

## **PILOT YEAR FINAL REPORT**

**To:**

**Date Submitted:**

**Project Title:** Kibale Community Fuel Wood Project

**Project Location:** Villages in Kiko and Isunga Parishes

**Primary Investigators:** Rebecca Goldstone and Michael Stern

**Address:** USA: 480 Hogback Rd Johnson VT 05656

Uganda: Box 730 Fort Portal, Uganda

**Phone:** 256-77-4105941

**Email:** kibalewood@yahoo.com

**Project Web Page:** [www.chimp-n-sea.org](http://www.chimp-n-sea.org)

**Organization Name:** Chimp-n-Sea Wildlife Conservation Fund

---

With the pilot year completed in May 2007, we can now officially report on the progress made and our methods for moving forward. We hope you enjoy the details below, reporting on the tree planting, stove building, and outreach education campaigns. The new year began in June and similar activities are currently being conducted, with modifications made based on experiences reported in this document.

**The goals and objectives** of the Kibale Community Fuel Wood Project (KCFWP) are:

- 1) To establish tree demonstration areas and actively promote home-grown wood.
- 2) Through an educational outreach program, to enhance appreciation for the National Park and its wildlife while teaching and encouraging the use of environmentally sustainable practices.

**These goals have been accomplished in the pilot year target areas of Kiko and Isunga, two of the Parishes that border Kibale National Park (KNP).** Fulfillment of these measurable goals is also helping achieve the project's stated purpose of protecting the wildlife of KNP from human encroachment and improving park-people relations by facilitating energy stability in surrounding villages.

## Education Campaign

The education campaign includes outdoor movie shows, a natural history museum, writing and drawing competitions, and workshops.

### The Science Center

Developed while *in situ* and housed in a trading center one kilometer from Kibale, the Science Center displays natural artifacts on loan from the Uganda Wildlife Authority in an educational setting (see full list of artifacts in attachment 1). The center also acts as a demonstration area, and the artifacts serve as a draw for people to learn about building fuel efficient stoves and growing trees.

The center is open 2-3 days each week and averages nearly 500 visitors each month. (While originally planned to be opened 3 days every week, the decision was made to only open on weekends and school holidays, so that students would not come to the museum rather than attend school.)

**In its first year, a total of 5,752 people visited the Kaburala Science Center,** approximately 60% children and 40% adults. A one-year anniversary party was planned by the community as a surprise for the project directors, and was even more heavily attended than the opening party. The continued high attendance to the Science Center provides the KCFWP with proof that interest remains in learning about Kibale and the project itself.

Two new conservation clubs were formed to celebrate the anniversary, both of which were comprised completely of adults. This fact bears some comment, as the local Kyanyawara Conservation Club had been in existence for several years, and is made up entirely of children. That enough members of the community felt moved and inspired by the Science Center to warrant the creation of two completely new clubs is an extremely encouraging sign of the Center's success. Another happening of note was the donation of a domestic pig skull to the pig family display. This was not only a sign of comprehension of the mission of the center and of the relatedness of domestic pigs to those (three species) found in Kibale, but a sign that community members want the place to be at its best, with as complete a collection as possible.

All artifacts found in the Science Center are on loan from the Uganda Wildlife Authority. We are grateful for their collaboration and support of this aspect of the project.

*Note: All facts about the Science Center are regarding its first year of operation, from October 1<sup>st</sup> 2006 – October 1<sup>st</sup> 2007. All other facts and figures in this report are regarding the pilot year of the KCFWP as a whole, which ran from June 2006 – May 2007.*

### Movie Shows

The traveling movie shows continue to draw very large crowds. In the pilot year, a total of **23 shows were screened at seven different locations**, many of which were accompanied by song/dance/acting performances by local environmental groups. An average audience consisted of 350 people, approximately half adults and half children. Movies have focused on Ugandan wildlife, as well as wildlife from around the globe. The success of the shows is not only evidenced by continued large audiences, but also by the oohs, aahs, and cries of delight and excitement during the events.

