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Article

The Role of Participant Learning in Community Conservation in the Arabuko-Sokoke Forest, Kenya

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Abstract

While the community conservation approach has gained broad acceptance, questions regarding its effectiveness persist. Many of the changes that community conservation projects seek to impart among participants correspond with their values and attitudes. This paper proposes the use of transformative learning as one of the measures of the success of a community conservation project in terms of promoting learning that leads to significant changes in a participant's values and attitudes. Using the ASSETS programme in coastal Kenya as a case study, we focused on participant learning and the extent to which such learning resulted in a more positive attitude towards conservation of the Arabuko-Sokoke Forest. Participation in ASSETS resulted in instrumental learning and communicative learning, as described in the transformative learning theory. Findings show that participation in ASSETS led to a variety of learning outcomes, such as learning new information about the forest, and learning to question local cultural norms and speak out for conservation.

Keywords: community conservation, individual learning, transformative learning, Arabuko-Sokoke Forest, Kenya

INTRODUCTION

The shift towards more participatory approaches to conservation is occurring in many regions of the world including Africa (Hulme & Murphree 1999), where community conservation projects employ a variety of tools designed to involve locals in conservation efforts, and to foster a more positive view of wildlife and conservation in the target community. Community conservation projects generally provide some economic incentive for conservation, e.g., by allowing communities to profit from entrance fees or through the provision of education, health, or other services (Hackel 1999).

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While this approach has gained broad acceptance, there is no conclusive evidence that the community conservation approach either promotes local development or effectively preserves biodiversity (Hackel 1999; Hulme & Murphree 1999; Infield & Namara 2001). In their study of participants in a community conservation project near a national park in Uganda, Infield & Namara (2001) found that attitudes toward the park were more positive in communities that had received intensive community conservation programming. However, nearly half of the respondents said they saw no benefit of living near the park, despite having received seven years of programming, and demands for access to natural resources in the park increased after the programme (Infield & Namara 2001). In a study of tourism revenue-sharing programmes near Ugandan national parks, Archabald & Naughton-Treves (2001) found that many respondents reported improved attitudes towards nearby national parks. Other studies, such as Boonzaier (1996: 307) have found, however, that attitudes of some locals towards conservation could become more 'cynical and ambivalent' following the establishment of a protected area with eco-tourism and revenue-sharing. In an analysis of

community-based natural resource management projects in Kenya, Nepal, and the US, Kellert *et al*. (2000: 705) found that there were 'serious deficiencies' in the projects with regard to both social and environmental indicators, which were much more pronounced in the Kenyan and Nepali contexts. Kellert *et al.* (2000) assessed a number of indicators and found that the Kenyan project failed to achieve broad empowerment and led to an uneven distribution of benefits, with power and benefits often concentrated in certain groups (Kellert *et al.* 2000).

Assessments of community conservation have, however, tended to be technical in nature and have perhaps not captured other important changes in individuals that go beyond a strict analysis of change in household income or the number of a particular species protected. As Keen *et al.* (2005: 6) outline, "[s]ocial and ecological sustainability ultimately depend on our capacity to learn together and respond to changing circumstances". Learning contributes to the establishment of effective partnerships for environmental management (Maarleveld & Dabgbégnon 1999; Keen *et al.* 2005), and learning experiences "re-establish the mental connections between our actions and environments, thus creating pathways for social change" (Keen *et al.* 2005: 8). As many of the changes that community conservation projects seek to impart correspond with the values and attitudes of participants, promoting learning that leads to changes in participants' behaviour is critical, but largely ignored in resulting assessments.

Transformative learning, a theory of how adults learn, is a promising theoretical framework for approaching learning that promotes the individual and social change necessary for more sustainable outcomes, like biodiversity conservation. Transformative learning theory attempts to provide a comprehensive theory of adult learning within different cultural contexts (Mezirow 1994, 1995, 1996, 2000, 2008; Clark & Wilson 1991; Merriam & Caffarella 1999). As such, the theory describes all the kinds of learning that adults can achieve, but not all learning described by the theory is transformative. Rather, the theory describes a process by which learning may result in changes of one's normative ideologies and it is when (and if) learning reaches this point that it is transformative (Clark 1993; Mezirow 1995, 1996, 2000; Diduck 1999; Sinclair & Diduck 2001). Such learning helps adults realise their potential for becoming more liberated, socially responsible, and autonomous learners, and to develop a more discriminating understanding of their experiences as a guide to action (Mezirow 1995). The theory explains how people construct more dependable interpretations of life, through a process of critically reflecting on the context of their beliefs and underlying assumptions, exploring new ways of being and relating to others, making decisions based on the new insight they have gained, and taking action or making changes based on this insight (Mezirow 1994, 2000). It is this type of learning that may facilitate the individual and social change needed for more effective conservation initiatives.

An assessment of learning outcomes based on transformative learning should shed insights into the values, beliefs and behaviors that promote conservation. The learning outcomes established in the research we carried out were analysed based on instrumental and communicative learning outcomes—the two principal categories of learning established in transformative learning theory. These stem from Habermas' (1972, 1981) identification of types of learning and problem solving. Both instrumental and communicative learning have been identified as being able to create transformative learning—learning that changes an individual's frame of reference, or worldview, and therefore has the potential to foster sustainability (Kerton & Sinclair 2010).

Instrumental learning is often task-oriented and has to do with improving performance and learning effective means to reach desired ends (Mezirow 1997). Instrumental learning has a number of characteristics: attainment of skills or information—things learnt may be tested empirically (such as how to plant a tree), determination of cause-effect relationships—such as the connection between deforestation and aridity, and task-oriented problem solving (Mezirow 1995). A central tenet of instrumental learning is assessing truth claims (Mezirow 2003).

