## Residents' Attitudes Towards Arabuko-Sokoke Forest & ASSETS

## Technical Report by Michelle Gooch December, 2007

#### **EXECUTIVE SUMMARY**

As one of the last remaining patches of East African coastal forest, Arabuko-Sokoke Forest (ASF) in Kenya is one of the Earth's biodiversity "hotspots." It has come under threat due to logging, poaching, and pressure for land clearance by local residents surrounding the forest who live in dire poverty. In the past two decades, conservation groups have implemented Integrated Conservation and Development Projects (ICDPs) around the forest with the aim of improving residents' livelihoods and fostering positive attitudes towards the forest. A Rocha Kenya's ASSETS is a unique attempt to link conservation, education, and eco-tourism. ASSETS provides secondary school bursaries to children living around the forest with funds generated through eco-tourism. During the summer and fall of 2007, I conducted a study examining local residents' attitudes towards ASF as well as the impact of ASSETS on forest-adjacent communities. As methodology, I administered household questionnaires and engaged in semi-structured interviews with parents of ASSETS beneficiaries as well as non-beneficiaries. I found that nearly all participants held positive attitudes towards the forest, though perceptions were varied and included positive and negative sentiments. ASSETS is widely praised among community members and has created a sense of ownership towards the forest, increased knowledge and awareness, and enhanced positive attitudes among beneficiary parents.

#### **SUMMARY OF RESULTS**

## Attitudes and perceptions towards the forest

- All participants said that they liked the forest. Nearly all ASSETS participants said that they
  did not want the forest to be cleared. Although the majority of non-ASSETS participants did
  not want the forest cleared, there were more non-ASSETS participants than ASSETS
  participants who either wanted the forest to be cleared or felt undecided. In general, a large
  majority of all participants held positive attitudes towards the forest.
- The perception that the forest brings rain was widely held among all participants. Most people
  felt that rain was the primary benefit from the forest and that if cleared, their community would
  become very dry and agricultural production would plummet.
- Many non-ASSETS participants mentioned 'existence factors' as benefits from the forest. These
  are benefits which are intangible and difficult to express, and include factors related to the
  forest simply "being there." These non-participants lacked specific awareness of the forests'
  importance but nonetheless had an ingrained sense of its worth.
- Very few participants mentioned any cultural or spiritual value associated with ASF. God was
  mentioned only by three individuals, though the vast majority of participants claimed to be
  Christian. It seems that the spiritual value of the forest is declining with successive generations.
- The majority of participants expressed a fear of entering the forest. This fear stemmed from darkness, wildlife, harsh forest guards, or other factors. Very few people mentioned recreation or aesthetic benefits from the forest. For most people, the forest is a place to be avoided at all costs.
- Although many people mentioned wildlife as being a problem associated with the forest, a recently-built electric fence has curbed the problem, at least in terms of eliminating the presence of the most destructive animals from people's farms. Though still the most frequently cited problem, wildlife crop damage seems to be diminishing. Whether the electric fence is ecologically appropriate in terms of preserving biodiversity remains yet to be seen.

### Experiences with ASSETS and other ICDPs

- The problem most frequently mentioned regarding other ICDPs is that they expand too quickly; in the beginning members benefited greatly but as the project expanded, benefits diminished to almost nothing.
- A large majority of ASSETS participants mentioned the bursary as being a benefit from the
  forest. However, when asked about the goal of ASSETS, very few mentioned conservation.
  Therefore, participants do see the program as coming from the forest, but they do not
  necessarily understand the meaning or purpose of conservation.
- When asked about the requirements for the bursary, most participants mentioned good grades and paying the required fee. No one mentioned engaging in practical conservation activities, though this <u>is</u> stated on the application form.
- Nearly all ASSETS participants expressed a sense of ownership over the forest and a strong
  desire to protect it. Non-ASSETS participants, on the other hand, were often apathetic to the
  issue of forest management, expressing the view that they had no control over the forest and
  that the forest was owned by the government or other outside forces.
- ASSETS was widely praised among beneficiary participants. Participants were extremely
  appreciative of the education provided to their children and only wished that ASSETS could
  pay for higher education (beyond secondary school) or offer career training or employment.
  Some members were very vocal about this desire, saying that opportunities for employment
  were minimal or nonexistent without education beyond secondary school.
- All ASSETS participants expressed that they strongly enjoyed the meetings with the parents
  association and that this association provided a type of positive fellowship with other parents.
  They also said that they learned many things about the importance of planting trees through
  these meetings.
- Few non-participants knew about ASSETS; those that did saw it as a bursary program and did not associate it with the forest or conservation.

#### **ACKNOWLEDGEMENTS**

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#### 1. INTRODUCTION

## 1.1. Integrated Conservation and Development

As biodiversity in the tropics becomes ever more threatened, scientists are increasingly recognizing the need to address the problem of poverty and socio-economic development along with conservation in the developing world. In the past decade, Integrated Conservation and Development Projects (ICDPs) have become an emerging trend in the conservation of biodiversity in and around protected areas in East Africa, as well as other parts of the world. The goals of most ICDPs are to "attempt to link the conservation of biological diversity within a protected area to social and economic development outside that protected area (Newmark and Hough, 2000)." ICDPs usually provide incentives to local communities surrounding protected areas in the form of shared decision making authority, employment, revenue sharing, limited harvesting of resources, or provision of community facilities such as dispensaries, schools, bore holes, roads, and woodlots, in exchange for community support for conservation (Newmark and Hough, 2000). There has been a great deal of controversy in the literature on ICDPs; many reviews criticize ICDPs for having only limited success in achieving conservation and development objectives (Kiss, 1990, Gibson and Marks 1995, Brandon & Wells 1992; Western & Wright 1994; Newmark & Hough 2000; Robinson & Redford 2004; Wells et al. 2006). Others have demonstrated clear linkages between ICDPs and positive attitudes towards conservation (Fiallo & Jacobson 1995; Alexander 2000; Gordon & Aviemba 2003).

#### 1.2. Local Residents' Attitudes towards Protected Areas

If a linkage between ICDPs and positive attitudes is in fact present, it is important that such attitudes be fostered among people living in communities adjacent to protected areas. It is also important to understand the complexity of factors involved in shaping public attitudes towards protected areas and conservation. Many studies have examined socioeconomic and demographic variables as predictors of attitudes towards protected areas in developing countries (Infield, 1988; Heinen, 1993; Newmark et al., 1993; Fiallo & Jacobson, 1995; Wang et al., 2006). While socioeconomic variables are often found to be powerful correlates of attitudes, they tend to vary in their relation to attitudes from case to case, and it may be that the *perceptions* people hold about a protected area more directly influence attitudes. Allendorf et al. (2006) found that peoples' perceptions of a national park in Burma were more powerful predictors of attitudes than socioeconomic variables, which only indirectly affected attitudes. For example, the perception that the park provided conservation benefits (a positive perception) increased the odds that an individual liked the park 28-fold, while the most influential socio-economic variable, occupation, increased the odds of liking the area only threefold. Therefore, it may be that socio-economic characteristics play a moderating role in shaping people's attitudes *through* their perceptions.

## 1.3. Defining Attitudes and Perceptions

For the purpose of this study, I have defined 'attitude' and 'belief' by drawing from Ajzen and Fishbein's Theory of Reasoned Action (Ajzen & Fishbein 1980) and its application in Allendorf et al. (2006). Attitude is defined as "a human psychological tendency that is expressed by evaluating a particular entity, called an attitude object, with some degree of favor or disfavor." Attitudes consist of perceptions<sup>1</sup>, which are "the associations that people establish between the attitude object and various attributes." For example, in the phrase, "I like the forest because it protects wildlife," liking the forest is considered a positive attitude towards the forest, and the protection of wildlife is considered a

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<sup>&</sup>lt;sup>1</sup> In the Theory of Reasoned Action, the term 'belief' is used instead of 'perception'. In this report I have chosen to follow Allendorf (2006) and use the term 'perception', since 'belief' has so many different connotations and may be confusing.

perception about the forest (linking the attitude object, the forest, with wildlife protection, an attribute of the forest).

#### 2. STUDY SITE

#### 2.1. Arabuko-Sokoke Forest

Arabuko-Sokoke Forest (ASF) in coastal Kenya provides an excellent case study for examining local attitudes towards conservation and for evaluating the effectiveness of ICDPs. At 420 km², ASF is the largest single block of indigenous coastal forest remaining in East Africa. ASF is part of the East African Coastal Forest/Eastern Arc Forest complex that ranks among the top 25 biodiversity hotspots on Earth (Myers et al., 2000). It has been ranked as the second most important forest for threatened bird conservation in mainland Africa, and is home to six globally threatened bird species (Collar and Stuart, 1988). ASF also contains 52 recorded mammal species, including 3 which are globally threatened—the Golden-Rumped Elephant-Shrew, Sokoke Bushy-tailed Mongoose and Ader's Duiker. The forest also contains a small population of elephants and a variety of endemic amphibians and butterflies (ASFMT, 2002; Gordon and Ayiemba, 2003).

