



Program "My Elephant Neighbor"

Final Report – June 2011

1. Title : Program "My Elephant Neighbor"

2. Names of Investigators : Mr. Julien MARCHAIS, program coordinator & Ms. Erica ROGERS, principal investigator

3. Starting date : January 3, 2011

4. Completion date : June 21, 2011

5. Summary of project goals and objectives : Conservation education program for 10 year-old children with the following objectives :

- Offer the "My Elephant Neighbor" program outdoor component to **five hundred** ten-year-old pupils from **20 schools** located around the Deux Balé Forest in Burkina-Faso. The program consists of a day excursion in the nearest elephant reserve to observe elephants and learn about their biology, ecology and cultural importance. It teaches children about the vital importance of the natural habitat for elephants, biodiversity and also for human populations.
- Offer the classroom component of the program to the 20 participating classes from which the children participants to the one-day excursion are from and reach some **1000 pupils**. The classroom component aims at teaching the same knowledge offered on-site. In order to reach the children on an emotional level, it was planned to use **an elephant-size poster** of the elephants of the Deux-Balé forest.

- Investigate the immediate and long-term impact of the program, both in **Burkina-Faso and Botswana**. This research is carried out independently by PhD Candidate Erica Rogers from the City University of New York.

6. Describe any changes in goals and objectives from the original proposal : For practical reasons we had to slightly modify our 2011 objectives. We think the changes improved our program :

- We eventually offered the "My Elephant Neighbor" program outdoor component to **two hundred and fifty** ten year-old pupils from **21 schools** located around the Deux Balé Forest. The main reason why we had to reduce the number of on-site excursions was a massive national teacher strike during the period of the program in March. Given that we can only run the outdoor component of the program from February to April, it was impossible to run the 50 excursions initially planned. Therefore, we largely developed and implemented the classroom-based component. The 25 day-excursion were funded by IEF as planned.
- We eventually offered the classroom component of the program to **320 classes from the 160 schools of the whole province**. Doing so we reached nearly **9000 pupils instead of the 1000 initially targeted**. Instead of an elephant-sized poster, we decided to produce a **booklet titled "My Elephant Neighbor"** which reaches the children on an emotional level, while teaching them about elephants. We realized that the elephant-sized poster would physically deteriorate very quickly in the classrooms, and thus would not be a sustainable option. We considered producing several flex-print posters but teachers and education officers warns us that the circulation of the poster from one class to the other would be a serious problem. The production of a booklet was preferred by the community, giving a great opportunity for each pupil to read the story. Each class received its own copy of the booklet. We are sending you by mail a copy of the booklet with a printed copy of this final report. **Although IEF did not support the production of the booklet, we added your logo among all the partners of "My Elephant Neighbor" program. We very much hope you will enjoy it !**
- Erica Rogers Investigated the immediate impact of the program **in Burkina-Faso but not in Botswana**. Unfortunately, the Botswana program was not run this year by the Living With Elephants Foundation. The preliminary findings of this research are very interesting and we strongly hope that Erica will be in a position to come back next year in Burkina-Faso to assess the long-term impact the program on the children she interviewed this year.

7. & 8. Summary of project results, activities and findings :

- Outdoor component : We conducted 25 on-site excursions for 21 schools in February and March 2011. Four schools, with the highest number of pupils per class were offered two groups. In total 248 children took part in the program accompanied by their teachers. Elephants were seen in 72% of the excursions, which is a bit less than in previous years. Fortunately for the elephants, the quality of the habitat is improving and they are more dispersed throughout the reserve to forage. 96% of the children had never seen an elephant in person before the excursions, which shows once again, how important this educational program is. 25 teachers and 5 education officers participated in the program. All of them said that were happy with the program, stating that it benefits the children and that it is an important complement to their teaching. They told us that the program contributes positively to the

education of the children who develop a positive attitude towards wildlife conservation and environmental protection. Most of the teachers and education officers would like the outdoor component of the program to be extended to all the schools in the province and all of the pupils. Currently, this is not possible. The economic situation of the region is such that this outdoor excursion is not affordable for any of the schools.