Communicative learning involves understanding purposes, values, beliefs, intentions, and feelings that stem from underlying assumptions. This is reflected in transformative learning theory because in order to do this, learners must become critically reflective (Mezirow 1997). In doing so, the learner usually engages in discourse with at least one other person in order to "reach an understanding of the meaning of an interpretation or the justification for a belief… We engage in discourse [and] to validate what is being communicated" (Mezirow 1997: 6). In this way, learning is a social process, and discourse is central to understanding meaning. Mezirow defines discourse as dialogue devoted to "assessing reasons presented in support of competing interpretations by critically examining evidence, arguments, and alternative points of view" (Mezirow 1997: 6). An example of communicative learning is discourse and critical reflection among forest-adjacent residents on livelihoods based on forest harvesting rather than land clearing for agriculture.

Jha-Thakur *et al*. (2009: 133) note that, "[l]earning, particularly transformative learning, is an established feature of environmental planning, management and assessment". The public participation component of environmental management thus often provides opportunities for non-formal education, such as transformative learning (Sinclair *et al.* 2008; Percy 2005; Fitzpatrick & Sinclair 2003; Diduck 1999, 2010; Webler *et al.* 1995). In the context of biodiversity conservation, a process of transformative learning could lead participants in a community conservation project to begin to question their attitudes towards conservation, or on the need for a change in the objective conditions within which they live. For example, a participant who formerly had negative views of wildlife and conservation could begin to question the validity of those assumptions. This could potentially lead to a transformation of behaviour, where the participant decides that conservation of biodiversity is a laudable goal and, correspondingly, makes changes in his or her own life to help protect biodiversity. A

person could also learn that the problem that a conservation programme is trying to solve has more to do with a need for change in the ways that laws (such as those about forest use) are enforced (or benefits are distributed). This could spur the development of a local group to push for change such as sustainable farming practices as Sims (in review) found in her work with farmers in Costa Rica, or for the formation of Water Users' Associations to manage water use conflicts among irrigation farmers, ranchers and communities on the slopes of Mt. Kenya (Kiteme & Gikonyo 2002).

Our research set out to determine, therefore, whether participation in a community conservation programme in Kenya's Arabuko-Sokoke Forest resulted in individual and transformative learning by participants, and whether such learning leads to action on conservation and sustainability. We also sought to establish whether considering learning outcomes are helpful indicators for determining and measuring sustainability goals in such programmes.

STUDY AREA

Kenya's Arabuko-Sokoke Forest and neighbouring Mida Creek are biologically diverse, productive systems and are home to numerous endemic and endangered plant, bird, butterfly and mammal species, such as the golden-rumped elephant shrew (*Rhynchocyon chrysopygus*) (Burgess *et al.* 1998). The 370 sq. km Arabuko-Sokoke Forest, a designated forest reserve, is the largest remnant of a coastal forest complex that once stretched from Mozambique to Somalia (Burgess *et al.* 1998). The eastern arc and coastal forest complex of Kenya and Tanzania, in which the forest is located, has been identified as one of the top 25 biodiversity 'hotspots' worldwide (Myers *et al.* 2000).

While the towns on the eastern edge have more amenities to service the tourist industry along the Gede-Malindi coastal strip, most of the approximately 104,000 people surrounding the forest are small-scale farmers, and many are among the poorest in the country (ASFMT 2002). Although extraction of forest resources is illegal, many residents rely on the forest to meet their basic needs. As a result, illegal extraction of firewood, small mammals, wood for building (poles), timber, charcoal, and wood for the carving industry, is considered a threat in the forest (ASFMT 2002). Although Kenyan law does not permit the harvesting of bush-meat, FitzGibbon *et al.* (1995) found that 62.7% of interviewed households living adjacent to the forest, and 33.3% of interviewed households living within 2 km of the forest were engaged in hunting and trapping activities within the forest.

Some forest-adjacent residents have not been enthusiastic supporters of conservation efforts in the Arabuko-Sokoke Forest. In fact, one study noted that participants in a community conservation programme who opposed the degazettement of the forest have sometimes received death threats from other residents who suspect them of informing forest management officials of illegal activities taking place within the forest (Gordon & Ayiemba 2003). A 1993 study found that nearly 60% of forest-adjacent residents interviewed indicated that they would be happier if the forest were not there at all, and over 80% of the residents supported clearing the forest for farming (Maundu 1993). Forest-adjacent residents, many of whom have land-holdings insufficient for the size of their family, see the forest as a source of new farm land and feel that the removal of the forest would also be a solution to the animal problems many residents experience. The forest is home to a number of animals including elephants, wild pigs, baboons, and monkeys, and there is a marked decrease in food production with proximity to the forest due to the damage caused by wildlife.

Because of its unique situation, the Arabuko-Sokoke Forest has received considerable attention from international development and conservation organisations, including BirdLife International (formerly known as the International Council of Bird Preservation), who along with the European Union and the United Kingdom Department for International Development contributed to the development of the Arabuko-Sokoke Forest Strategic Forest Management Plan 2002–2007. These agencies continue to support Arabuko-Sokoke Forest conservation. The United States Agency for International Development, through its Forest Range Rehabilitation and Management Strengthening Programme, supported enhanced forest management in the forest. There are also a number of nature-based enterprise projects surrounding the forest, the oldest and most well known being the Kipepeo Butterfly Project, which has operated since 1993 (Gordon & Ayiemba 2003). This project trains farmers living near the forest to raise butterflies, the pupae of which are sold in the international market. The project also operates a butterfly visitor and education center at the Gede ruins, a popular tourist site.