Most movies have subtitles that help people understand the spoken English better, though simply watching nature in action is an effective learning tool. At sections that may be difficult to comprehend, our staff members explain what is happening in the local language. It is amazing how quiet crowds of up to 600 people will stay when they are interested to hear what is going on.

Movie shows were not conducted as frequently as originally planned, due to the energy requirements of the equipment and the intermittent nature of electricity at our base (we used rechargeable batteries that took several days to charge). In the expansion phase the project received a grant for solar power, and currently all our of energy requirements are met by the power of the sun. This should allow for weekly shows, as originally planned.

### Workshops

**Four stove workshops were held**, attended by a total of 165 people. Participants were able to witness a “contest” between a fuel-efficient stove and the local three stone fire, as well as gain first hand experience in stove building. Additionally, mini-workshops were held at people’s homes while in the process of building a stove, and in trading centers where bricks were available. The project used every opportunity to gather people and share information, and stove building always draws a crowd of interested individuals.

### Contests

**Three educational contests were held in the pilot year**, with 313 total entries and 35 winners. The first asked for art or essay submissions about Kibale, the second focused on writing entries concerning traditional or creative stories, and the third asked for thoughts or comments about the KCFWP. Educational and utilitarian prizes (school supplies, posters, mosquito nets, etc.) were awarded for the best submissions. Winners also read/presented their work to audiences at movie shows. These contests will continue as a means of keeping community enthusiasm high, practicing participatory learning techniques, and as a means of evaluation for the education campaign.

**Totaling attendance at workshops, movie shows, the science center and entries in the education contests, the KCFWP has actively engaged nearly 12,000 people in our pilot year activities.**

## **Demonstration Areas**

Six demonstration areas were attempted (4 in Kiko Parish, 2 in Isunga Parish); four were successful (3 in Kiko, 1 in Isunga), exceeding our initial target of three. Three of the successful demonstration areas are at churches, the fourth is a property being rented by the project in a popular trading center (that also houses the Science Center). Churches were chosen as the main focus for demonstration areas because they are the only existing community meeting places.

Each demonstration area was planted with a border of over 100 trees in October, 2006. Both *Sesbania sesban* and *Markhamia* were planted during the first rainy season (both indigenous, nitrogen fixing trees that can be planted with crops). The seedlings that did not survive the first rains or the threat of goats were replaced in April 2007 (the second rainy season). In April, additional species of indigenous legume trees were also planted (*Leuceana*, *Calliandra*, and *Acacia*), to see if they could perform better than *Sesbania*, although *Sesbania* remained the star performer.

### Review of Demonstration Areas

- At two areas (Kaburala Science Center and Kyanyawara Christian Fellowship), the trees performed as anticipated, and grew to over fifteen feet tall in just six months. At one of these

areas, trees were cut at both 6 months and one year to test their coppicing and wood production capabilities (results of these cuts below). At the other, they were left growing, as we were awaiting the results of the first cut.

- At two areas (Kasojo Catholic Church and Isunga Catholic Church), volunteers took relatively good care of the trees, but they failed to perform as well as expected. This was addressed with a second planting of superior seeds of increased varieties in April 2007 and further education of the volunteers. Better sensitization and the replanting of seedlings did indeed work at both areas. Upon inspection in October, the trees were very tall and looked strong. Some trees that had been struggling in April due to trampling had even bounced back and are now thriving. Some of the trees at each of these areas were cut to test coppicing capability, as they are a different variety of *Sesbania sesban*.
- At the final two areas (Kyanyawara Church of Uganda and Iruhuura Church of Uganda), volunteers neglected the trees. Goats and people destroyed the seedlings by eating/walking on them. This was addressed with better sensitization of the immediate neighbors of these areas, as well as a second planting in April 2007, and a third and final attempt in September 2007. Replanting at these areas did not prove to be successful. Our repeated meetings motivated neither church leaders nor community members, and no trees remain. We will continue to work with these areas on our education campaigns but will no longer plant seedlings at their locations.