- Classroom component : As mentioned above, we developed this component much more intensively this year than we first planned. We reached the 160 primary schools of the province instead of the 20 schools we have been working with for the past 5 years. We conducted a first workshop with education officers and teachers in February in order to improve the first version of "My Elephant Neighbor Booklet" and to organize the use of the booklet in the classrooms. Then in April and May we conducted 7 workshops with teachers from all 160 primary schools of the Balé province and with officers of the department of education. The improved version of the booklet was distributed to all the teachers with a guide to use it with their pupils. All the teachers confirmed that the booklet is useful for their teaching in environmental education and to raise awareness for elephant and wildlife conservation. 96% confirmed that the booklet was adapted for the targeted standards (4% reported feeling that it was too complicated to understand). All of the teachers were happy with the teacher's guide to use the booklet and found it appropriate. In total nearly 9000 children were targeted in the province. However, it is unlikely that all those pupils had a chance this year to get exposed to the booklet as May is the end of the school year in Burkina-Faso and massive strikes occurred this year. Nevertheless, we had the feedback from 152 teachers (95%) showing us that they used the booklet with their pupils and we have some very interesting children comments, yet to be analyzed, from all of those schools. For example, in the booklet, there is one drawing showing a little girl looking at elephants from a distance. We asked the children if they would like to be in such a position and 93% said yes, while 7% said no because they are afraid of elephants. For 2012, we plan to distribute a larger number of booklets in the 160 primary schools because this year we were only able to give 2 to 4 booklets per school. With a kit of 10 booklets, teachers will have enough material to involve all their pupils and the message of the program will reach all the 9000 targeted children. It is even considered for 2012 to try to reach the 205 primary schools of the Mouhoun province as well, because they also have elephant habitat to protect.
- Independent research : Erica Rogers's research report is attached. The following are her central conclusions from the preliminary analysis:
 - " It was hypothesized that students with direct exposure to elephants will show the highest increase in environmental attitudes and knowledge specifically related to conservation of elephants, more so than students exposed to any other type of intervention. The results supported our hypothesis as well as the statement by the IEF that personal experiences with elephants will have a greater impact than any other form of education in the development of a conservation ethic. The results also qualitatively showed some impact of the My Elephant Neighbor booklet. While the impact of direct exposure was clearly stronger, we are unable to offer the nature class to as many children as the booklet can reach. For example, this year the nature class was offered to 21 schools and the booklet was offered to 160 schools. For this reason we will work to improve the booklet so that its impact on the attitudes and behaviors of children can be more clearly seen.

Preliminary conclusions can be drawn that environmental education programs in which children have direct experiences with elephants may be most effective in communicating conservation messages. This may be due to the personal meaning created through experience, as opposed to an idea or lesson. It is also believed that the connection that children have with animals, as seen in the younger child's identification with the elephants, creates an ideal time to intervene, specifically with environmental education programs directed towards the protection and understanding of local elephant populations. The duration of these effects remains to be examined with this cohort. "

9. Explain what was the project's overall impact on conservation (capacity building, technology transfer, human-elephant conflict mitigation, how is it enhancing the survival of the species, other wildlife etc.). We can list 2 major impacts of the My Elephant Neighbor project on elephant conservation and harmonious human-elephant coexistence in the Deux-Balé region : One immediate and one for the future.

1. **Immediate impact** : We have run this educational program, first titled "Children and Elephants" then "My Elephant Neighbor" since 2007. In 2007, the situation of the Deux-Balé forest was disastrous with thousands of cows foraging in the forest, piles of illegally collected wood, large trees cut down, small game poaching, illegal fires, and illegal fishing. The first two years of the program, we did not notice any improvement in the situation regarding conservation. Following those two years however, the fact that the program was running, encouraged the government to strengthen the management of the forest. Since 2009, a new team is in charge of the protected area management and we are starting to see improvement and rehabilitation of the wildlife reserve. The elephants now seem more relaxed and are beginning to disperse in some parts of the forest that they could not access before. Other species like roan antelopes, bushbucks, warthogs, african civets, vervet monkeys and baboons seem to be on the rise. Most of the illegal activities which used to occur are now under control. It does not mean that the wildlife reserve is back to its natural climax and that the entire elephant habitat is now safe, but we can say that we are now moving in this direction. If the efforts are sustained, the situation should improve year after year. This overall impact on conservation is not only due to our educational program but it definitely plays a part in the current progress being made. In 2011, the government signed a three year agreement with our organization stating that we should continue our educational program and develop other activities in partnership. Among the terms of the partnership, we have enabled the employment of a local education officer, who was trained by our team. In conclusion, despite the fact the that program is targeted to the children, the broader impact is already tangible. Next year, we should have the first data on elephants and wildlife measuring this impact.
2. **Impact for the future** : We described above the impact that our program has in the present and we think that the impact of the program will be even greater in the future. Indeed, our educational program is offered to children so that they become the most active conservationists for the elephants and the wildlife of their region. The fact that our program is appreciated today by adults helps the rehabilitation of the forest. Once the forest is rehabilitated, it will be the people themselves who will take care of it, protecting the elephants and the rest of its

biodiversity. Without this local commitment, the local elephants will not be able to safely live in the region. Our educational program, as stated in sections 7 & 8 is highly appreciated by the teachers, both on site in the Deux Balé Wildlife reserve and in the classroom. All the teachers think that the program benefits the children. Moreover, Erica's independent research findings clearly show the impact of the program on the children. Therefore, we think that our program has already an impact in the present for improved elephant conservation and human-elephant coexistence and we expect that it will have a greater impact in the future because of the positive involvement of the children. Our feeling is that the program is needed for at least another five years in the region to reach sustainable results. Today the trend is positive but the situation remains fragile.

10. Did this project influence any local/regional/national policy in regards to elephant conservation and/or habitat protection? Explain. : The project indeed influences the local and regional policy given that the educational program is now active in all the 160 primary schools of the province. As mentioned in section 9, we have signed a three year agreement to work with the wildlife administration on various activities, including environmental education. We are discussing the possibility of extending the educational program in neighboring provinces and we have begun to discuss potential projects in other regions of the nation where elephant populations are found.