Kilifi district, home to a large portion of the forest, is among the poorest regions in Kenya, and residents are confronting a myriad of social and environmental challenges. About 67% of the population cannot meet the minimum cost of food and non-food items essential for basic needs and are considered absolutely poor (National Coordination Agency for Population and Development 2005). The high incidence of poverty is attributable to extreme climatic conditions (drought and flooding), low levels of education, and land tenure patterns, among others. The district HIV prevalence rate is 1.9% among adults (National AIDS Control Council 2007). A large number of orphans and a high rate of school dropouts also characterise the district. These problems are compounded by the very high birth rates in the area. As an example, between 1999 and 2005, the Kaembeni sub-division grew by 60% through births, not migration.

Forest-adjacent communities have identified secondary (high) school accessibility as one of their major concerns, as tuition is well beyond the means of many local residents (only primary school is free). In 2001, A Rocha Kenya, the Kenyan affiliate of the international Christian conservation organisation A Rocha, initiated the ASSETS (Arabuko-Sokoke Schools and Eco-tourism Scheme) programme in communities surrounding the Arabuko-Sokoke Forest and the adjacent Mida Creek mangrove. Its goal is to conserve biodiversity

and to increase benefits that the local community receives from eco-tourism activities such as wildlife viewing, bird watching and nature walks (A Rocha Kenya 2009). Proceeds from eco-tourism activities are used to fund secondary school bursaries for families (of any religious background) in need, living within 3 km of the forest or creek. Bursary recipients and parents, as well as other pupils and residents from participating schools and communities, receive environmental education on threats faced by the forest and creek, bird migration and their conservation challenges, the marine ecosystem and turtle conservation, as well as drug use and abuse, and HIV/AIDS and prevention. Participants also engage in practical conservation activities such as joining Wildlife Clubs, establishing tree nurseries and planting trees, and training in conservation-related technologies (beekeeping, energy efficient stoves). The idea for the bursary scheme came out of discussions between the Director of A Rocha Kenya, officials of the Forest Dwellers Association, and other local officials involved in conservation and environmental education. International donors also support the bursaries.

Students apply for the programme during their last year of primary school. Recipients are chosen based on willingness to participate in the conservation scheme, family need (number of dependents, state of family house) and academic ability. The bursary pays 30–70% of tuition (not books, uniforms or boarding costs), depending on need, and is paid directly to the school. The amount may also vary by school as national, provincial and district level schools all set different tuition rates. ASSETS funded 5,634,557 KES in bursaries from 2001–2008 (A Rocha Kenya 2009). The average bursary was KES 9,305 in 2008 or about 53% of total tuition. Since inception, the programme has provided secondary school bursaries to 317 students in eight schools (A Rocha Kenya 2009). 100 students have graduated (of the remaining 217 recipients, 157 are males and 60 are females). Plans are to expand to all 36 schools within 5 km of the forest by 2015.

In return for the bursaries, children and their guardians participate in educational meetings on topics of conservation and the environment, and commit to forest conservation through signing a pledge form. ASSETS aims to reduce pressure on the forest and adjacent creek in a number of ways (A Rocha Kenya 2005, 2009; ASSETS 2005, 2007) as outlined in Table 1.

While ASSETS is open to participants of all religions, religious affiliation may affect school choice (Christian or Muslim), and may affect learning outcomes regarding values and beliefs. Nationally, Kenya is about 80% Christian, although the Coast Province is 50% Muslim (USDS 2007). The number of religious adherents at the district level is more difficult to assess but one recent study of Kilifi estimated 47% to identify as Christian, 13% Muslim, 24% Traditionalists, 12% 'other', and 4% unknown (Centre for Geographical Medicine (Coast) 2005).

The ASSETS programme is jointly managed by A Rocha Kenya and a committee consisting of representatives from several government, non-government and community organisations, including Kenya Wildlife Service, Kenya Forestry Research Institute, Kenya Forest Service, National Museums of Kenya, Ministry of Education Offices (Malindi and Kilifi), Mida Fishing Community, Forest Adjacent Dwellers Association, A Rocha Kenya and Nature Kenya. Implementation of ASSETS activities is the responsibility of a fulltime coordinator and part-time/volunteer community extension officers, conservation assistants and an administrator.

APPROACH

This study took a qualitative, case study approach, examining the ASSETS project, with a focus on participants who had attended Bogamachuko Primary School, in Kaembeni sub-location, on the western edge of the forest. Bogamachuko is the only primary school in Kaembeni, an administrative division home to an estimated 6000 people, at the end of 2005. Nineteen ASSETS households from Kaembeni participated in this research, representing 27 recipient students. A complete list of ASSETS participants in Kaembeni was obtained from A Rocha, and then directions to each homestead was obtained from the teachers and Head Mistress at Bogamachuko Primary School. A Rocha staff were not involved in contacting families or conducting interviews. Fourteen non-recipients in Kaembeni and three ASSETS households from the eastern edge of the forest were also part of the case study. Interviews were also conducted with a number of key informants including local government and forest officials, and representatives from conservation organisations and the local residents' association.