### Wood Production

Fifty of the trees at the Kaburala demonstration area underwent their first cut in April 2007, producing 32 pounds of wood and 30 pounds of leaves. All of these trees coppiced as expected, though not all survived until the next harvest six months later. A second cut from the 22 of these same trees that survived and thrived after the first cutting yielded another 25 pounds of wood. Other trees at the same demonstration area, which had been allowed to grow for a full year before harvesting, were harvested in October. Twenty-three one-year-old trees were cut, yielding 97 pounds of wood. Several of the strongest trees were left standing, in order to provide seeds. **The total amount of wood harvested from one year of growth at the Kaburala demonstration area was 154 pounds.** While this does not approach the more than 50% of the wood a family would use in a year that we were hoping for, it is still a considerable amount of wood for a family is using a fuel efficient stove. The harvesting methods reported in the literature as being most successful in Kenya and India were in fact not the most successful in Uganda; further refining of the harvesting methods should allow for even greater production. (A discussion of why these harvest methods did not work as well as they might have is below.)

Most of the trees at other successful demonstration areas were left standing, as a source of seeds and also because we wanted to test the harvest techniques on a small sample before completing on all the successful trees.

### Review of Wood Production Results and Harvest Methods

The 50 trees that were cut at 6 months and a year produced a total of 57 pounds of firewood. The 23 trees cut only once, at one year, produced 97 pounds of firewood. This may indicate a shift in our future growing recommendations.

Part of the problem with the trees cut at 6 months was that less than half of them survived to the next cutting. 28 had serious problems with pests, and did not survive. It is possible that, because *Sesbania sesban* is native to Uganda, the pests here are better adapted to exploiting a cut tree than

they are elsewhere. Additionally, in some trees, the cutting itself damaged the trunk (by peeling bark), exposing an even greater portion of the tree to pests and disease. However, the amount of re-growth after another six months suggests that these trees would have produced less wood than trees harvested at 12 months even if all had survived.

The solution is not as simple as merely cutting the trees at one year instead of at six months, though. When cut at one year, the trees had lost their juvenility, and only three of the 23 showed any signs of coppicing. Therefore, if trees are to produce the maximum amount of wood on limited amounts of land (cutting at one year), yearly re-planting would most likely be needed, thereby increasing the amount of effort and time required. The KCFWP is still experimenting with how these one-year-old trees will perform, and sensitizing the community as to the various costs and benefits of cutting trees while young versus at one year of age.

### Overall Impressions of the Demonstration Areas

A note on *Sesbania sesban*: The tree, which we have adopted as our star performer, has in fact lived up to much of its reputation. From a seed, the tree grows remarkably quickly and can grow with very little space and minimal care. It produces very good quality firewood that dries quickly, is dense and burns hot. However, while reports say the tree can be harvested up to eight times a year, we find that twice a year is much more realistic for Uganda. Yearly harvesting and re-planting may prove to be the most productive method, though it is also very labor intensive, so we will continue to experiment in this respect.

Additionally, the natural variation in seeds has led to an inconsistency in the trees. Attempting to purchase seeds from Uganda's National Forest Authority produced mediocre results. We are now seeking out particular trees that grow and coppice appropriately and are creating a seed bank from those trees. Luckily, each tree produces a tremendous amount of seed. We are also planning to experiment with cloning individual trees from root cuttings.

Overall, we are pleased with the results and the effort put in by volunteers at the demonstration areas. Motivation and good training are definitely factors in the success of the demonstration areas, but the KCFWP also relies heavily on particular individuals interested in actively improving the fuel wood crisis. The demand for fuel wood continues to grow in all the areas we work, and the fact that some demonstration areas did not succeed suggests the project take a more individual approach. Within the first year, at least 100 people (60 from Kiko parish and 40 from Isunga) have taken seeds and planed at their homes – many have been successful in rearing trees. Their successes should help tremendously in encouraging others. Our demonstration area success rate is at 66%, so we will continue demonstration areas with those groups who are extremely motivated, (and continue introducing demonstration areas in new target locations), but we plan to also look towards individual farmers to act as ambassadors for the tree planting aspect of the project in the future.

### **Fuel Efficient Stoves**

The stove campaign has been one of the most successful parts of the KCFWP because it has been embraced and adapted by the local communities. The fuel efficient stove being promoted is based on the Winiarski “rocket stove”, where air is sucked through a limited intake chamber and vented through a small chimney directly onto the saucepan. This design reduces the amount of wood needed, and also burns hotter than a traditional stove, thus producing less smoke. It also cooks the food quicker!