ASF is located in the Coast Province of Kenya and traverses Kilifi and Malindi Districts at a latitude of 3° 20′ S and longitude of 39° 50′ E. The eastern part of the forest lies on a flat coastal plain at an altitude of 45 m above sea level, rising to a plateau of 60-200 m in the central and western parts of the forest (ASFMT, 2002). ASF is located in a hot and humid climate with an average temperature of 29 C. There are two rainfall seasons of over 1,000 mm in the wettest part, declining to 600 mm in the dry part (KIFCON, 1995). Three major vegetation types exist in the forest, including:

Mixed Forest—a dense forest type covering roughly 7,000 ha in the wetter, eastern part of ASF. The coastal sandy soil in this region support diverse tree species including *Afzelia quanzensis*, *Hymenaea verrucosa*, *Combretum schumannii*, *Manilkara sansibarensis* and *Encephaloartos hildebrandtii*.

*Brachystegia* Forest—a more open forest type covering about 7,700 ha in the center of ASF. This forest is dominated by *Brachystegia spiciformis* and consists of drier, white sands.

Cynometra Forest—a dense forest or thicket on the northwest side of ASF, covering about 23,500 ha. This forest contains red sands and is dominated by Cynometra webberi and Manilkara sulcata, as well as the euphorbia species Euphorbia candelabrum, though numbers are reducing. Brachylaena huillensis used to be abundant in this region, but its numbers have been severely reduced by extraction.

ASF was originally declared Crown Forest in 1932 and was re-gazetted with new boundaries as a forest reserve in 1943. On-site management did not begin until 1959 with the establishment of the Jilore Forest Station. A second Forest Station at Gede was established in 1969. In 1968 the forest boundaries were extended by 6,610 acres to include a portion of land in the southeast. In 1977 a 43 km² Nature Reserve was designated inside the forest; this area was extended by 1,635 ha in 1979 (ASFMT, 2002).

ASF is managed jointly by four government departments, including the Forest Department (FD), Kenya Forestry Research Institute (KEFRI), Kenya Wildlife Service (KWS) and National Museums of Kenya (NMK), all of which have worked together since 1991 as the Arabuko-Sokoke Forest Management Team (ASFMT; Mbuvi and Ayiemba, 2005). A Strategic Management Plan was written by the ASFMT in 2002, outlining key issues and guidelines for obtaining "a fully functioning forest ecosystem with no reduction in forest size by 2027 (ASFMT, 2002)." The new Forest Act of 2005 provides for the inclusion of forest-adjacent communities in the management of forests in Kenya. It established a Kenya Forest Service (KSF) to replace the current Forest Department, providing for the "inclusion of communities in

the conservation, control, management and utilization of the resources therein (Forest Action Network, 2005)."

ASF is surrounded on all sides by 52 villages, home to roughly 110,000 people. These people are mainly of the Giriama tribe, though other Mijikenda tribes are represented along with a small population of the original Sanya hunter-gatherer tribe (Gordon and Ayiemba, 2003). Forest-adjacent dwellers live in poverty and struggle to survive on subsistence agriculture. Crop yields are low due to poor sandy soil and frequent crop raids by wildlife from the neighboring forest. Due to poverty and lack of livelihood options, forest-adjacent communities have been forced to rely on illegal resource extraction from the forest. They risk arrest and/or beatings or pay bribes to corrupt forest guards in order to cut trees for fuel, poles, and timber, and hunt wildlife for meat either to consume or sell.

Arabuko-Sokoke Forest is becoming increasingly threatened due to illegal resource extraction as well as antagonism between local people and forest authorities (Fitzgibbon et al. 1995; Gordon & Ayiemba 2003; Mbuvi & Ayiemba 2003). This antagonism has at times erupted in forest invasions and campaigns for de-gazettement. Reasons for discontent are widespread among communities around most state-controlled forests in the developing world: poverty, resource denial, crop raiding by wildlife, and hunger for land (Maundu, 1994). A survey conducted in 1991 found that 96% of farmers (N = 32) were unhappy with the forest, and 54% wanted it completely cleared for settlement (Mogaka, 1991). A follow-up survey in 1993 found that 59% (N = 142) wanted the whole forest cleared for agriculture (Maundu, 1994). Even as recently as 2004, a study comparing community attitudes surrounding protected forests in Kenya found that "the lack of affinity for the forest is a striking feature of the community around ASF (Ramani, 2004)."

#### 2.2. ICDPs around Arabuko-Sokoke Forest

The historic lack of affinity towards the forest among local populations combined with rampant destruction and biodiversity loss within the forest has resulted in the implementation of many different ICDPs around ASF. Starting in the early 1990s, these projects were implemented by government institutions and NGOs. Examples of ICPDs around ASF include butterfly farming, bee-keeping, mushroom farming, tree-planting, aloe-vera farming and silk worm farming. Most of these ICDPs have provided community members with conservation incentives in the form of alternative livelihood strategies that are dependent on markets for cash-generating businesses. Some of the incentives provided are products which can be used domestically to reduce pressure on the forest, such as wood from on-farm woodlots.

#### **2.3.** *ASSETS*

ASSETS (Arabuko-Sokoke Schools and Ecotourism Scheme) is a unique example of an ICDP which attempts to link education, ecotourism, and conservation around ASF as well as Mida Creek, an important mangrove ecosystem which is in close proximity to ASF. ASSETS was implemented by A Rocha Kenya, a faith-based conservation organization, in 1991. Through providing secondary school bursaries to students from communities bordering the forest and creek using funds from eco-tourism and donations, the goal of ASSETS is to increase environmental awareness and provide alternative livelihood options among those living in forest-adjacent communities. ASSETS has worked to enhance ecotourism in the area by constructing a 260 m suspended mangrove walkway, bird hide and visitor center at Mida Creek and two tree platforms – one in ASF and one in the nearby Gede Ruins. Project staff members have also trained 17 local guides as a means of employment in the ecotourism industry. Funds generated from the ecotourism facilities are channeled towards ASSETS and combined with other individual and corporate donations to pay for the bursaries.

Another strategy of ASSETS is to encourage parents of beneficiaries to plant trees on their farms in order to supplement their households with wood for domestic requirements and hence ease pressure

on the forest. Tree nurseries were established at each of eight beneficiary primary schools, and parent groups were recently registered as an association called Muvera wa ASSETS. The parents who are involved in Muvera meet weekly at the tree nurseries and each have set days in which they are responsible for watering the seedlings.

ASSETS is unique in that it combines many approaches. The project encourages protection of the forest and creek through access to secondary education, which local community members strongly desire but can rarely afford. It spreads awareness of the importance of the forest and creek through meetings with beneficiaries and their families throughout the year. It also attempts to generate direct cash income for project members through the sale of tree seedlings and alternative technologies.

## 3. RESEARCH OBJECTIVES

The purpose of this study was three-fold; to 1) describe the attitudes and perceptions about ASF held by local residents (people living in communities adjacent to ASF), 2) determine which variables influence attitudes towards the forest and the ability of these variables to predict attitudes, and 3) evaluate the effectiveness of ASSETS in achieving its goal of improving attitudes towards the forest.

#### 4. METHODS

I chose 3 ASSETS beneficiary communities on different sides of ASF to use for this study: Nyari, Bogamachuko, and Mijomboni (Fig. 1). The different geographic locations of the communities with respect to the forest allowed for the comparison of communities with different climates, particularly rainfall patterns, as well as access to the urban tourist centers of Malindi and Watamu. Communities on the western side of ASF are more isolated and impoverished, with fewer roads and thus limited transport to urban centers. The climate on the west side of the forest is also much dryer resulting in poor agricultural production. Communities on the east side of the forest receive more rainfall and also have the advantage of close proximity to urban centers for markets and jobs in the tourism industry.



**Figure 1.** Map of study sites.

I conducted 117 oral household questionnaires over a period of 9 weeks from July-August, 2007. In order to familiarize myself with the communities and for convenience, I stayed in the primary schools in each community for a period of 3-4 weeks while conducting the interviews. Because I had limited knowledge of Swahili and no knowledge of Giriama, the local language, I conducted the interviews with the help of an interpreter.

ASSETS beneficiary households were selected from a list and visited in order of their proximity on-foot from the primary schools. For each ASSETS home, a non-ASSETS home was chosen from the same

general area of the community. I selected the participants based on who was at home at the time of the interview; provided the person was over 18 years of age. When multiple people were present, the person most willing to be interviewed was chosen. In ASSETS beneficiary homes, I attempted to interview the parent who normally attended the weekly ASSETS parent meetings, though this was not always possible. Although I attempted to interview equal numbers of men and women, the women participants far outnumbered the men simply because women tended to be the only adults at home during the day when the interviews were conducted.