Methods relied primarily on semi-structured interviews

Table 1

ASSETS approaches to reduce pressure on the forest

- Bursary recipients and their families must refrain from illegal extraction and harvesting from the forest, therefore reducing the pressure on the forest and creek.
- Providing financial assistance to families lessens their need to harvest illegally.
- The bursaries are funded by eco-tourism (e.g., entry fees). The ASSETS programme raises awareness that this income is dependent on a healthy and diverse natural environment.
- Participant families are given seedlings in order to plant their own wood lots, lessening their need to harvest firewood from the forest.
- Bursary recipients and their parents participate in a variety of conservation-related activities, including videos, games, and facilitated talks, providing numerous opportunities to learn about conservation and the environment.
- By increasing education levels in the region, the programme hopes to reduce poverty in the long run, further reducing demand on the natural resources in the forest and the creek.

following Foddy (1999), and Merriam (1998). The interview schedule covered a range of topics, including discussion regarding tourism in the forest, forest use and conservation, the challenges and benefits associated with the forest, their participation in ASSETS, and their understanding of the programme's goals, as well as more specific questions about learning, and participant values and attitudes towards the forest and its conservation. Drawing on our combined experience of over 20 years in designing and conducting field research on community-based projects in Kenya and elsewhere, all three researchers spent time in the field, participated in selecting the study site and designed the research. None of the researchers were involved in implementing the ASSETS programme. One of the authors (Collins) resided within the community in Kaembeni and carried out the interviews, with the assistance of one translator, who was fluent in English, Swahili and Giriama. The interview questions were normally answered over the course of 3–4 hours, but the semi-structured interview format provided considerable flexibility in the field. The research also drew upon other methods of participatory rural appraisal, including transect walks and participant observation (Chambers 1994). Transect walks were conducted near and within the Arabuko-Sokoke Forest with some participants, which helped us gain insight into the participants' resource use activities and their attitudes towards the forest. Participant observation was conducted throughout the research period by staying at a local elementary school, and participating in community life by working in the fields and attending community events. The study also incorporated a review of reports and published information, and key informant interviews. Data analysis began in the field with the organisation and transcription of the data. The transcribed data was then explored, coded and sorted into themes using QSR NVivo coding software (QSR 1999–2002). Constructs derived from the learning literature were used to sort and code the data into data segments allowing the development of families of codes or themes. These codes and themes serve to validate types of learning outcomes among participants and non-participants.

This research focused on the parents and guardians of ASSETS recipients, rather than the students, as adults make most resource use decisions and many secondary school students board at their school. Although demographic indicators, like age, income, and education were generally consistent among the participants, the ASSETS participants did vary in some ways: their relationship to the child (whether they were their parent or sibling), their involvement in other conservation projects, the number of years they had been involved in ASSETS, the number of recipient children they had, and the number of meetings they had attended. To further verify the learning outcomes of ASSETS participants, interviews were carried out with Kaembeni residents who were not ASSETS recipients. These non-participants were selected to correspond with the general location of ASSETS residents in relation to the forest. The results and comments for both groups of participants reported here represent the views of a majority of the respondents that we interviewed. Unless otherwise indicated, the names associated with the quotes used are not those of the actual participants and each name used refers to a different person.

INSTRUMENTAL AND COMMUNICATIVE LEARNING OUTCOMES

As established above, transformative learning is a theory of adult education that describes the process by which people construct more dependable interpretations of life, by assessing the context of their beliefs and opinions, seeking informed or negotiated agreement, and making decisions based on the insight they gain (Mezirow 2000). Learning outcomes of the participants in this research were analysed based on two principal categories established in the transformative learning literature: instrumental and communicative learning.

Instrumental Learning Outcomes

Instrumental learning is task-oriented or skills-based learning and includes learning new information and learning to deduce cause-effect relationships (Mezirow 2000). Participation in ASSETS led to a variety of instrumental learning outcomes as outlined in Table 2.

Through their attendance at ASSETS meetings and interactions with ASSETS staff, participants acquired new information about the forest and the species within. Parents participated in a variety of conservation related activities, including games and facilitated talks, which provide numerous opportunities to learn about conservation and the environment as established in Table 1. As a result of this interaction ASSETS staff have a strong rapport with the parents. Parents are encouraged to ask questions, and the meetings often turn into informal discussions about different conservation related issues. In the past, ASSETS staff has shown videos about conservation and the environment, though this activity is often limited by a lack of electricity in the community. One participant became very knowledgeable about the birds of the Arabuko-Sokoke Forest and the ongoing bird banding being conducted by biologists:

Table 2

ASSETS instrumental learning outcomes

New information	New information about the Arabuko-Sokoke Forest; forest species; and forest ecology Trees can be grown on-farm and sold for income Understanding of ASSETS; its goals, operation and management Understanding of tourism in the Arabuko-Sokoke Forest; why tourists visit and what they like
New skills	Tree planting: spacing; watering; protection from domestic animals
Deducing cause-effect relationships	Connection between deforestation and aridity
Learning to share ideas	Telling others about conservation and the importance of the Arabuko-Sokoke Forest

> We heard that the forest has 273 species of birds and that some are only found in the Arabuko-Sokoke Forest… The forest attracts migratory birds and they are being identified by rings (Michael, ASSETS participant).

A number of the participants learnt about the elephant shrew (*Rhynchocyon chrysopygus*) an endemic species found in the forest:

> Through research that was done in all the other forests, they found that the elephant shrew was only found in this forest (Diana, ASSETS participant).

Participants in Mida learnt about the connection between the Arabuko-Sokoke Forest (known locally as the 'dry forest') and the mangrove forests that border their *shambas* (farms):

> What I've concluded is that the mangrove survives from trees in the dry forest. If the Arabuko-Sokoke Forest is cut down, then there will be no water into the mangroves, and the mangrove will also die. If it dies, the ocean water will come and destroy our crops (Karin, ASSETS participant).

In terms of task-oriented learning, ASSETS participants learnt about tree planting on their farm, such as how to space trees when planting them, how often to water trees, and how to protect young trees from farm animals. Although tree planting is not a major component of the ASSETS programme, it is encouraged, as it provides farmers with extra income and lessens their need to go to the forest for wood products. Given these desired outcomes the focus is primarily on fast-growing exotic species like *Casuarina spp.* (whistling pine) that can be harvested in 3 to 4 years, but some *Gmelina arborea* (white teak) a fast-growing deciduous tree native to the Indian sub-continent is also planted:

> Through the education we received [through ASSETS], it has helped us. I have started a nursery and planted trees... We were given seedlings and taught about how to raise a nursery (David, ASSETS participant).

