNR, as in other locations (Sebele, 2010; Wali et al., 2017), these conflicts might be resolved when tourism benefits and opportunities are more equitably distributed and local residents are empowered to participate in decision-making processes.

Limitations and future research

Our analyses, which revealed a strong influence of both individual and aggregated community level perceptions on the tourism-conservation connection, highlights the need for research at multiple scales, including multi-levels models with larger samples to identify correlates of success (Stronza et al., 2019). While we focused on communities around a government-managed protected area, other types of protected areas, including those that are privately-owned and those built around traditional ecological knowledge and governance structures, could yield unique opportunities and benefits (Roe & Elliott, 2004; Serenari et al., 2017). The geographical scope of tourism-related benefits should also be considered. In Loita, the community farthest from MMNR, tourism involvement and benefits were lower than in other communities. Other research indicates that distribution of tourism-related benefits to communities well outside of protected areas is often negligible (den Braber et al., 2018; Larson et al., 2016), creating potential sources of regional conflict.

We measured outcomes based on local residents' perceptions, a key source of evidence in conservation decision-making (Bennett, 2016). However, future studies could focus on more objective indicators of conservation and/or development goals (e.g., Naidoo et al., 2019), including overt measurement of human behavior (Nilsson et al., 2020). More comprehensive, and perhaps qualitative measures of factors such as conservation support, inclusive governance, and community resilience could be integrated into future work (Stone & Nyaupane, 2018). Because community involvement in local tourism and conservation governance is a key predictor of success, research should also focus on the engagement process and ways it might be strengthened to accommodate more diverse stakeholders (Mbaiwa & Stronza, 2010; Stronza et al., 2019). This might include longitudinal work assessing the long-term impact of particular interventions, including those involving community conservancies (Stronza et al., 2019). Potential for conflict among individuals and within communities due to inequitable tourism benefit distribution could be measured and taken into account. To address these conflicts, researchers and practitioners should continue to explore how ICD through tourism influences the well-being of human and ecological communities that reside close to parks and protected areas (Wilkie et al., 2006).

Conclusion

Previous studies exploring connections between tourism-based livelihoods and conservation have often found the strongest linkages in more developed tourism sites (Chung et al., 2018; Nyaupane & Poudel, 2011). Our results from MMNR in Kenya support this assertion to some degree, but we also discovered one major caveat: high levels of tourism might undermine support for conservation and community resilience, particularly when governance structures are not inclusive and distribution of tourism-related benefits and opportunities are viewed as inequitable. At either end of the tourism involvement spectrum, inequities and disparities (real and perceived) fueled potential conflict, threatened capacity building around tourism-focused livelihoods, and jeopardized community resilience – a key to sustaining positive links between tourism and conservation. While tourism might enhance development of financial capital, such inequities and disparities impede the formation of other forms of community capital (e.g., human, social, political, natural) that reinforce positive linkages and sustainable tourism growth (Stone & Nyaupane, 2016, 2018).

Attitudes towards tourism and support for conservation were most positive in Aitong, the moderate tourism community. Although challenges related to tourism-benefit-distribution were still present, these challenges were not eroding perceptions of inclusive governance and community resilience. Communities like Aitong may represent sweet spots where tangible benefits linked to tourism are recognized by individuals, and social and political structures support opportunities for expanded local involvement and equitable benefit distribution at the community level (Mbaiwa & Stronza, 2010; Rasoolimanesh et al., 2017; Stronza et al., 2019). In these situations, well-managed tourism development can achieve key goals of ICD: fostering support for protected area conservation and enhancing community resilience. Other studies in Africa have examined the “spiraling up” of community capitals linked to participation in tourism, highlighting potential mechanisms to help explain these synergistic gains for individuals and communities (Stone & Nyaupane, 2018). In places like MMNR, we urge park managers, tour operators, and local communities to strive to find a tourism sweet spot where local residents are empowered, economic inequality is reduced, and natural resource conservation is embraced. In such situations, links between tourism, protected areas, and local livelihoods become more direct and resilient, aiding in the joint achievement of conservation and development goals.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributor

Dr. Holland is currently a faculty member in the Department of Environmental Sciences at the University of North Carolina Wilmington. Dr. Holland joined the faculty at UNCW after completing her PhD in Parks and Conservation Area Management at Clemson University. Before that, Dr. Holland earned her Master's in zoology from Miami University and a B.A. from the University of North Carolina Chapel Hill in Biology and Education. Dr. Holland's research and teaching interests include protected area management, human-wildlife conflict, community-based natural resource management and wildlife tourism. Her work has taken her to 6 continents to explore and experience the many opportunities and challenges associated with protected area management.

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