The oral questionnaire had three main sections (see Appendix I and II for sample questionnaire and interview guide). These included socio-economics, attitudes and perceptions about ASF, and participation in ICDPs (including ASSETS). Attitudes were assessed by asking the person whether they liked or disliked the forest, and how they would feel if the forest were cleared. A list of perceptions about the forest was generated by asking people why they liked or disliked the forest and what benefits and problems they associated with the forest. I later sorted people's perceptions of the forest into major categories (see Appendix III) which were created inductively after recording responses.

I spent the final half of the interview asking more probing, open-ended questions to gain a more indepth understanding of the person's attitude towards and experience with the forest and ICDPs. I also conducted semi-structured interviews with a number of key informants, including headmasters and teachers, influential community members, the forest warden, and staff from ASSETS, Nature Kenya, and the Kipepeo Project.

#### 5. RESULTS

#### 5.1. Socio-economics

Appendix IV shows socio-economic data for each of the three study communities. Participants were generally uneducated, poor subsistence farmers. Most participants were between 30-45 years of age and were dominantly female.

The majority of participants mentioned that they frequently receive some level of crop damage due to wildlife from the forest (Fig. 2). Crop damage was highest in homes that were closer to the forest edge. The largest number of complaints of crop damage came from Boga, followed by Nyari and Mijomboni.

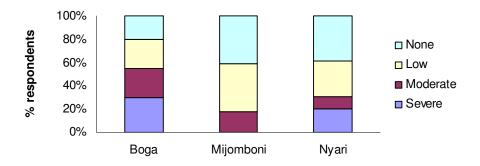


Figure 2. Severity of crop damage by wildlife

## 5.2. Forest Use

Most participants were, not surprisingly, hesitant to honestly answer questions pertaining to forest use. Therefore it is impossible to draw any definite conclusions about levels and types of forest use among the three communities. However, the answers given do provide insight into general types of forest use among forest adjacent communities. Uses cited include the following:

## Legal Uses:

- 1. Water
- 2. Larvae and food plants for the Kipepeo Project
- 3. Mushrooms
- 4. Honey and bees
- 5. Fuel with permit
- 6. Indigenous seeds for tree nurseries
- 7. Wild fruits
- 8. Route
- 9. Patrol for local askaris
- 10. Chasing monkeys
- 11. Medicinal plants
- 12. Past employment in timber companies

## Illegal Uses:

- 1. Poles
- 2. Fuel without permit (usually for selling)
- 3. Bushmeat
- 4. Wood for carving
- 5. Timber
- 6. Charcoal

Figure 3 shows the level and type of forest use among participants in the three communities. Forest use was highest in Mijomboni and lowest in Nyari.

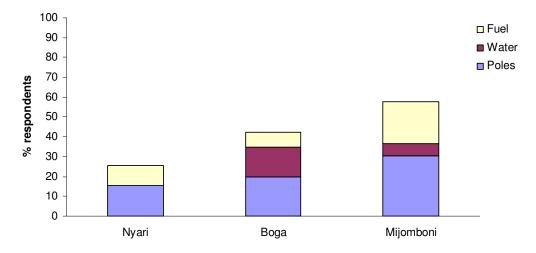
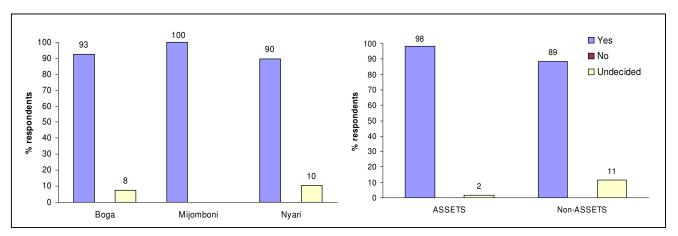


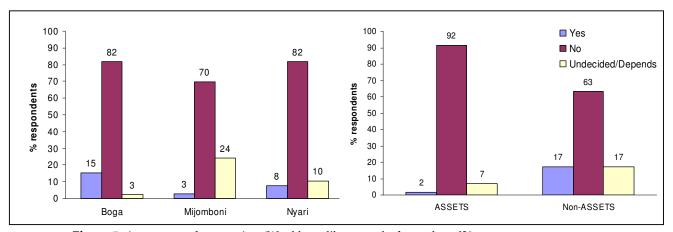
Figure 3. Level of use by community members of fuel, water and poles from ASF

## 5.3. Attitudes towards ASF

Overall, attitudes towards ASF were good. No one said that they disliked the forest, and only a handful said that they were unsure whether they liked the forest or not (Fig. 4). The question "do you want the forest to be cleared?" was perhaps a better indicator of attitude and evoked a greater variety of responses (Fig. 5). There was a difference between ASSETS and non-ASSETS participants with respect to answers to this question. Nine-two percent of ASSETS participants said they did not want the forest to be cleared (and only 2% said they wanted the forest cleared; others were undecided), versus only 63% of non-ASSETS participants (17% wanted the forest cleared and 17% were undecided).



**Figure 4.** Answers to the question 'Do you like the forest'?



**Figure 5.** Answers to the question 'Would you like to see the forest cleared?'

Participants seemed very reluctant to say they did not like the forest, even though it was evident from their answers to other questions and overall demeanor during the interview that they harbored negative sentiments towards the forest. This quote from a Boga non-participant is representative of the sentiment expressed by many – a negative attitude combined with a refusal to 'dislike' the forest:

"How would I like something that's closed to me? You can't access fuel or anything. How would you like something that's not yours? But I can't say I don't like it." (Boga-NP)<sup>2</sup>

The presence of a foreign researcher may have made people nervous and despite numerous reassurances that neither I nor my translator was in any way associated with the government or any other organization, people may have been reluctant to put forth their true opinions. On the other hand, it may be that all respondents really do like the forest overall, while harboring negative sentiments towards certain aspects of the forest (i.e. forest management).

#### 5.4. Positive Perceptions

<sup>&</sup>lt;sup>2</sup> When quotes are used, the author of the quote is referenced by the name of the community in which the person lived and whether they were an ASSETS participant (A) or non-participant (NP). In this case, Boga-NP is a non-ASSETS participant from Bogamachuko. Boga = Bogamachuko, Nyari = Nyari, and Mij = Mijomboni.

#### 5.4.1. Summary

Appendix III shows the specific perceptions mentioned, both positive and negative, and their categories. A remarkable 70% of ASSETS participants mentioned ASSETS as a benefit from the forest (Fig. 6). Two percent of non-ASSETS participants also mentioned ASSETS as a benefit. Rain was mentioned frequently by both groups as an important benefit from the forest. Nineteen percent of non-participants mentioned 'existence factors' as benefits from the forest versus only 2% of ASSETS participants. More non-participants mentioned the potential for clearing as a benefit. Recreation/aesthetic benefits were mentioned very infrequently. Resource extraction was widely mentioned by both groups, poles being the most frequently mentioned resource in this category. Tourism was also frequently mentioned, though more ASSETS participants (37%) mentioned tourism than non-ASSETS participants (15%).

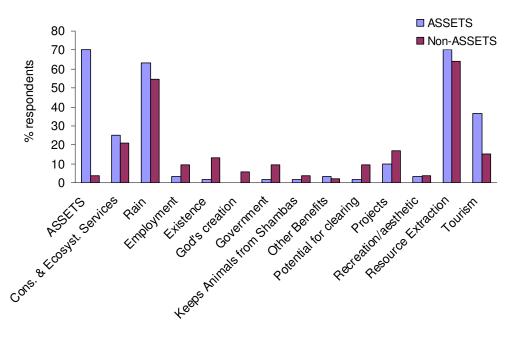


Figure 6. Residents' positive perceptions of ASF (by category).

#### 5.4.2. ASSETS benefits

It is quite notable that 70% of ASSETS participants mentioned ASSETS as a benefit from the forest. The bursary was often the first thing people mentioned when asked about the forest, indicating that many participants make a direct linkage between the forest and the bursary. Apart from the bursary, others mentioned ASSETS trainings (tree nursery and alternative technology) and trips (to collect indigenous tree seeds from the forest) as benefits. Two non-participants from Boga also mentioned ASSETS as a benefit because they knew of neighbors who were benefiting. This Mijomboni non-ASSETS participant was quite informed about the project to an unusual degree among those not involved:

"ASSETS came because of the forest. It aims to conserve the forest. It involves the parents, who go to the forest to collect seeds to plant in the nursery. It helps students with fees in schools." (Mij-NP)

Most ASSETS participants knew that ASSETS helped students with school fees and "came because of the forest". However, as will be discussed later, few of them knew that the goal of ASSETS was conservation of the forest and all lacked specific knowledge about the conservation requirement for the bursary.