> I have changed, because a long time ago, I planted *casuarina* trees but now I know to plant them a certain space apart. I used to plant them close, but now I plant them further apart (Gloria, ASSETS participant).

> I learnt how to take care of trees… I learnt that you need to water during dry season until the trees grow big. I also learned about weeding (Grace, ASSETS participant).

A perceived cause-effect relationship between deforestation and aridity was frequently mentioned by participants. When asked about the benefit of the forest, nearly all of the ASSETS recipients mentioned the 'attraction of rain'. This form of local knowledge pre-dates ASSETS interventions but has little scientific explanation. Perhaps the vast coastal forest influenced local rainfall patterns prior to deforestation, for example. Many of the recipients had 'always known this', or had learnt it long ago in school. At the farm level for instance, planting trees will not literally attract rain to a specific farm, though it may prevent erosion and topsoil loss. The introduction of the ASSETS programme in Kaembeni happened to correspond with a severe drought in the region. ASSETS' message, that deforestation is connected with aridity and environmental degradation, seemed to have special significance to the participants given the environmental conditions they were experiencing. As one participant summarised:

> During the olden times, there were so many trees and closed forests; we had good harvests. There were less people and less cutting of trees. We used to receive a lot of rain … now, the harvests are very poor (Diana, ASSETS participant).

Other participants came to a similar conclusion based on the history of harvests and deforestation:

> I can't understand how [this works], but during the past years we used to harvest a lot and now our harvest is poor, but we used to have more trees … I see there is a difference in the weather conditions. I connect the poor harvests with the trees, but I don't know [the scientific details of this] (Jacob, ASSETS participant)

> If the forest were given out to farming we would get some more *shamba* but there would be no rain. It's better we receive the rain on a small *shamba* than no rain on a big one (Jacob, ASSETS participant).

Implications of the perceived relationship between trees and rainfall is discussed further below.

Communicative Learning Outcomes

As opposed to instrumental learning, where competency is measured in terms of being able to complete a given task, communicative competence "refers to the ability of the learner to negotiate his or her own purposes, values, feelings, and meanings rather than to simply act on those of others" (Mezirow 2000: 10). Communicative learning involves understanding, questioning, and negotiating cultural and normative values. While instrumental learning outcomes were more common, participation in ASSETS did lead to communicative learning outcomes for half of the participants. For example, participation in ASSETS led to a change in attitudes, as some participants began to see a value in the forest and its conservation and take steps to support conservation and address issues of illegal extraction, such as breaking the local norm and confronting neighbours involved in illegal activities.

In terms of changing attitudes, some ASSETS participants reported that they thought differently of the Arabuko-Sokoke Forest after having participated in ASSETS. After benefiting from the forest through the bursaries and learning about the

benefits of a forest, parents had a new appreciation for the forest and valued it differently:

> I have new thoughts, since the past years I have seen the forest as an area where people could get land for farming... Through participating in the meetings I have learnt that even if the forest is given out to people as *shambas* [farms], they will plant it, and in a few years the conditions will worsen here because there is no forest (David, ASSETS participant).

> …now I feel that the forest should be conserved. If everyone was thinking the way I am there would be no problem, we wouldn't need the guards. But, some people are caught by the government, which means that my thoughts are different from the thoughts of others (Anna, ASSETS participant).

> I used to feel that people should go freely [without a license] for firewood and for poles… but since joining [ASSETS] I feel that restrictions are better (Martina, ASSETS participant).

> Since before, I knew the forest was restricted. But, when I joined the organisation that's when I felt like protecting the forest so that those items [plants and animals] in the forest can be preserved so they increase (Lisa, ASSETS participant).

The issue of illegal extraction from the Arabuko-Sokoke Forest is highly sensitive and confronting another person about their use of the forest is uncommon since people generally fear reporting others to the Forest Department patrols. Nevertheless, some ASSETS participants now felt it was appropriate to take action and to tell others about the importance of the forest.

> The community should all come together and keep an eye on each other. If we see someone cutting trees we should tell them to stop... if we could join together for conservation we could be heard and make some difference. Many voices are difficult to ignore, we have more strength together (Rebecca, ASSETS participant).

Some participants began confronting those people they knew to be involved in illegal extraction:

> Before I joined ASSETS I would see people cutting trees for poles and I would think it's alright. But after I attended the meetings with A Rocha I can tell people about the importance of trees… I explain the benefits people can get and the destruction they can cause by cutting trees (Marlene, ASSETS participant).

Transformative Outcomes

Transformative outcomes, or transformations in personal perspective or paradigm, were less common among participants, with James being the most notable example of instrumental and communicative learning leading to behaviour change of a transformative nature. For James, transformative learning emerged from his role as a community leader, and his involvement in a number of projects, including ASSETS.

James' Story

As a local leader committed to education, James saw the effect that conservation organisations like ASSETS were having on schools and students in his area and decided to take action. An ASSETS parent himself and a participant in many local organisations, James took up the cause of forest conservation and began spreading the word. When he became aware of local residents involved in illegal activities in the forest he, along with one or two friends, began visiting these residents to tell them about the benefits of the forest and warn them of the consequences of being caught poaching. Although sometimes received warmly, he has also suffered 'verbal abuse' from his neighbours. But when one such abusive neighbour was caught in the forest it was James and his friends who paid his fine.