11. Captions of the 5 photos : The pictures are sent separately in high resolution

Caption (picture credit)	Picture
Group of children watching relaxed elephants with calves at the water hole (Erica Rogers)	
Group of children watching relaxed elephants foraging in the Deux-Balé Forest (Erica Rogers)	

"Draw an elephant" art session at the end of the educational program (Erica Rogers)



Studying elephant bolus with friends (Julien Marchais)



Principal investigator Erica Rogers interviewing children (Julien Marchais)



Reading the "My Elephant Neighbor" booklet carefully to learn about human-elephant coexistence (Erica Rogers)



Studying the "My Elephant Neighbor" booklet with our teacher to learn about elephant and our peaceful coexistence (Julien Marchais)



12. Immediate conservation impact : As stated in our proposal, the 300 to 600 Mouhoun elephants, whose core population finds refuge in the Deux-Balé protected areas may disappear before 2050 if their habitat is not protected from ongoing destruction. Our educational program has been active around the Deux-Balé forest since 2007 and we are happy to see that since 2009, the government has joined our efforts and is rehabilitating the protected area of the Deux-Balé Forest. This year, we signed a three year partnership to foster environmental education and conservation actions. Although our program targets children, its impact is already tangible because the adults of the region are very appreciative of the initiative. Offering our educational program to the children, encourages the adults to protect the elephants because it is very important for them that their children and grand-children have a chance to see their elephant neighbors.

13. Long term conservation impact : Children of today will be the conservationists of tomorrow. Without their awareness and involvement, elephant conservation will be a difficult challenge in many parts of its range. In Burkina-Faso and West Africa, the human population is growing fast and will probably triple by 2050. In the decades to come, there will be great need of creativity and motivation to achieve peaceful human-elephant coexistence. Exposing children to their elephant neighbors in a positive manner is the most effective way to involve them and their families in long-term elephant conservation. Our philosophy is very simple: one protects what one appreciates and one appreciates what one knows intimately. The statistics of our program over the years clearly show that over 80% of the children who were offered the program had never seen an elephant before. In order to protect the local elephants in the future, children need to be positively exposed to them, preferably directly or at least indirectly, so that they will be part of their thoughts for the future. We are glad to see that the preliminary results of an independent research study on the impact of the program showed that exposing children changes their perception of elephants for the better.

14. Budget

Budget lines	Amount requested from IEF	Matching funds	secured from other partners	Total costs
Educational programme	5 500 USD	5 000 USD	Amnéville Zoo	10 500 USD
Research study	4 500 USD			4 500 USD
Total budgeted	10 000 USD	5 800 USD	Amnéville Zoo	15 000 USD
Total received	10 000 USD	5 833 USD		15 833 USD

Please find below the itemized budget per lines and actual expenditure in USD :

Educational Programme	Budgeted	IEF expenditure	Amnéville expenditure
Transportation (for 25 trips instead of 50)	5000	2500	426,4
Food (for 25 trips instead of 50)	3500	1750	378,1
Operational and living cost of local animator (educational material, phone calls, printing, housing, transportation and food)	2000	1000	1451,3
International flight France – Burkina-Faso + mission costs for programme coordinator	1000	250	1300,8
Workshops with teachers for the use of the "My Elephant Neighbour" Booklet in 160 schools instead of 20			2176,8
Total	10500	5500	5833,4

Amnéville Zoo, which has been supporting the programme since inception, is a very flexible financial partner. Thanks to their very useful flexibility we were able to strictly respect the budget supported by IEF despite slight increase in on-site excursions costs.

Research Study	Budgeted	Actual expenditure
International flight NYC – Burkina-Faso + transport in the country + room and board	4000	2100
Assessment Measures and project material	450	650
Consultation with statistician	150	150
Total	4500	2900
Balance		1600

With your agreement, we would like to use the balance of 1600 USD to attend the IEF Rotterdam Symposium taking place this coming October and for which we have been selected to give a presentation. The financial situation of our little NGO is healthy but we have limited means and the use of this balance would be of great help for us to be part of the IEF symposium.

IEF symposium costs (USD)	IEF	own funds
Conference registration fee (2 persons)	722	
Plane ticket NYC - Rotterdam		1086
Train Paris- Rotterdam		340
Lodging & board (2)	878	683
Total	1600	2109

15. Conclusion

In conclusion, we strongly believe that the "My Elephant Neighbor" program fosters a positive attitude towards elephants in a region where their population is seriously endangered. Our program that has run for the past 5 years (2007-2011) creating a positive attitude in children and parents alike. The fact that we started this program at a time when the conservation situation was very bad contributed to the involvement of the administration to reinforce the protection of the Deux-balé forest and the Mouhoun elephants. If our sensitization efforts continue, we can hope for a sustainable future for these elephants. In the long-term, the inhabitants will be their first protectors. Already illegal activities have decreased, the Deux Balé protected area is under rehabilitation, and the elephants have dispersed in parts of the reserve which were recently busy with illegal activities such as cattle herding, small-game poaching, and illegal wood collection. The quality of the habitat is improving, the elephants lead a more peaceful existence, and the signs of wildlife are on the rise. Biodiversity is in a better state and the human-elephant coexistence is slowly becoming less antagonistic.