#### 5.4.3. Rain

It is a commonly held belief among forest-adjacent dwellers that the forest helps to regulate climate and make rainfall more reliable; therefore it is not surprising that this benefit was frequently mentioned. A few more ASSETS participants mentioned rain as a benefit than non-ASSETS participants, which may be due to the teachings commonly given by ASSETS staff to the parents at meetings. However, non-ASSETS participants frequently mentioned rain as a benefit as well, believing that without the forest, the area would be desert-like and agricultural production would plummet. A Mijomboni resident commented,

"This area would be very dry [if the forest were cleared]. We'd receive rain for two years after clearing, then production would go down. Like before, this place used to be all forest, but now it's cleared and the production is very low." (Mij-NP)

Despite the fact that Boga is much more arid than areas east of the forest, Boga residents also seemed to associate the presence of the forest with rain:

"If cleared there would be no rain- during the times when we were coming to this area we used to receive lots of rain because there weren't as many shambas cleared but since so many shambas have been cleared the rain is less. If the forest was cleared there would be no rain at all." (Boga-NP)

"I've heard it [the forest] has trees that attract rain. This area is very dry but we still receive a little rain." (Boga-NP)

### 5.4.4. Conservation/Ecosystem Services

A few more ASSETS participants mentioned conservation/ecosystem services benefits, though this difference was slight (70% versus 58%). In particular, respondents mentioned that the forest provides a shelter for animals, harbors animals endemic to ASF, is a source of indigenous tree seeds, provides clean air, is there for future generations to see, serves as a windbreaker, and prevents soil erosion. This Nyari ASSETS participant sums up the view many participants had of the forest serving multiple different purposes, including ecosystem services:

"Trees are part of the ecosystem of life and they protect humans. If it was cleared people wouldn't be happy and there would be a war because the people who cleared it would want a big piece of the land. The forest protects people from hunger because of rainfall. It is also a shelter for wild animals." (Nyari-A)

Many ASSETS parents and a few non-participants thought that the forest should be conserved to serve as a "remembrance" for future generations. A Nyari woman wanted future generations to see the animals and know the birds from the forest. We sat in her shamba overlooking Gamani, a patch of secondary forest, and she spoke of how her grandfather had left the area forested:

"If my grandfather had cleared all this land all the trees these animals would not be here and the children would not know them." (Nyari-A)

#### 5.4.5. Recreation/aesthetic

Very few people in either group (ASSETS and non-ASSETS) mentioned recreation/aesthetic benefits (which included such benefits as beautiful, cool, and shade). Most people said that they did not enjoy being inside the forest for fear of getting lost or encountering wild animals. To many, the forest was a dark, scary place full of danger. No one entered the forest for enjoyment alone. Although most said they never entered the forest at all, those that did said they only went inside the forest for water or as a short-cut route to towns on the far side of the forest.

#### 5.4.6. Resource Extraction

Within the category 'resource extraction', fuel and poles were most frequently mentioned by all respondents, followed by timber. More ASSETS participants mentioned resource extraction as a benefit than non-ASSETS participants. This is surprising since ASSETS works to eliminate the need for extracting resources from the forest (through providing alternatives). However, data for this category may be unreliable because many people mentioned resource extraction as a *potential* benefit, not one that they currently use (and this applies to all categories), and some mentioned it as a benefit for *some* people but stated quickly and adamantly that it is not allowed and that they themselves do not extract resources, as expressed in the following quote:

"Not me but there are some people who go into the forest and they cut trees to sell and buy food for their children. That is illegal but because we border the forest we have to do so. So although it is bad, if you don't have food you have to go there and cut trees and sell. So let the government or the forestry department or the research department do something so those people who are surrounding this forest get benefits so they don't go and destroy the forest." (Mij-NP)

This respondent viewed resource extraction as a benefit though was upfront in admitting that it was illegal and that she did not take part. Her comment illustrates the sentiment felt by many respondents, especially in Mijomboni where access to secondary forest is limited or unavailable, that forest destruction for resources is not desired but is necessary where poverty prevails and alternatives are nonexistent.

#### 5.4.7. Tourism

Tourism was mentioned much more frequently by ASSETS participants than non-ASSETS participants (37% versus 15%). Twelve percent of ASSETS participants mentioned the ASSETS tree house as a benefit because it attracts tourists. ASSETS participants therefore realize the potential and current benefits from tourism in ASF and Mida Creek. A large majority of ASSETS participants made the link between the animals in the forest, the tree house, the tourists, and the bursary, as expressed in the following quote:

"There is the tree house that attracts tourists who visit and take photos of animals and trees and give cash for bursaries." (M3A)

## 5.4.8. Employment

More non-ASSETS participants mentioned employment as a benefit than ASSETS participants. This is somewhat surprising, since a goal of ASSETS is to provide employment to local people through access to jobs in the eco-tourism industry. However, employment was mentioned very infrequently overall. It is a widespread hope among protected area managers and ICDP staff that protected areas can serve as a source of employment to local people. In actuality, employment in the tourism and protected area management sectors usually goes to foreigners (as is the case with ASF), and local people are left sidelined. In the case of Mida Creek, ASSETS has employed local guides to work at the boardwalk, but there are few positions available and currently very few tourists actually visit the area.

## 5.4.9. Existence Factors

Thirteen percent of non-ASSETS participants listed 'existence factors' as benefits. This category was created to accommodate for the benefits listed out of frustration when a participant was unable to articulate why exactly the forest was important. The forest, for them, is a fact of life. Many of them have lived near the forest for most of their lives (and lived with the restrictions placed on them) and see the forest as something good, though they lack specific awareness as to its importance. As one non-ASSETS participant put it,

"It's like a routine; you wake up, farm around the home, go to the other shamba, farm around there, come home; every day the same." (Nyari-NP)

"It has to survive. Because I have been with it for so long." (Mij-NP)

Interestingly, very few ASSETS participants (2%) mentioned 'existence' benefits. It may be that through participation in the ASSETS program, people learn the direct importance of the forest and see tangible benefits. Whereas prior to ASSETS they may have 'liked' the forest and had a positive attitude, after participating in the program they now have a clear idea of why the forest is important and can verbalize more concrete, specific benefits. In any case, the 'existence value' of the forest inherent among non-participants should not be overlooked.

5.4.10. God

"It's owned by God - when I was born the forest was there." (Mij-NP)

Only a few people mentioned that the forest (or the animals in the forest) were created by God and thus were important, and all of those were non-ASSETS participants. The fact that the majority of participants considered themselves Christian and the largest minority were Muslim (implying a belief in God), and the fact that A Rocha is a faith-based organization, makes these small numbers surprising. In general, the forest seemed to hold little cultural or spiritual value for people. A conversation with a colleague was revealing of the fact that the forest has lost spiritual significance over time. This person, herself a Giriama, spoke of the kaya forests and their spiritual significance in past generations:

"The Kayas are sacred, like a shrine. They have big trees. People are afraid to sneak into the Kayas because of the spirits. During the old times people didn't cut big trees because they were sacred. They contained good angels; they'd go under the trees and ask for rain. But nowadays people don't believe – they think God is in the church and the mosque."

## 5.4.11. "Protecting" animals

Many people mentioned the forest "protecting" animals as a benefit. When questioned further on this, people either said that the animals attract tourists or had inherent value (such as being endemic to ASF), or that if the forest were not there, the animals would come and invade peoples' shambas. The former saw the animals as good and the forest as good because it protected them (these perceptions were placed in the tourism or conservation/ecosystem services categories), while the latter saw the animals as bad and the forest as good because it kept them away from people (these responses were included within their own category – keeping animals away from shambas). The fact that historically cropraiding by wildlife has been such a problem for forest-adjacent dwellers makes it not surprising that people should perceive the forest as a haven for destructive animals, and that these people should fear the consequences of clearing the forest:

"It protects the wild animals and they don't come and disturb human beings outside the forest. They stay in the forest and therefore I would say the forest is good because the wild animals live there permanently, and they get everything—food, water, from the forest." (Nyari-NP)

"It would be too bad [if the forest were cleared]. Because all the animals would run away from the forest and they would come to where human beings are living, and that would be very dangerous." (Nyari-NP)

#### 5.4.12. Potential for clearing

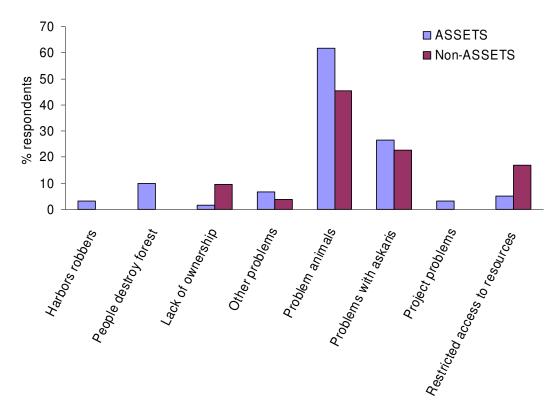
Despite the fear of destructive wildlife, however, 9% of non-participants saw the potential for clearing as a benefit of the forest. Even though they all seemed to realize that the forest was protected and thus inaccessible currently, there was a belief among some people that the virgin soil might one day be made available to them for farming. These people felt that they, being forest-adjacent dwellers, would have

first access to the forest land. The fact that it was still a forest (versus shambas) meant that a) the soil would be fertile, and b) if "opened" they would get land on a first-come first-serve basis. ASSETS participants, on the other hand, felt that the clearing of the forest would be a bad thing, and thus did not see this as a benefit from the forest.