What separates James from other participants was the action he took; standing up for conservation in Kaembeni involves questioning cultural norms:

> Before I joined ASSETS, I could see people coming out of the forest with poles or logs for carvings and I wouldn't pay any attention to them. But, after joining in ASSETS I have the confidence to tell people coming out of the forest about the importance of the forest and about conserving it, and I'm doing it.
>
> *How do people react?*
> They normally ask me questions and I answer them, until we come to an agreement and he says, 'yes, even me, I see the importance of the forest'.
>
> *What things do you tell them?*
> So, I normally tell them that if we destroy the forest we'll be missing some benefits from organisations like A Rocha that help us, and if we destroy the forest it will be gone forever and future generations will be told, 'there used to be a forest here'.
>
> *What types of questions do they ask? [when you confront them]*
> Like, 'why should we conserve it?' 'what benefit will we get?' some even say it should be divided into *shambas*. Some give the suggestion that if the forest is cleared there will be no elephants to destroy our crops.
>
> *Do you think many people have changed?*
> Yes... We have a neighbor on my other *shamba* who used to cut poles from the forest for his own use and for selling. After selling, he takes palm wine and I went to visit him with 2 others and threatened him that the consequences of being caught in the forest is a 50,000 KES fine, or going

to jail for two years, so what will your family eat [if you're in jail]? He listened to us and he stopped, and we advised him to give his children at least 1 hour every night to study. So, he gave them that time and then he came back to visit us and said thank you, and that he now understands the importance of the forest, and that he'll emphasise that his children perform well on the final exam next year [to be accepted into ASSETS]...

You go and visit the people you know who are in the business? There was another incident, we saw someone cutting poles and we arranged to meet him. When we went to his home he was so harsh to us so we decided we couldn't speak to him. Unfortunately, later one day he went to the forest and was caught by the Forest Department rangers. After this, he sent someone to each of the 3 [who had visited him] and asked for 1,000 KES each, we came up with 2,000 KES and gave it to him [to pay to get him released]. After he was released he came back and told us, 'that day I made a big mistake in yelling at you, maybe you cursed me and that's why I was caught'.

Given that many residents are unlikely to report others for illegal activities, personal intervention from a respected community member has the potential to change the way people view the forest. When asked why he took this action, James responded that he simply saw it as his duty. He had realised the importance of the forest in providing benefits to his community and decided he had to tell others:

I was among the leaders of this community, if you're a leader and you mishandle important information then the rest will mishandle it. If you're the leader and you see the importance of it [the forest], it will start with you and the rest will follow.

COMPARING NON-PARTICIPANT AND PARTICIPANT PERSPECTIVES

Non-participant households were chosen to geographically correspond with participants, as someone's proximity to the forest (and proximity to animal problems) often corresponds with their attitude towards the forest. We wanted to speak to non-participant families to examine if and how any learning outcomes were communicated by participants to non-participants. In the end, the difference in attitudes between participants and non-participants indicated by the data provided an interesting comparison, and suggested that ASSETS is having an effect on how participants view the conservation of the Arabuko-Sokoke Forest (Table 3).

While non-participant and participant responses were similar in some respects, for instance in their understanding of why the Arabuko-Sokoke Forest is being conserved, they were markedly different in other regards. ASSETS participants were much more positive about the forest and its conservation: they were more aware of the benefits of the forest, were happier living near a forest and the animals within, and did not want to see the forest destroyed or converted to farmland.

Previously Documented Views

In 1993, Maundu (1993) conducted a study of attitudes towards the Arabuko-Sokoke Forest in forest-adjacent communities in advance of the Kipepeo Project. Three questions from this survey were included in this study in order to provide a comparison: *Is the forest of any value or significance to you? Would you be happier if the forest were not there? Would you be happier if all or part of the forest was given out for shambas?*

In the 1993 study, it was reported that approximately half of the forest-adjacent residents questioned indicated the forest was of value to them and 59% indicated they would be better off if the forest were not there (Maundu 1993). In contrast, ASSETS participants expressed overwhelmingly that the forest was of value to them and that removing it would not be advantageous, as the forest provides a number of benefits, such as the bursaries, attracting rain, diversity of birds and other wildlife and acting as a windbreak, which can all be associated with the instrumental learning outcomes of ASSETS participants. Many non-participants indicated that the forest was of no value to them, and that they would like to see it cleared, because of the damage they suffer from crop-raiding animals and because they want access to more farm land:

Table 3

ASSETS participant and non-participant perspectives contrasted*

	ASSETS participants	Non-participants
Why is there an interest in forest conservation?	Forest/trees attract rain; forest generates income (for government, from tourists)	Forest/trees attract rain; forest generates income (for government, from tourists)
Is the forest under threat?	Under threat/doing fine (tie); not sure	Forest is doing fine; not sure
How to help the forest?	The rangers should catch people; people should stop stealing trees	The rangers should catch people; people should stop stealing trees
How to hurt the forest?	Sneaking in to steal/cut trees	Sneaking in to steal/cut trees
Is the forest of any value or significance to you?	Yes, it is of value (95%)	Yes, it is of value (57%)
Would you be happier if the forest were not there?	No (all respondents)	Yes/ No (tie)
Would you be happier if all or part of the forest was given out for *shambas*?	No (all respondents)	Yes, clear forest for farms (53%)

*Where more than one response is listed, the first was the most popular response

> [T]o value something it needs to be a help to you. We get no assistance or benefit from [the forest], only problems: the elephants that will come and kill us in our homes (Cathy & Sharon, non-participants).