However the Mouhoun wildlife areas complex, which makes up the entire range of the Mouhoun elephants, is not limited to the Deux-Balé protected area and is under growing pressure, as West Africa is known to have the fastest growing human demography in Africa. Therefore we need to continue our educational program around the Deux-Balé forest and extend it to all the provinces where the Mouhoun wildlife areas lie. It is also very important to assess the impact of our program in the long term and we hope that Erica Rogers will be in a position to continue her research in 2012 to follow the cohort she has studied in 2011 to evaluate the impact that remains one year after the experience.

Hoping that you will be convinced by the achievements of the program, we would like to submit a new proposal to you for 2012 to keep supporting our educational program and Erica's longitudinal research study.

On behalf of the programme team,
Julien Marchais, program coordinator

16. Erica Rogers Research Report (Preliminary Findings)

Report to the IEF: Preliminary Findings

Erica C. Rogers

June 2011

The following are preliminary findings based on the first wave of data collection with the Children and Elephants program in Burkina Faso.

Purpose of Research and Central Questions

The My Elephant Neighbour program was implemented with the hope that, through its field-based and school-based education program, children will retain knowledge about elephants, and develop an attitude of conservation. This research study was implemented in order to evaluate My Elephant Neighbour program's objectives by looking at behavioral, attitudinal, emotional, and knowledge-based changes in the students who have participated.

Specifically, a major aim of this research was to compare the impact of direct exposure versus indirect exposure to elephants on the development of a conservation ethic, in order to try to understand which interventions were effective and in what ways. The International Elephant Foundation proposed that, "personal experiences with elephants can create life-long conservationists and cannot be duplicated in other mediums," (www.elephantconservation.org). This central hypothesis was tested in Burkina Faso.

Because knowledge about elephants is learned not only via this program but also through community, media and other modes of communication in daily life, we used a group of students of the same age, culture and level of education that did not participate in the My Elephant Neighbour program as a control group.

This ongoing research study proposed the following five central questions: (1) How are elephants perceived by children and how do these perceptions vary across age, where they are from and their previous exposure to elephants?; (2) What, if any, are the changes in attitudes and behavior towards elephants?; (3) What, if any, are the changes in the child's capacity to empathize with elephants, with humans?; (4) What percent of these changes are sustained over time?; and (5) Which interventions are most effective based on age, gender, previous experience with elephants, culture and basic intelligence level?

This six-month report will address questions 1, 2, and 5. As changes in affective (emotional)

development are not expected to occur over one week, question 3 will be addressed in the delayed post-test, a later portion of the research. Question 4 which addresses long term changes and sustainability will also be addressed at this later assessment date.

Participants

The sample was made up of 106 students in the CM1 level class (4th-5th grade equivalent, typically 10 to 11 year old students). Six different schools were used out of the 21 participating in the My Elephant Neighbour Program in the Deux-Balé forest region (see Figure 3 in Appendix A for map of the region). Two participating schools were from rural villages, Koho (n=18) and Ourobonon (n=17); and four schools were within Boromo, Boromo “A” (n=17), “B” (n=18), “C” (n=18), and “D” (n=18).

Participants ranged in age from 9-15 years (see Figure 1 in Appendix A for age distribution). One student out of the 106 did not know her age. The average age of the sample was 11.1 years with a standard deviation of 1.1. There were 56 females and 50 males who participated in the study. Maternal and paternal ethnicity was distributed across 18 different cultural groups (see Figure 2 in Appendix A for ethnicity distribution). For both parents, the majority of the sample was Mossi, the principal ethnic group of Burkina Faso, which makes up about 40 percent of the population.

The sample was split into four groups. This year, because of improved park management and more space for the herds to safely inhabit, the consistency of elephant sightings on the Nature Class excursions was decreased. This led to the creation of a fourth group (Group D), those who went to the park, participated in the nature class, but had no direct exposure to elephants.

Group A (n=39), the direct exposure group, was made up of those who participated in the nature class in the reserve and did get to observe the elephants. Group B (n=26), the indirect exposure group, was made up of those who were given in classroom education through the My Elephant Neighbor book. The book included a culturally appropriate educational story about the human-elephant conflict, as well as a section about elephants in the surrounding region, with several color photos of local elephants. This was the first year that the My Elephant Neighbor booklet was implemented and as such will be improved based on this year’s findings. To date, the booklet does not give exactly the same knowledge based information as the nature class. On the other hand, the booklet does provide information that the nature class does not in such areas as the ivory trade and the evolution of the human elephant relationship, so all of this will be taken into account in interpretation of the findings. Group C (n=22), the control group, was made up of students in the same class who did not participate in either intervention. Finally, Group D (n=19), as mentioned previously, was made up of those students who participated in the nature class in the Deux Balé

reserve, which included educational games and activities, but did not have the opportunity to see elephants (no direct exposure).