### 5.5. Negative perceptions

## 5.5.1. Summary

By far the most frequently mentioned negative perceptions were problem animals, problems with askaris (forest guards), and restricted access to resources (Fig. 7).



**Figure 7.** Residents' negative perceptions of ASF (by category).

#### 5.5.2. Problem animals

Many people said that animals had been a problem in the past but that the problem had been solved by the electric fence. This sentiment was especially prevalent in Mijomboni where the electric fence has nearly eliminated all instances of crop-raiding.

#### 5.5.3. Problems with askaris

Next to problem animals, problems with askaris were ubiquitously mentioned among ASSETS and non-participants alike. Residents feared the askaris and were full of stories of beatings and harsh treatment. One Nyari ASSETS participant told a story of a fight between an askari and a poacher:

"During the old times, askaris used to work with a rungu (type of weapon). I heard of one askari who was walking in the forest and met a poacher carrying a rungu. With a rungu you have to fight very close; the poacher threw the rungu and he tied the askari to a tree, so after a few days he died. People found his corpse.

That askari was very harsh. He used to beat people until they were unconscious and take them to the station." (Nyari-A)

The askaris are seen by locals as harsh outsiders who treat anyone they see in the forest as a criminal. Many people were hopeful about the possibilities for "local askaris," who would be chosen from the communities (as opposed to outsiders) and would therefore be more motivated to protect the forest and would also be more respected by the other community members.

#### 5.5.4. Illegal destruction

Only ASSETS participants (10%) mentioned illegal destruction of the forest as a problem. Some of these respondents said that they had participated in ASSETS-sponsored tree-planting days inside the forest, and that those who are cutting the trees are destroying 'their' work:

"We are planting trees and he's cutting them- are we providing him with an income?" (Mij-A)

#### 5.5.5. Lack of ownership

Non-ASSETS participants mentioned lack of ownership as a problem more frequently than ASSETS participants (9% versus 2%). Many non-participants saw the forest as something owned by others and thus felt a lack of concern for anything forest-related. This comment made by a non-ASSETS participant from Boga is typical of such sentiments:

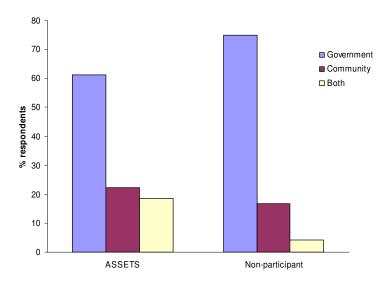
"Would you like something that doesn't belong to you? I like my shamba because it's mine. I can't like the forest because it's owned by someone else." (Boga-NP)

#### 5.5.6. Restricted access to resources

More non-ASSETS participants mentioned restricted access to resources (17% versus 5%). It may be that ASSETS participants no longer see these restrictions as a problem and instead see them as a good way to protect the forest.

## 5.6. Who owns the forest?

ASSETS participants seemed to have a greater sense of ownership over the forest than non-ASSETS participants. In response to the question, "Who owns the forest?" more ASSETS participants answered 'the community' or 'the community and the government' (22% and 19%) than non-ASSETS participants (17% and 4%; Fig. 8).



**Figure 8.** Responses to the question "Who owns the forest?"

Many non-ASSETS participants felt that the forest was owned by outsiders and that they had no control over the management of the forest. The following quotes are representative of the sentiment felt by many non-ASSETS participants:

"It's owned by the government and white people. They keep the elephants in so they stay in the forest and people stay on their shambas." (Nyari-NP)

"Would you like something that doesn't belong to you? I like my shamba because it's mine. I can't like the forest because it's owned by someone else." (Boga-NP)

Conversely, the majority of ASSETS participants felt a strong sense of ownership over the forest and a responsibility to protect it. Many participants stated that they were protecting the forest and that they routinely talk to people about the importance of the forest. The following quotes demonstrate the sense of ownership and responsibility felt by ASSETS participants:

"In old days it was for the government but currently it's for the community because we are the ones to protect it so we can benefit." (Mij-A)

"It's protected by the government but the benefits are taken by the community members so it's our responsibility to protect the forest. And the sub-chief is selected by us but he works for the government, so we are the government." (Mij-A)

It seems that the past sentiment that the forest is off-limits and of no benefit to locals is changing, though very gradually. In general, non-ASSETS participants still feel apathetic towards forest management as if it is beyond their control and thus of little concern. Beneficiaries of ASSETS bursaries, however, have experienced tangible benefits which they link with the forest and thus feel empowered and responsible for the forest's protection. They link the survival of the forest with the continuation of the bursary for their neighbors' children and for their own younger children, as demonstrated by this quote:

"If the forest were cleared the project [ASSETS] would come to an end. The Thursday meetings would stop. The fame of Boga for assistance will stop." (Boga-A)

Many participants felt a sense of pride in their children's education and repeatedly mentioned that they would wish for the program to continue so that it might benefit other children in the future.

## 5.7. Impact of ASSETS

The majority of ASSETS participants were filled with praise for the organization and the help that they had received through the bursary. Most people said that their children would not have been able to attend school without the bursary. One participant remarked,

"Something I will never forget is the assistance. My kids get education because of the forest. Though the forest was there for a long time and not helping people, since ASSETS people are benefiting. ASSETS provides bursaries to kids; it also involves parents by training and teaching them, so future generations can benefit from the forest and find the environment is ok." (Boga-A)

Many ASSETS participants also indicated a change of attitude and/or behavior towards the forest since becoming involved with ASSETS. One man from Boga admitted that he used to be a carver but since the coming of ASSETS he has planted trees on his shamba and thus reduced his dependence on the forest. Others admitted that they knew of other parents who used to be involved in illegal destruction who had since stopped. Since people were, with good reason, reluctant to admit to ever having 'used' the forest, indicators of changed attitudes were more common. The following quote is representative of a commonly expressed sentiment – that the coming of ASSETS brought with it a realization of direct benefits from the forest:

"Before joining ASSETS I would think 'what is the forest used for? They should at least let us clear it for shambas.' But since ASSETS I have realized the forest can benefit us. I even went to the forest to collect seeds with ASSETS." (Boga-A)

Another participant indicated a changed attitude towards the way people use the forest:

"I haven't changed any behaviors towards the forest – I never used the forest. But since I joined ASSETS – before I could buy poles, charcoal, fuel, without caring where it came from. But after joining ASSETS, whenever I see people carrying those things, I ask if the person has a permit. If they say no, I tell them why it's important to have a permit." (Nyari-A)

Beneficiaries also realized that the forest could benefit them directly as opposed to indirectly. Though many had always held positive attitudes towards the forest and known of its importance for rain and other ecosystem services, the coming of ASSETS allowed them to realize tangible, direct benefits:

"Before ASSETS I didn't know a forest could benefit an individual directly, but now I am [benefiting directly]. There is a difference in the benefits – now I can benefit directly as opposed to indirectly." (Boga-A)

ASSETS participants felt a sense of fellowship and community with fellow ASSETS parents through their involvement with Muvera, the parents association which meets weekly at the primary school tree nurseries. Most were quick to say that they enjoyed the meeting immensely and rarely missed one. This Mijomboni woman was especially enthusiastic about her involvement in the meetings:

"I even leave my work to go to the parent meetings. I like it so much. Even if there was no one to prepare lunch for the school children I wouldn't even care, I'd go to the nursery." (Mij-A)

The meetings provide parents with the opportunity to befriend other parents and allow them a set time every week to engage in conversation while working together for a common cause. Relationships between neighbors and fellow community members are forged and strengthened through the parent meetings.

## 5.8. Misconceptions

ASSETS participants were not without misconceptions regarding the organization and the forest. For example, only 16 out of 60 ASSETS participants mentioned conservation when asked "What is the goal of ASSETS?" The response most commonly heard was that ASSETS was a poverty-alleviation scheme alone:

"To help children around this community because people around here are poor." (Mij-A)

Although participants did make the link between the bursary and the forest (since a large majority of participants mentioned the bursary as a benefit coming from the forest), they did not understand that conservation of the forest was the primary goal of ASSETS.