In 1993, Maundu also found that the vast majority of those forest-adjacent dwellers interviewed favoured clearing the forest for *shambas*. In our study, none of the ASSETS participants interviewed favoured clearing the forest, as they had learnt of the cause effect relationship between forests and rain, and because they understood bursaries would stop if the forest were cleared:

> It's only 20 years ago that this area was full of trees, just like the forest. It only took a few years for it to be cleared, now the trees are gone and it's dry. So, if the forest were divided into *shambas* it would only take a few years, then it will be dry like here. Then, we'd have nothing (Abraham, ASSETS participant).

Only non-participants indicated that they would favour clearing the forest for farming, either because people would get farms or because the animals would go away.

Why Conserve the Forest?

Most of the individuals interviewed in this study were aware that the Arabuko-Sokoke Forest was being conserved, but were often unaware of why this was so. When asked to explain *why* the forest had attracted such conservation interest, the most frequently cited response was that trees and forests attract rainfall. The popularity of this response is not surprising, as ASSETS staff, government officials, the school curriculum, and traditional beliefs all teach about and stress the connection between trees and rain. Additionally, weather conditions in coastal Kenya have been quite arid in the years before this study. Many respondents recognised that deforestation had occurred in their region in recent decades, and some people linked the recent aridity to this deforestation.

Another popular perceived motivation for the conservation of Arabuko-Sokoke Forest was the (non-bursary) financial benefits derived from the forest. Respondents understood that the forest generated income for the government, and indicated that that income was the motivation behind conservation efforts.

A number of respondents, both ASSETS participants and non-participants, felt that the forest was being conserved because of the animals living within it. This view is likely a relic of decades of mega-fauna focused conservation efforts in Kenya. A handful of respondents felt that conservation for the animals' sake was an important goal, expressing sentiments such as "I've seen an elephant and a *dik dik*. It's a value to see and know the animals" (David, ASSETS participant). However, many ASSETS participants had learnt instrumentally about bird and animal species in the forest, which likely impacted their attitude. For the majority of respondents, however, animal conservation was not personally important, but a government objective: "the government and the *wazungus* [Whites/Europeans] own the animals so they want the forest to be conserved [because they benefit from it]" (Lisa, ASSETS participant).

Other reasons for conservation mentioned by participants included benefits such as: the forest acts as a windbreak, the forest should be conserved so that future generations can enjoy it, the forest brings the rain, the forest provides non-timber forest products like wild aloe and traditional medicines, the forest provides wood resources like firewood, and the forest brings ASSETS bursaries.

Forest Threats and Solutions

A third of the ASSETS participants interviewed indicated that the forest was under threat. Their understanding of this corresponds largely to communicative learning outcomes about issues such as illegal activities in the forest, something also stressed by ASSETS staff, or because of their experience with the forest they had noticed a change over time:

> It's under threat because I know there are people who sneak in, even though it's restricted (Karin, ASSETS participant).

> There has been a change since I've been here: there's been a reduction of trees (Diana, ASSETS participant).

> [There's] a certain type of tree, I used to see when travelling from here to Matsangoni, but now, they are nowhere to be seen in the forest or around the homesteads. That tree is *Muhuhu* (Abraham, ASSETS participant).

Most non-participants and a number of ASSETS participants indicated that the forest was 'doing fine':

> The forest is doing fine. If people were using it too much it would already be finished. The forest is still there, the trees are doing fine. The forest is the same as in the olden days (Brandon, non-participant).

DISCUSSION AND CONCLUSIONS

Participation in the ASSETS programme led to a variety of instrumental and communicative learning outcomes, such as learning new information about the Arabuko-Sokoke Forest, learning new skills like tree planting, and learning to question local cultural norms and speak out for conservation. This supports the findings of others that have considered adult learning through participation in resource management and environmental decision-making (e.g., Sinclair *et al.* 2008; Sims & Sinclair 2008; Diduck & Mitchell 2003; Fitzpatrick & Sinclair 2003; Palerm 2000; Webler *et al.* 1995). In this situation, a majority of ASSETS participants reported a new, more positive view of the Arabuko-Sokoke Forest, and participants' opinions of the forest were certainly more positive

than the opinions of non-participants of the same community. Some ASSETS participants took action on conservation issues by confronting those involved in illegal activities in the forest, and by starting nurseries and planting trees on their own farms.

Instrumental learning outcomes were the most dominant among participants, with all but two participants reporting instrumental outcomes, as has been found in other similar studies in the developing world context (Sims & Sinclair 2008; Marschke & Sinclair 2009). This outcome was not surprising given ASSETS' focus on activities like teaching people about the importance of the forest, and providing participants with seedlings to plant on their own farms. The data also revealed that instrumental learning, especially changed behaviours about planting trees, was more evident in participants who had been involved in ASSETS for a longer period of time. This may be a result of the fact that they had more exposure to ASSETS staff and that those who joined the programme in the early years received seedlings to start their own woodlot. Participants who attended the ASSETS meetings generally learnt more, although there were notable exceptions. This was also not surprising, as participants who attended frequently meetings had more opportunity to interact with and learn from the ASSETS staff and from one another.

Communicative outcomes were revealed in the interview data for half of the participants. Communicative learning outcomes included categories such as participants' support for forest conservation, their support for stopping illegal harvesting within the forest, as well as positive changes in their attitude towards the forest itself. The fact that more participants did not reveal communicative outcomes corresponds with the findings of other researchers that have considered adult learning in the realm of resource and environmental decision-making (e.g., Diduck & Mitchell 2003; Marschke & Sinclair 2009). In the case of ASSETS, a number of factors may have contributed to the lack of communicative learning outcomes. Principally, participants observed and identified the absence of a forum or structure to support dialogue among participants, and between participants and staff. While the ASSETS staff does meet with participating parents, these meetings are sometimes infrequent. There are logistical challenges (roads) and financial constraints (fuel costs) limiting staff access to certain communities, and some parents find it difficult to attend meetings, given the often pressing livelihood issues with which they are contending. Reduced opportunities for dialogue may limit participant learning, since dialogue is central to communicative learning, as established by Mezirow (1991, 2000).