Almost all participants, 97 percent of the sample, were in the top 25 percent of their respective class. Three percent of the sample ranked between the 25th and 40th percentile. All interviews were conducted in French, the subjects' second or third language. A local colleague accompanied the researcher to assist in translation. Original interview questions in French as well as an English translation are included in this report (Appendix D).

Baseline Findings

Over the past ten years, Des Elephants et Des Hommes educational program has found that a majority of the local children living near elephant reserves where the NGO is active have never been exposed to elephants. This was again found in Burkina Faso in 2011. Ninety percent of the sample (95/106 participants) reported never having seen an elephant in person. It was hypothesized by the NGO Des Elephants et Des Hommes that without exposure, there is little hope for these children to be concerned about the welfare of the surrounding elephant populations or to grow into motivated conservationists. These findings again re-affirm the need for this educational program. However, 105/106 participants were able to name an elephant when shown its picture during the pretest. Responses to baseline questions indicate that the majority of participants had not seen an elephant in person, but had seen an image of an elephant. Nearly half of the sample thought that there was a risk of elephants disappearing from the region; 64 percent reported that there were elephants in the region; and 82 percent reported that they like elephants (See Table 1 in Appendix A for frequency of responses to questions regarding basic elephant experiences and attitudes at baseline).

In examining differences in attitudes and knowledge based on age, gender, ethnicity and region, a significant difference was found on the response to the question "Do you like elephants." Of the 17 participants who reported that they do not like elephants, 100 percent were from rural villages as opposed to one of the schools in the town of Boromo. This does not appear to be correlated with whether or not a child had seen an elephant previously, as only three out of the eleven who had seen an elephant were from rural villages. The other eight lived in Boromo.

In the initial analysis we did not find any significant differences between males and females on their attitudes towards elephants, nor was there a significant difference based on age of participants. However, it was found that children ages 9 and 10 were more likely to identify with elephants and understand their feelings and behaviors than those ages 11-15, as measured on the abbreviated Mentalizing Stories Test. While this is only a preliminary finding, it does support the claim that developmentally, children are more likely to identify with animals at an earlier age

(Melson, 2001). This might point to the need for early intervention when it comes to environmental education regarding elephants.

The primary outcome measure for this study was the Children's Environmental Attitudes and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995). The modified CHEAKS used in this study was adjusted for linguistic difficulty, cultural differences and the availability of time. The questions were also modified to focus more on elephants than the original measure. It was made up of ten questions rated on a Likert-type scale from 0-2, total scores from 0-18. The majority of participants expressed feelings of pride, protection, and care towards elephants; however the majority also did not report conservation behaviors or knowledge about elephant conservation (Table 2, Appendix A).

In the overall posttest scores, the observed elephant group (mean = 12.8) and the nature class no elephants group (mean=13.4) scored higher on the CHEAKS than the control (mean=10.6), $F(3,102)=7.45, p<0.05$.

Qualitative Findings

Participants were asked open-ended questions to ascertain their perceptions about the human-elephant conflict, the role of elephants, and the needs, behaviors and qualities of elephants. The following section will discuss selected qualitative findings.

When asked to describe an elephant, participants in the observed elephant group and the in-class education group, were more likely to use words with positive or negative valence, rather than neutral descriptors. This was not true for the nature class no elephants group or the control.

The Role of Elephants

In the observed elephant group, a 12 year-old male from Boromo reported on the pretest that, "the role of elephants is that people kill them." Following his participation in the program, he reported that the role of elephants is "to live." The number of participants describing the role of elephants as crucial to the ecosystem because they plant trees through the seeds that they excrete, creating forests, went from zero on the pretest to eleven on the posttest. All eleven participants were from the observed elephant group. One 10 year-old female from the village of Koho in the observed elephant group said on the pretest that the role of elephants was "to destroy trees," and following the intervention she described their role as "to destroy and to plant," showing a more integrated perspective. A belief of one 13 year-old male from the village of Ourobonon was that the role of elephants is "to live with the white people who help the elephants." In the posttest he reported that the role of the elephants was to guard the forest. Here, an interesting shift happened over the course of the nature class from understanding westerners as those interested in protecting and taking care of

elephants, to taking ownership of thinking about the elephant and its role as guardian of the forest. Again in the observed elephant group, one 10 year-old female from the village of Ourobonon reported on the pretest that “the elephants are there to help us [humans],” and on the posttest stated that the role of the elephants is “to have fun with each other.”

In the nature class no elephants group, another interesting finding was the belief that one 10 year-old male from Boromo held; that the elephants encourage the lions to devour the other animals. Notably, after the nature class where he was not able to see elephants, he reported that the role of elephants is to encourage the lions not to eat the other animals.

Human-Elephant Conflict

In the in-class education group, among those who read the story about the elephants, the message that elephants have been killed by people seemed to be understood. The majority of these participants reported that the biggest danger to elephants was that people might shoot them, either for ivory or meat, or conflict over land.

The following are several individual examples from the observed elephant group. One 13 year-old female from the village of Ourobonon reported that the biggest problem between people and elephants was that she was afraid of elephants on the pretest. After the intervention, she reported that the biggest conflict is that people like to kill elephants. An 11 year-old female from Ourobonon showed a change in her understanding of the reciprocal nature of the human-elephant conflict. She originally stated that the biggest problem between people and elephants is that if an elephant is around it will kill her. After the intervention, she reported both sides of the problem; that people kill elephants and reciprocally elephants harm people. In the posttest, the observed elephant group was the only group where no participants reported that there were not any problems existing between humans and elephants.