There was little awareness of conservation being a requirement for the bursary. On the bursary application form, it explicitly states that beneficiaries must engage in practical conservation activities, including the following:

- To keep a well maintained wood lot at home.
- To protect Arabuko-Sokoke Forest by not cutting down any trees from it, nor hurting wild animals or birds in it.
- To protect Mida Creek by not cutting mangroves, nor fishing with nets of undersized-mesh, and by releasing, in good condition, all turtles caught in nets.
- To be actively involved in conservation initiatives (e.g. mangrove planting, butterfly farming, bee-keeping, wildlife clubs etc.)

When asked, "What are the requirements for the bursary?", no one mentioned conservation. Most mentioned scoring above the required marks on exams, maintaining a C average or above in secondary school, and paying the required contribution to the parents association.

Very few non-ASSETS participants knew about ASSETS. Non-ASSETS participants who had knowledge of the program generally thought of it as a bursary scheme and did not associate the project with the forest in any way. One man knew of the link with the forest but thought that he lived too far away from the forest (roughly 1 km) to benefit – though his next-door neighbour was a beneficiary. This lack of understanding indicates that ASSETS beneficiaries are not very vocal within their communities about the program, though they claim to be.

It should also be noted that not all ASSETS participants were well-informed or positive about the forest. Those participants who were not very active in the program and/or did not attend meetings had little to no knowledge of the forest's importance:

"It brings benefits to the government, like the animals. I don't know why the animals are important. They would rather an elephant kill a person than a person kill an elephant, but I don't know why." (Mij-A)

However, despite misconceptions, those who were involved in the program to a greater extent than simply receiving the bursary were more informed and positive towards the forest than non-ASSETS participants. ASSETS was widely praised among community members, and seemed to foster positive attitudes towards the forest, increased knowledge and awareness, and a sense of ownership.

## 6. CONCLUSIONS & RECOMMENDATIONS

## 6.1. Complexity of Attitudes

Local residents' attitudes towards ASF were complex and multidimensional. Positive attitudes often went hand in hand with negative sentiments, and participants often had difficulty expressing their attitudes and perceptions. I found that the question "Do you like the forest?" was not a good indicator of attitude, since answers were unanimously positive, and many people expressed predominantly negative sentiments. Asking whether a person would be happy if the forest were cleared was a better way to assess attitude. However, this question has limitations because it assesses a person's attitude towards the act of clearing the forest, and not the forest itself.

Contradictions abounded in participants' answers to questions, revealing the complex and multidimensional nature of their attitudes towards the forest. A person might express fondness for the forest and even mention its importance for conservation, and in the next sentence would express a desire that the forest be cleared for shambas or extreme disdain for the wildlife which were 'dangerous and destructive'. These contradictions further attest to the complexities and difficulties involved in assessing attitudes.

It must also be acknowledged that attitude does not necessarily lead to behavior. Even though the majority of participants expressed positive attitudes, further study is necessary to determine whether positive attitudes actually lead to conservation behavior towards the forest. This further study should include monitoring of indicator species and habitats within the forest alongside attitude surveys to determine whether attitudes are linked with behavior patterns. As alluded to in the following quote, it is very likely that needs stemming from poverty and hunger will prevail in dictating people's behavior:

"Most people go into the forest because of hunger. People that go are always afraid and fearful. You don't even go for three days without hearing 'so and so' got caught in the forest." (Boga-NP)

If a person is hungry and needs to feed his/her family, the person will illegally extract resources from the forest regardless of holding a positive attitude towards the forest. People do not enjoy entering the forest illegally – according to the previous quote they are always "afraid and fearful." However, many people are forced into such illegal behavior due to poverty. This simply emphasizes the necessity of poverty alleviation along with practical conservation and awareness-raising by ICDPs.

### 6.2. Already-existing perceptions as building blocks for ICDPs

Many ASSETS non-participants held favorable attitudes towards ASF. The fact that non-participants frequently mentioned 'existence factors' implies that, though lacking in specific knowledge of the forest's importance, these people possessed an ingrained knowledge of the forest as something good and worth protecting. Already-existing positive perceptions imply that a complete attitude-shift is not necessary, since no one held an inherently negative attitude towards the forest. ICDPs such as ASSETS should work to change negative perceptions while encouraging and building upon positive perceptions. Those non-ASSETS participants who mentioned existence factors are simply lacking in specific knowledge and awareness which can be spread through ICDPs such as ASSETS. In fact, ASSETS is already doing a good job of building upon many positive perceptions. By encouraging parents to plant trees on their shambas, they are building upon the positive perception of the forest as a source of resources – the fact that the parents hold this view implies that they need resources, and ASSETS is helping them to come up with alternative sources for those resources, ensuring that the forest continues to exist. Very few people mentioned recreation/aesthetic benefits, but ASSETS takes parents into the forest for seed collection and tree planting, encouraging positive experiences in the forest which may help to foster positive recreation/aesthetic perceptions. However, as mentioned later, ASSETS should consider doing more to foster such experiences.

## 6.3. The forest as an isolated habitat

Most people thought that the only way to protect the forest was to keep people out. The vast majority of people felt the forest should be protected. When asked whether local community members should be more involved in managing the forest, the dominant opinion was that the government should be solely responsible for forest management. People felt that if "owned" by the community, people would freely go into the forest and destroy it until there was nothing left. People seemed extremely distrustful of the ability of the community to adequately manage the forest. For example, one non-ASSETS participant from Boga said,

"In my own opinion I would have it for the community but if the community owned the forest they might even go in and destroy it for shambas so it's better owned by the government." (Boga-NP)

There was a prevailing view that the forest would do fine if it were only left alone, without human presence, and that having a small patch of forest as a 'remembrance' was sufficient. People saw the forest as in need of protection, but had no concept of the environment as a whole being interconnected.

In spreading awareness, ICDPs must stress the concept of habitat fragmentation, so that people recognize the need for connectivity and the fragility of the forest as an isolated habitat. People need to realize that an isolated forest surrounded by farms filled with exotic trees is not "doing fine." In encouraging the planting of indigenous trees on farms, ASSETS is helping to spread this awareness. However, they should do more to promote understanding as to why this is important.

### 6.4. The need for positive experiences

Nearly all participants seemed to have a fear of entering the forest. When asked if they enjoyed spending time inside the forest, a large majority said that the forest was dark and harbored dangerous animals, so the least amount of time spent in the forest, the better. This sentiment is revealed in the low number of positive recreation/aesthetic perceptions expressed. ICDPs should promote positive experiences *inside* the forest, rather than simply spreading the notion that the only solution is to keep people out. For example, ASSETS should plan more trips for parents to the forest that are fun and enjoyable. Many studies have shown that the desire to conserve nature often stems from a person's past experiences simply enjoying being in a wilderness setting. Disappointingly low numbers of Kenyans actually visit their own country's national parks and protected areas. High entrance fees deter many people who simply cannot afford to enter the parks. Kenya Wildlife Service recently increased the entrance fee for ASF to 100 Kenyan Shillings for residents and \$20 US for non-residents. This cost may make it difficult to promote such experiences. However, positive experiences within a protected area are vital for fostering and sustaining positive attitudes among local community members. One member of the Kipepeo Project expressed an enjoyment of the forest, saying,

"It's so cool, with big trees all around you and monkeys jumping around, birds singing; it's pleasing to the heart." (Mij-NP)

This man had long been a member of Kipepeo, saying that he had never entered the forest before the project started, but since had been going in regularly to collect butterfly pupae. Promoting enjoyable experiences such as these is something that should be considered by all ICDPs.

## 6.5. Spiritual value of ASF

The findings of this study show that ASF has little cultural or spiritual value for the local population. This is in agreement with the findings of a KIFCON report (1992) as well as Negussie (1997), who found that although the Giriama protect small patches of forest known as kayas as ancestor shrines, few kaya shrines exist in ASF and the cultural and spiritual value of the kaya is declining with successive generations. It is worth repeating the quote already cited in this report regarding the spiritual value of the kayas:

"The kayas are sacred, like a shrine. They have big trees. People are afraid to sneak into the kayas because of the spirits. During the old times people didn't cut big trees because they were sacred. They contained good angels; they'd go under the trees and ask for rain. But nowadays people don't believe – they think God is in the church and the mosque."

This quote serves as a challenge to a faith-based organization like A Rocha Kenya, umbrella organization to ASSETS. Missionaries in Africa have, over time, led local people to believe that once converted, they need no longer search for the spiritual in nature. For the Giriama, God has becomes confined to man-made buildings (the church and mosque). Though they once found the divine in the forest, the Giriama have since lost that appreciation. However, the people bordering ASF do believe in God, the vast majority claiming to be either Christian or Muslim. A faith-based organization such as A Rocha is in a unique place to build off of people's past associations and current faith, reinstating an awareness of the presence of God in the forest.