While transformative outcomes were not as clear from empirical evidence, a number of social action outcomes were documented, primarily concerning planting trees. The James example provides the strongest evidence of potential transformation, as it was quite clear that James' new found concern for forest conservation was due to his participation in ASSETS, coupled with his experiences observing other residents removing resources from the forest. His resulting actions to try to curb illegal harvest are particularly important because of his existing role as a community leader. The implementation of any new activity very much depends on the motivation and vision of local leaders (Marschke & Sinclair 2009). Leaders such as James are adept at using their status and influence in adapting socio-cultural norms for forest conservation, even directly confronting those who engage in illegal forest activities with expectations of conforming to new normative behaviours, rather than reporting them to the authorities, the institutional norm. As a single, isolated case, James' story provides only limited evidence of actualised transformation. A self-reported story may also be interpreted as having an element of self-interest, although in this case James' story was corroborated by others. Even so, such motivation drives much of learning and could become the basis for further learning and action. Regardless of the motivation, our view is that the dynamic approach reflected in James' story, and its resulting learning outcomes, may do more for sustained conservation than conventional approaches.

Another positive learning outcome was the participants' understanding of why they are a part of the ASSETS programme. For some, this understanding was corresponded with their participation in instrumental activities, while for others it related to their communications with others. With projects that attempt to encourage conservation by providing material or monetary benefits, there is sometimes a concern that this could result in a situation where people see the environment only in terms of how much it is worth, i.e., they are willing to conserve, but only when it pays. However, while a handful of ASSETS participants indicated that they only wanted to see the forest conserved because they benefited from it financially, and that without this benefit they would 'suggest to cut it for cultivation' these individuals were a very small minority. In contrast, most ASSETS participants indicated that the most important benefits from the forest were not the bursaries, but rather the 'non-bursary' environmental benefits provided by the forest, chiefly, the perceived connection between trees and rain.

While this study demonstrated that the ASSETS programme contributed to a number of learning outcomes among participants, the data also revealed a number of opportunities for improvement. For instance, less than half of the ASSETS participants interviewed indicated that they thought the Arabuko-Sokoke was currently under threat. There is some debate as to whether threats to the forest are increasing or decreasing, however, the literature is quite consistent: forest biodiversity is declining (e.g., Myers *et al.* 2000). Although more ASSETS participants reported that the forest was under threat compared to non-participants, a surprising number of ASSETS participants reported that the forest was 'doing fine' or that they did not know whether it was under threat or not. The ASSETS participants who did feel the forest was under threat tended to cite specific examples such as the decline in hardwood trees like *Muhuhu* (*Brachylaena huillensis*), while those who felt the forest was fine made only general observations (e.g., 'the forest is still there') or had not visited the forest for some time.

The prevalence of the correlation that 'trees bring rain' made by ASSETS participants undoubtedly emerges from their recent experiences with drought and is a common perception people hold in Kenya and other parts of Africa; people are desperate to do something to change the situation and many have latched on to forest conservation projects as a solution to drought. While the localised tree planting undertaken by some participants is certainly positive, it is possible that participants' tree planting efforts might not lead to positive change in their area in terms of 'fixing' the rain problem and preventing future drought, thus exposing the relationship as inaccurate. In the future, this may colour participants' feelings about the utility of taking action for forest conservation issues.

While many ASSETS participants were enthusiastic supporters of the conservation of the Arabuko-Sokoke Forest, it became clear that some participants saw conservation as something that happens only within the formally defined boundaries of the forest, providing no indication that they felt that the trees and bushes on their own farm should be conserved. In fact, some participants who were passionate defenders of the Arabuko-Sokoke Forest and looking for ways to help in the conservation effort were in the process of clearing the 'bushes' from their own farms. If the Arabuko-Sokoke Forest is to survive, conservation and stewardship through agro-forestry programmes that promote sustainable land use outside the forest boundary, on neighboring farms, should not be ignored.

These observations, in combination with the documented learning outcomes, suggest a number of measures ASSETS could possibly implement to encourage learning among programme participants while promoting greater forest conservation. For example, enhanced environmental and conservation education, such as guided walks in the forest that point out specific threats, may aid in communicating the state of the forest more accurately to programme participants. It may also be helpful for ASSETS to revisit its conservation education programme, and incorporate a greater focus on the need for on-farm conservation efforts. Additionally, ASSETS could consider establishing a forum or structure to promote dialogue among participants, and between participants and ASSETS staff, such as a parents' committee or a similar organisation. During the course of the research, many participants indicated that they would be very willing to join such an organisation and felt having such an organisation in place, within a community, would promote dialogue and communicative learning and aid in spreading awareness of ASSETS and forest conservation to other community members. Furthermore, an established parents' organisation would also be able to undertake other conservation related initiatives, such as a community-based monitoring programme that is integrated into a participatory forest management scheme, as developed in Tanzania for example (Topp-Jørgensen *et al.* 2005).

Transformative learning theory provided a useful lens for considering changes in values and attitudes among participants of a community conservation programme. While the study did not address illegal resource use specifically—participants would be understandably hesitant to discuss participating in illegal activities—the learning approach resulted in a more complete and nuanced understanding of what participants were learning from the programme, and how this learning affected their values, attitudes and actions concerning conservation. Components of a learning approach could be adopted and utilised in evaluations of other community conservation projects. Such a move would not only aid in better understanding whether a project contributes to learning, and changes in values and attitudes among participants, but could also provide a means of identifying obstacles to learning, and opportunities for improvement.

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