The KCFWP adapted design is made out of local materials (brick, reeds, mud, and dung) and can be made for 2000 Ugandan Shillings. The project supplies metal at a subsidized cost (included in the 2000 Shillings) that can better direct the flow of heat toward the saucepan and act as a lid, which is absent in most homes.

The method for building is that a staff member visits the home of an interested individual, requests that they prepare materials and then returns at a scheduled time. The staff member builds a mock stove to instruct the individual and then allows the individuals to build their own stove. This way, if the stove is to break or if the neighbor requests one, this individual can do the work themselves, without relying on KCFWP staff.

In the pilot year, **132 stoves were built with the assistance of KCFWP staff and at least 10 additional stoves were built independently.** Our own experiments indicate that the stove reduces firewood consumption by 30%, while reports from individuals indicate that it can save up to 60% of the wood needed. **The average family using a KCFWP rocket stove used 37% less wood than the average family using a traditional stove.** Based on survey results and an estimate that the average “heap” of firewood weighs 20 pounds, **the 142 stoves initiated by the KCFWP have reduced wood use around Kibale by more than 1,500 pounds per day.** Also of note is how often people mentioned the stoves in the surveys as a means of reducing the firewood struggle as well as a way of better protecting Kibale National Park. (More details on stove use in Attachment 2, below.)

## Surveys and Evaluation

A total of 418 pre and post surveys were conducted of households in the pilot year. The information obtained confirmed our expectations that: 1) wood is becoming more difficult to obtain; 2) small plots of land are a hindrance for people wishing to plant trees, and; 3) people are eager to learn new ways to grow/conservate firewood. Aside from confirming our beliefs, the surveys also framed the project as a community driven endeavor, which has helped its acceptance. The impact here has been that citizens view the KCFWP as a program designed to provide assistance and advice, rather than a scientific study with no benefit to locals or as a donor program which gives materials without expecting anything in return.

Interesting survey findings can be found in attachment 2. Overall, an analysis indicates that:

- 1) It is still a struggle for people to obtain firewood;
- 2) The stove campaign was a success – **many more people are using fuel efficient stoves** (31% in June 2007 as opposed to 3.5% in June 2006), and **the average person using a fuel efficient stove uses 37% less firewood** than the average person still using a traditional stove;
- 3) The tree planting campaign, while not as successful as hoped for, did get the message of the benefits of planting Sesbania to people – **more people are growing trees at home** (61.5% in June 2007 as opposed to 55% in June 2006).
- 4) Fewer people are collecting their firewood inside Kibale National Park (21% in June 2007 as opposed to 37.5% in June 2006).

Some answers that indicate the education campaign is having an impact on people’s perceptions include: **Less people answered that they should be allowed to collect firewood inside Kibale National Park** (9% in June 2007 as opposed to 12% in June 2006); **More people answered that natural forests will disappear if we continue to rely on them for firewood** (94% in June 2007 as opposed to 83% in June 2006); **More people suggested using an energy saving stove as a good way to reduce the struggle for firewood** (17% in June 2007 as opposed to 0.5% in June 2006), and

even **more suggested an energy saving stove as a good way to help preserve Kibale** (26% in June 2007 as opposed to 0 in June 2006).

Some answers highlighted areas where we need to focus more effort in the education campaign: More people answered that they do not grow wood at home because their land is too small (83% in June 2007 as opposed to 79.5% in June 2006), and fewer people even thought it possible to grow firewood on small land (54% in June 2007 as opposed to 72% in June 2006). Our demonstration areas have proved the fact that it is possible to grow a significant amount of firewood around an average farm in this region; bringing this message to a greater proportion of the target population has proven to be a challenge. Ideas on how we aim to fix this can be found under the Demonstration Area heading, above.