## 6.6. Expansion and decreasing benefits

The main problem mentioned by participants pertaining to experiences with ICDPs other than ASSETS was that of expansion and decreasing benefits. Many people said that in the beginning stages of the project with which they were involved, they benefited greatly, but as the project expanded, the benefits decreased significantly. This member of an ICDP said,

"In the past there were more benefits... because there weren't many people involved then. After it expanded there were so many people involved and the benefits decreased because it became competitive, and there was a small market, so there were many restrictions; you'd take the products [to the ICDP office] and they wouldn't be accepted. Many farmers got discouraged and the numbers [of farmers] started reducing. I'm currently not very involved because the local market is so competitive."

The issue of expanding too quickly is one that all ICDPs should be wary of. A project runs the risk of disillusioning members if they focus all of their efforts (and funds) on expansion and not enough on the experiences of individual members. In cash-incentive based ICDPs that provide alternative sources of income, this occurs when the market for the product is not large enough to support the number of farmers attracted to the ICDP. In a project such as ASSETS, this could happen if ASSETS expands to include more students in more schools than their funds can support. The questioned must be asked, 'do we focus on providing the best possible opportunities for a smaller number of students, or do we focus on providing access to basic secondary school education for the largest number of students possible?' This is a question that must be addressed by project staff members who know the needs of the community and interact with community members on a daily basis. However, it should not be overlooked.

### 6.7. Opportunities for ASSETS graduates

When asked how ASSETS could be improved, two wishes were expressed. Many participants said that they wished ASSETS would pay for higher education (beyond secondary school). Many also desired that ASSETS provide career training in the form of employment or volunteer opportunities. These desires reflect the fact that secure jobs are hard to come by after secondary education alone. Many ASSETS beneficiaries come from very poor families who cannot afford to pay for any training beyond secondary school. Although at present, funds do not allow ASSETS to pay for higher education, this should be considered in the future as the project faces decisions whether to expand to more primary schools or to focus more funding on current students. ASSETS should also consider the possibility of providing volunteer training to a select few beneficiary graduates. A Rocha Kenya could provide graduates with the opportunity to experience the workings of a conservation organization at very low cost (meals and guidance alone – provided the volunteer could secure housing elsewhere).

#### 6.8. Collaboration with other ICDPs

All ICDPs should recognize that their mission will be most easily and effectively achieved if they work in cooperation with other ICDPs in the same area. It is an all too common occurrence for projects to arise independently of one another, often with similar or even overlapping goals. It is necessary for ICDPs to recognize that they cannot do everything, and that other projects may have the capacity to take over where one falls short. ASSETS should work to link community members with other ICDPs, particularly those involving alternative technologies or livelihood training.

## 6.9. Need for on-going evaluation

ASSETS, along with all ICDPs, should continue to evaluate and monitor its programs. Most ICDPs in developing countries do not include a form of evaluation in their design (McDuff, 2001). Too often, when evaluation does occur, it is typically conducted by external evaluators for the purposes of accountability, and results are rarely used to improve programs (Bamberger, 1991). An analysis of conservation education programs revealed that those that conduct formative evaluation showed higher

rates of overall success than programs with no formal evaluation component (Jacobson and McDuff, 1997). Provided they are conducted in a participatory way, evaluations can be a useful tool not only for assessing ICDPs as a paradigm, but also for improving those existing projects and empowering local conservation leaders and community members. Returning to the question, "Does attitude influence behavior?", it is important that ASSETS conduct evaluations in such a way that they assess both attitudes and behaviors of participants, including attitude surveys and ecological monitoring. Ongoing evaluations, provided the results are used by the project, can help to improve existing programs and provide funding organizations with evidence of success and progress.

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### APPENDIX I: ASSETS PARTICIPANT QUESTIONNAIRE & INTERVIEW GUIDE

#### Socio-economics

- 1. Description of homestead:
  - a. Number of houses in compound
  - b. Type of roof
  - c. GPS coordinates of home
- 2. Name
- 3. Gender
- 4. Age
- 5. Tribe
- 6. Religion
- 7. Relation to beneficiary
- 8. Name of ASSETS beneficiary
- 9. How many children do you have?
- 10. How many of your children are in primary school?
  - a. Seconary school?
- 11. How many have completed primary school?
  - a. Seconadry school?
- 12. How many babies do you have? Married children?
- 13. What do your children do who are not in school?
- 14. What does your spouse do?
- 15. How many years of education have you had?
- 16. How long have you lived on this land?
  - a. Where did you come from (if moved)?
  - b. Why did you come here?
  - c. How was this land acquired?
- 17. How much land do you own here?
- 18. Do you farm any other land?
- 19. What crops do you grow here? On your other land?
- 20. Do you plant any trees on your shamba?
  - a. Where did you get the seeds?
- 21. How do you make money?
  - a. Are you dependent on anyone in your family who works away from home?
- 22. What animals do you own?
  - a. How many?
- 23. Where do you get your:
  - a. Fuelwood
  - b. Poles
  - c. Water
- 24. Do you ever see wild animals in your crops?
  - a. What kind of animals?
  - b. When did you last see them?

## Forest: Attitudes, Perceptions, and Use

- 25. What benefits do you associate with the forest?
- 26. What problems do you associate with the forest?
- 27. Do you like or dislike the forest?
  - a. Why?
- 28. Would it make you happy if the forest were cleared?
- 29. Do you get any resources from ASF? (Suggest legal uses: mushrooms, honey, wild fruits, medicinal plants)?
- 30. Do you ever enter Arabuko-Sokoke Forest?
  - b. Why?
  - c. How often?
- 31. Do you feel that you're dependent on the forest for any reason?
- 32. What are your feelings about the management of the forest?

- 33. Does the forest belong to the people or the government? Is that the way it should be?
- 34. Do you have a story about an experience you've had in the forest that made you feel strongly either good or bad? If no, do you know of a story you've heard from someone else or that has been passed down through generations about the forest?

## Participation in Conservation and Development Projects

- Are you aware of any projects other than ASSETS that aim to help people living adjacent to the forest? If no, prompt.
- 36. Have you participated in any of these projects?
  - a. In what ways did you benefit, if any?
  - b. Did you like your experiences?
- 37. If no: Would you like to participate in any of these projects?
  - a. Which ones?
  - b. Do you think these projects are helping people?
- 38. If someone were going to start a new project in this community, what kind of project would you suggest?
- 39. Why was your child given an ASSETS bursary?
- 40. Where does the money come from that pays for your child's secondary school fees?
- 41. Are you aware of any other requirements to get the bursary?
- 42. How have you participated in ASSETS?
- 43. Do you participate in the parent meetings? If not, does anyone else in your household?
- 44. Do you go to the tree nursery any other times during the week?
- 45. How do you feel about going to the tree nursery?
- 46. Have you liked your experience with ASSETS?
- 47. What do you think is the goal of ASSETS?
- 48. Do you feel differently about the forest now than you did before you participated in ASSETS or other project? How so?
- 49. How would you improve ASSETS?

#### Sample Follow-up Interview Questions

- 1. Are you happy to be living near Arabuko-Sokoke Forest?
- 2. Why do you think the forest is protected?
- 3. What is the biggest problem facing this community?
- 4. Why do you think education is important?
- 5. Do you think that people living adjacent to the forest should be more involved in forest management?
- 6. Have you heard of someone being caught for doing illegal activities in the forest? What happened?
- 7. Is it common for people in this community to go into the forest for resources?
- 8. Do people from this community ever report illegal activities they see going on in the forest?
- 9. Have you ever heard of someone being hurt or threatened because they reported someone?
- 10. Do ASSETS parents every report other people in the community that they see doing illegal activities? Do they talk to people in the community about conservation? Does this cause people who are not ASSETS beneficiaries to feel resentful?
- 11. Has your child (the ASSETS recipient) ever told you or your family anything about Arabuko-Sokoke Forest or conservation? Did that make you think differently about the forest?

## APPENDIX II: NON-ASSETS PARTICIPANT QUESTIONNAIRE & INTERVIEW GUIDE

## Socio-economics

- 2. Description of homestead:
  - a. Number of houses in compound
  - b. Type of roof
  - c. GPS coordinates of home
- 3. Name
- 4. Gender
- 5. Age
- Tribe
- 7. Religion
- 8. How many children do you have?
- 9. How many of your children are in primary school?
  - a. Seconary school?
- 10. How many have completed primary school?
  - a. Seconadry school?
- 11. How many babies do you have? Married children?
- 12. What do your children do who are not in school?
- 13. What does your spouse do?
- 14. How many years of education have you had?
- 15. How long have you lived on this land?
  - d. Where did you come from (if moved)?
  - e. Why did you come here?
  - f. How was this land acquired?
- 16. How much land do you own here?
- 17. Do you farm any other land?
- 18. What crops do you grow here? On your other land?
- 19. Do you plant any trees on your shamba?
  - a. Where did you get seeds?
- 20. How do you make money?
- 21. Are you dependent on someone else in your family who is working?
- 22. What animals do you own?
  - a. How many?
- 23. Where do you get your:
  - a. Fuelwood?
  - b. Poles?
  - c. Water?
- 24. Do you ever see wild animals in your crops?
  - a. What kind of animals?
  - b. When did you last see them?