The distribution of baseline responses to the open-ended question, what is the biggest problem or conflict between people and elephants, can be found in Table 3 in Appendix A. See Table 4 in Appendix B for a distribution of posttest responses to the open-ended question, what is the biggest problem or conflict between people and elephants, by group.

Change Scores and Between Group Comparisons

Change scores on the CHEAKS were found by calculating difference scores (Posttest–Pretest scores) for each participant and then averaging the change scores for each group (see Table 5 in Appendix C for CHEAKS change scores by group).

Using a one-way Analysis of Variance to measure change in performance on the CHEAKS, a significant difference was found between groups at the 0.05 alpha level, $F(3,102)=3.69$, $p=0.014$

(Table 6, Appendix C). Subsequently, pairwise comparisons were carried out. The direct exposure group had significantly higher change scores than all three other groups, $p < 0.1$ (Table 7, Appendix C).

Two other significant findings were, first, that responses to the question, are you proud to live in a region where there are elephants, increased in “yes” responses significantly more in both the observed elephant group and the in-class education group than in the nature class no elephants group and the control group, with the change scores significantly higher in the observed elephant group than in the in-class education group, $p < 0.1$. Second, those who went on the nature class (both the observed elephant group and the nature class no elephants group) saw a significant decrease in reported fear of elephants, regardless of whether or not they saw elephants, when compared to the in-class education group and the control, $p < 0.05$.

Conclusions

It was hypothesized that students with direct exposure to elephants will show the highest increase in environmental attitudes and knowledge specifically related to conservation of elephants, more so than students exposed to any other type of intervention. The results supported our hypothesis as well as the statement by the IEF that personal experiences with elephants will have a greater impact than any other form of education in the development of a conservation ethic. The results also qualitatively showed some impact of the My Elephant Neighbor booklet. While the impact of direct exposure was clearly stronger, we are unable to offer the nature class to as many children as the booklet can reach. For example, this year the nature class was offered to 21 schools and the booklet is now in 160 schools. For this reason we will work to improve the booklet so that its impact on the attitudes and behaviors of children can be more clearly seen.

Preliminary conclusions can be drawn that environmental education programs in which children have direct experiences with elephants may be most effective in communicating conservation messages. This may be due to the personal meaning created through experience, as opposed to an idea or lesson. It is also believed that the connection that children have with animals, as seen in the younger child’s identification with the elephants, creates an ideal time to intervene, specifically with environmental education programs directed towards the protection and understanding of local elephant populations. The duration of these effects remains to be examined with this cohort.

Further Study

As these are preliminary findings, the differences between participants from rural villages and from the town will be further explored as well as continued exploration of the ways in which gender, age, and culture influence perceptions of elephants and the efficacy of both field-based and classroom-based environmental education programs. Pre and post drawings of elephants and humans will also be analyzed at a later date.

In the following year, it is hoped that the same participants will be evaluated and changes in both conservation attitudes and empathic capacity will be measured one year later.

Appendix

Appendix A: Descriptive Pretest Tables and Figures

Figure 1: Age distribution of sample.

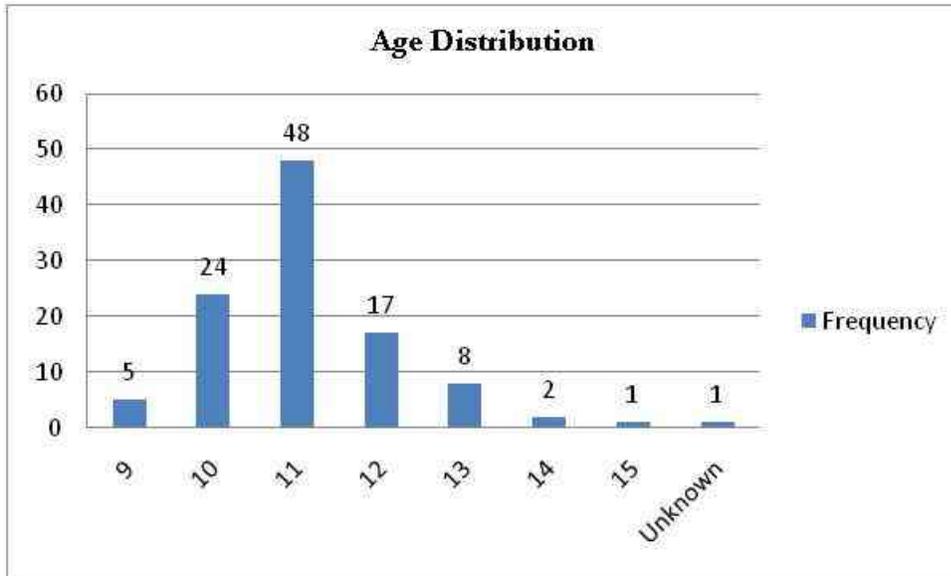


Figure 2: Frequency Distribution of Ethnicity by Parent.