## **Conclusion**

The KCFWP is beginning to better understand the complex needs and interests of the communities who border Kibale National Park and how these affect the Park and its wildlife. There is a clear desire in citizens to improve their living situations and reduce the daily struggles of village life, and in this regard, the fuel efficient stoves have been a welcome addition. Interest in planting trees appears present, though is not as high as we would like to see it. We feel that the desire to plant trees is related to the effectiveness of law enforcement inside the park, and we hope that working in collaboration with UWA will help with this. Some of the activities in the expansion phase are directly related to this aspect of the problem. Protecting Kibale National Park has become a very important thing to citizens, even a prideful aspect of their lives, as evidenced through written submissions and personal communication. We look forward to continuing to strengthen our relationships with communities around the park, working together to better protect this amazing wild environment while assuring that citizens also have their needs met.

**Thank you very much** for your support of the Kibale Community Fuel Wood Project! If you have any questions or comments, please do not hesitate to contact us at any time.

## **ATTACHMENT 1**

### **Science Center Artifacts List**

1. Elephant Skull
2. Elephant leg bone
3. Elephant tusk
4. Elephant tooth
5. Buffalo Skull
6. Buffalo femur bone
7. Buffalo vertebrae
8. Lion Skull
9. Lion skin
10. Lion foot print
11. Hippo tusk
12. Hippo skull
13. Red Colobus skeleton
14. Red Colobus skull
15. Black and white colobus skull
16. Two guenon skulls
17. Chimpanzee pelvis
18. Chimpanzee skull
19. Blue duiker skull
20. Red duiker skull
21. Red duiker skeleton
22. Bushbuck skull
23. Bush pig skull
24. Warthog skull
25. Warthog tooth
26. Domestic pig skull
27. Uganda Kob skull
28. Uganda Kob femur bone
29. Waterbuck skulls (male and female)
30. Cane rat skull
31. Terrapin turtle shell
32. Python teeth
33. White tailed Mongoose skull
34. Weaver bird nest
35. Finch nest
36. Insect collection
37. Confiscated poacher spears, net, bow & arrow, bell, and trap
38. Spider eating wasp
39. Butterfly collection

The center also includes an extensive library. A list of those books and magazines can be supplied upon request.



**ATTACHMENT 2****Survey Details**

(Note, this is not a full list of all survey questions – some are being used more for long-term analyses, and have been omitted here.)

	<b>Kiko June 2006* n=118</b>	<b>Kiko June 2007 n=100</b>	<b>Isunga June 2006 n=100</b>	<b>Isunga June 2007 n=100</b>	
Is it a struggle to obtain firewood?	<b>92% YES</b>	<b>95% YES</b>	<b>95% YES</b>	<b>95% YES</b>	
How do you propose to lessen the struggle?	<b>11% Take wood from KNP 1% Use a fuel efficient stove</b>	<b>8% Take wood from KNP 13% Use a fuel efficient stove</b>	<b>13% Take wood from KNP 0% Use a fuel efficient stove</b>	<b>10% Take wood from KNP 21% Use a fuel efficient stove</b>	
Do you grow trees at home?	<b>55% YES</b>	<b>63% YES</b>	<b>55% YES</b>	<b>60% YES</b>	
Average Wood Use	<b>1.08 Heaps</b>	<b>1.36 Heaps</b>		<b>1.15 Heaps</b>	<b>1.17 Heaps</b>
		<b>Trad. 1.5 Heaps</b>	<b>Fuel Eff. 1 Heap</b>		
Traditional or Energy Saving Stove?	<b>5% Energy Saving Stove 95% Traditional</b>	<b>30% Energy Saving Stove 70% Traditional</b>	<b>2% Energy Saving Stove 98% Traditional</b>	<b>32% Energy Saving Stove 68% Traditional</b>	
“You can grow trees on small land”		<b>59% TRUE 41% FALSE</b>	<b>72% TRUE 16% FALSE</b>	<b>48% TRUE 48% FALSE</b>	
“If we continue to rely on forests for firewood, they will disappear”		<b>97% TRUE 2% FALSE</b>	<b>83% TRUE 13% FALSE</b>	<b>90% TRUE 6% FALSE</b>	

\*Survey questions were modified after the June 2006 Kiko survey, so not all of the answers are present in that category.