## Forest: Attitudes, Perceptions, and Use

- 25. What benefits do you associate with the forest?
- 26. What problems do you associate with the forest?
- 27. Do you like or dislike the forest?
  - a. Why?
- 28. Would it make you happy if the forest were cleared?
- 29. Do you get any resources from ASF? (Suggest legal uses: mushrooms, honey, wild fruits, medicinal plants)?
- 30. Do you ever enter Arabuko-Sokoke Forest?
  - a. Why?
  - b. How often?
- 31. Do you feel that you're dependent on the forest for any reason?
- 32. What are your feelings about the management of the forest?
- 33. Does the forest belong to the people or the government? Is that the way it should be?

34. Do you have a story about an experience you've had with the forest that made you feel strongly either good or bad? If no: Do you know of a story that you've heard from someone else or that has been passed down through generations about the forest?

#### Participation in Conservation and Development Projects

- 35. Are you aware of any projects that aim to help people living adjacent to the forest? If no, prompt.
- 36. Have you participated in any of these projects?
  - a. In what ways have you benefited?
  - b. Did you like your experiences?
- 37. If no: Would you like to participate in any of these projects?
  - a. Which ones?
  - b. Do you think these projects are helping people?
- 38. If someone were going to start a new project in this community, what kind of project would you suggest?
- 39. Have you ever heard of ASSETS or A Rocha?
  - a. If no, prompt: It's a program that gives out bursaries for children to attend secondary school
- 40. If they've heard: What do they do? What is the goal?
- 41. Do you think ASSETS is helping people?

## Sample Follow-up Interview Questions

- 1. Are you happy to be living near Arabuko-Sokoke Forest?
- 2. Why do you think the forest is protected?
- 3. What is the biggest problem facing this community?
- 4. Do you think that people living adjacent to the forest should be more involved in forest management?
- 5. Have you heard of someone being caught for doing illegal activities in the forest? What happened?
- 6. Is it common for people in this community to go into the forest for resources?
- 7. Do people from this community ever report illegal activities they see going on in the forest?
- 8. Have you ever heard of someone being hurt or threatened because they reported someone?
- 9. Do you think education is important? Why?

## APPENDIX III: PERCEPTIONS BY CATEGORY

## Positive Perceptions

Benefits	Boga (%)	Mijomboni (%)	Nyari (%)	ASSETS (%)	Non-ASSETS (%)
ASSETS	40	47	31	70	4
Bursary	40	47.1	28.2	68.3	3.8
Training	3	0	3	3	0
Trips	3	9	3	8	0
Conservation/Ecosystem Services	18	21	31	25	21
Provides food/shelter for animals	8	6	13	10	8
Has animals found only in ASF	5	3	5	7	2
Source of indigenous seeds	3	9	0	5	2
Windbreaker	3	3	3	3	2
Future generations can see what a					
forest looks like	5	0	3	2	4
Clean air	0	0	8	3	2
Controls soil erosion	0	0	8	3	2
Protects the environment	0	3	3	3	0
Fertile soil	0	0	3	2	0
Fertility	0	0	3	0	2
Brings rain	68	47	62	65	53
Employment	3	12	5	3	9
Forest guards	3	0	3	2	2
Tour guides	0	9	0	0	6
Workers on electric fence	0	3	0	0	2
	8	9	5	2	13
Existence factors  Just exists	3	0	5	0	6
	3	3	0	0	4
Brought up near forest	3	0	0	0	2
Stays close to the forest					
Been with forest for a long time	0	3	0	2	0
Belongs to the community	0	3	0	0	2
God's creation	3	3	3	0	6
Forest belongs to God	3	0	3	0	4
Animals were created by God	0	3	0	0	2
Government	5	3	8	2	9
Animal products (like ivory) help					
government	3	0	0	0	2
Foreign \$ to government	0	3	3	2	2
Animals benefit the government	0	0	3	0	2
Income for economy	0	0	3	0	2
Keeps animals away from shambas	3	3	3	2	4
Other	5	0	3	10	17
Toilet	0	0	3	0	2
Short-cut route	5	0	0	3	0
Potential for clearing for land/food	10	3	3	2	9
Projects	5	26	10	10	17
Bees	3	9	5	5	6
Nature Kenya school	3	0	0	0	2
Projects (General)	0	6	3	2	4
Kipepeo Project	0	18	0	5	6
Nature Kenya tree nurseries	0	6	0	0	4
Training and learning	0	3	0	0	2
KWS school	0	0	3	2	0
Recreation/aesthetic	8	0	3	3	4
Beautiful	3	0	0	2	0
Shade	8	0	0	3	2

Cool	0	0	3	0	2
Resource Extraction	60	79	64	70	64
Poles	43	53	44	50	42
Fuelwood	48	56	46	55	43
Water	15	0	0	3	8
Medicinal plants	5	6	8	10	2
Charcoal	13	3	0	5	6
Bushmeat	3	9	10	7	8
Wood for carving	10	0	3	5	4
Wild fruits	3	3	13	10	2
Timber	10	29	21	20	19
Resources (General)	0	3	0	2	0
Strings for tying roofs	0	0	3	2	0
Mushrooms	0	0	3	2	0
Timber for government schools	0	0	3	2	0
Tourism	13	38	31	37	15
Tourism (General)	18	38	31	42	13
ASSETS tree house attracts tourists	3	18	0	12	0
No Benefits	24	13	0	10	2

# Negative Perceptions

Problems	Boga	Mijomboni	Nyari	ASSETS	Non-ASSETS
	(%)	(%)	(%)	(%)	(%)
Harbors robbers	0	0	0	5	3
Illegal destruction	0	3	9	5	10
Lack of ownership	8	3	5	2	9
Forest is owned by someone else	6	5	0	5	2
Only government benefits	0	3	3	0	0
Benefits elephants and white					
people	6	0	0	3	0
Other problems	3	12	3	7	4
Accidents with panga	0	0	3	0	2
Biting insects	6	0	3	3	0
Fear the forest	0	3	3	0	3
Can easily get lost	0	0	3	0	2
Problem animals	55	38	67	62	45
Crop damage	18	23	9	18	13
Past crop damage	0	3	6	8	8
Elephants-crop damage	18	3	0	23	10
Elephants-past crop damage	0	8	9	0	7
Fear/attack	0	8	26	8	15
Wild animals (general)	12	20	6	8	13
Animals a problem for others					
(only forest-adjacent households)	12	5	0	10	5
Weaver birds destroy fruit	6	0	0	3	0
Problems with forest guards	12	25	38	13	27
Project problems	0	3	3	3	0
ASSETS only benefits certain					
families	0	0	0	3	2
ASSETS won't help with college	0	3	0	0	2
Kipepeo problems	0	0	3	0	2
Bee hives have no bees	0	0	3	0	2
Restricted access to resources	13	18	3	5	17
Not allowed to go inside	12	3	3	5	2
Have to sneak in	0	3	0	0	0
Can't access resources	6	10	15	3	5
No Problems	30	24	23	22	30

APPENDIX IV: SOCIO-ECONOMIC VARIABLES

	Boga	Mijomboni	Nyari	ASSETS (n	Non-ASSETS	Total
	(n = 40)	(n = 34)	(n = 39)	= 60)	(n = 53)	(n = 113)
Distance of home						
to ASF						
< 0.5 km	13	10	8	7	24	31
0.5 - 1  km	6	7	2	12	3	15
1 – 1.5 km	10	1	3	8	6	14
1.5 - 2  km	7	9	6	15	7	22
> 2 km	4	7	20	18	11	31
% Female	83	29	36	68	74	28
Average number						
of children	6.6	6.6	6.2	7.3	5.6	6.5
Average age	44	44	45	46	42	44
Average education						
(years)	2.9	3.8	4.1	4.1	3.0	3.6
Average residency						
(%)						
Born there	2	9	6	13	17	17
<20 years	11	6	16	27	32	33
>20 years	23	10	12	43	36	45
Didn't know	4	9	5	17	15	18
Religion (%)						
Christian	58	56	56	60	56	57
Catholic	3	9	10	8	6	7
Muslim	5	6	8	8	4	6
Traditional	3	0	18	10	4	7
None	33	29	3	13	32	21
Roof type (%)						
Thatch	68	59	74	61	74	67
Iron	32	41	26	39	26	33
Land (%)						
< 3 acres	11	3	35	17	8	15
3 – 6 acres	24	9	19	13	21	20
7 – 12 acres	37	69	25	43	36	47
13 – 20 acres	16	13	3	10	9	11
> 20 acres	13	6	0	7	6	7