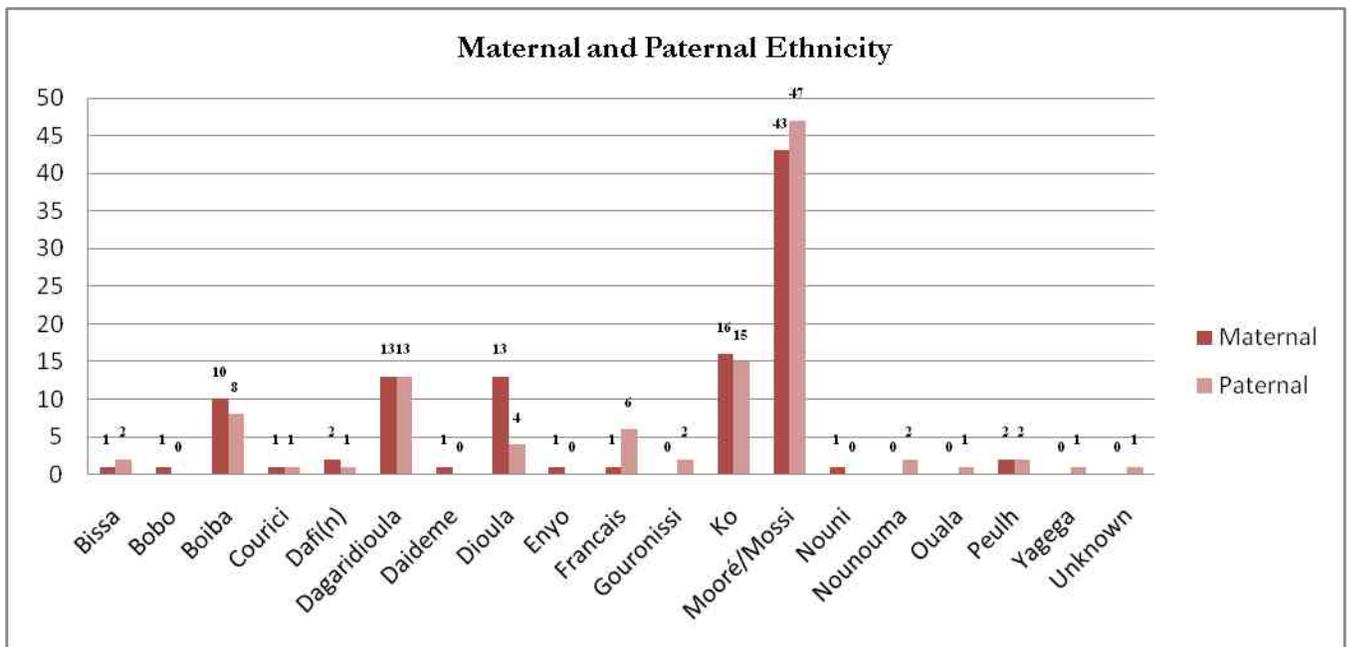


Figure 3: Location of Study.

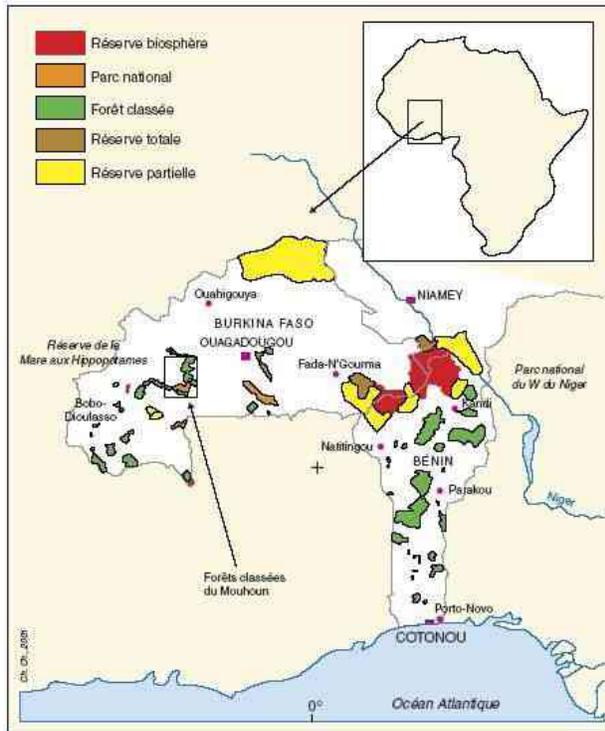


Figure 1. Cartes de localisation des aires classées de l'ouest du Burkina Faso (provinces des Balé et du Mouhoun).

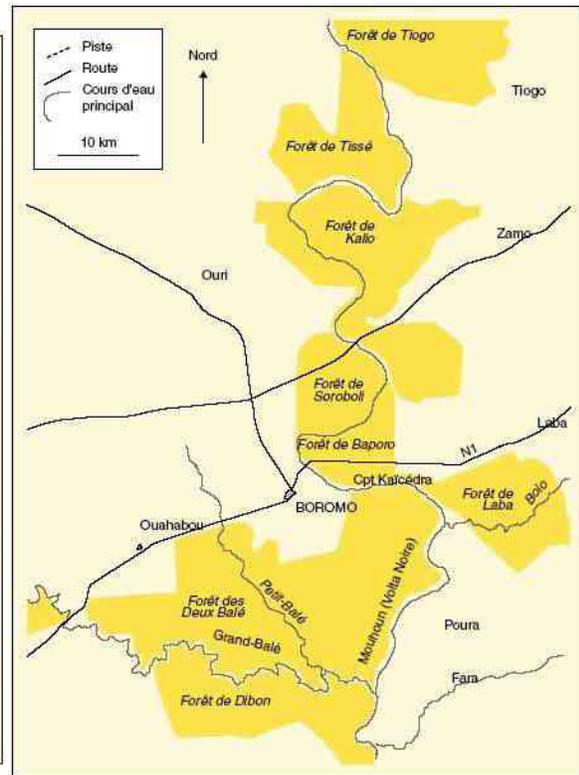


Figure 2. Les « forêts classées » de la région de Boromo (Burkina Faso).

Table 1: Frequency of responses to questions regarding elephant experience and attitudes at baseline.

Question	Yes	No	I Don't Know
Are there elephants in the region?	64	41	1
Have you seen an elephant in person?	11	95	0
Have you seen an image of an elephant in a book or on the television?	106	0	0
Do you like elephants?	82	19	1
Do you think there is a risk of elephants disappearing from the region?	47	58	1

Table 2: CHEAKS Responses at Baseline.

Question	Yes/Correct	No/Incorrect	I Don't Know
When you grow up will you keep your cattle near the village to leave the forest for the elephants?	53	49	4
I am proud to live in a region where there are elephants.	87	19	0
I planted a tree.	67	39	0
I have asked my parents how to protect animals.	40	66	0
I am afraid of elephants	78	28	0
I am angry when people hunt elephants for their meat or ivory.	89	15	2
I will be sad if elephants disappear from the region.	73	33	0
Elephants take care of their families.	92	11	3
Among the elephants, who is the leader of the group? (matriarch)	4	99	3
What do elephants need to live? (looking for at least food, water, space)	37	68	1
What will happen if there are no more elephants? (looking for ecologically minded response)	70	36	0

Table 3: Baseline responses to the open-ended question, what is the biggest problem or conflict between people and elephants?

Response	Frequency
Elephants destroy crops or houses	11
People kill elephants	10
Elephants kill people	6
Nothing	1
I don't know	39
Elephants are afraid of loud noises	3
Two way (reciprocal) understanding of problem	1
Other	35

Appendix B: Descriptive Posttest Tables, Between Groups

Table 4: Posttest responses to the open-ended question, what is the biggest problem or conflict between people and elephants, by group.

Response	Group A	Group B	Group C	Group D
Elephants destroy crops or houses	10	4	2	3
People kill elephants	7	4	4	5
Elephants kill people	1	1	1	0
Nothing	0	2	4	6
I don't know	6	5	7	0
Elephants are afraid of forest fires people start	1	0	0	0
Elephants are afraid of loud noises	1	0	0	0
Two way (reciprocal) understanding of problem	3	1	0	0
Other	10	9	4	5

Appendix C: Between Group ANOVA Tables

Table 5: Average Children's Environmental Attitudes and Knowledge Scale (CHEAKS) Change Scores by Group.

Group	AVG Change Score on CHEAKS
A, Direct	.955
B, Indirect	2.667
C, Control	2.22E-16
D, Nature Class No Elephants	.579

Table 6: Between Subjects Analysis of Variance for Change Scores on the CHEAKS.

Source	SS	Df	MS	F	Sig
Group	129.257	3	43.086	3.686	0.014
Error	1192.253	102	11.689		
Total	1496.000	106			

Table 7: Pairwise Comparisons of CHEAKS Change Scores using Least Significant Difference

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Significance
Control	Direct	-1.712*	.912	.063
	Indirect	.955	.990	.337
	Nature Class Only no eles	.376	1.071	.726
Direct	Control	1.712*	.912	.063
	Indirect	2.667*	.866	.003
	Nature Class Only no eles	2.088*	.957	.031
Indirect	Control	-.955	.990	.337
	Direct	-2.667*	.866	.003
	Nature Class Only no eles	-.579	1.032	.576
Nature Class Only no eles	Control	-.376	1.071	.726
	Direct	-2.088*	.957	.031
	Indirect	.579	1.032	.576

*. The mean difference is significant at the .1 level.

Appendix D: Interview Questions; French : English.

1. Nom : Name
2. Age : Age
3. Garçon ou fille : Boy or girl
4. Langue de la maman : Mother tongue
5. Langue du papa : Father tongue
6. Ecole : School
7. Quel est le nom de cet animal ? : What is the name of this animal ?
 - a. C'est un éléphant : It's an elephant
8. Sais-tu s'il y a des éléphants dans la région ? : Are there elephants in the region ?
9. Est-ce que tu as vu un éléphant en vrai ? Où ? Quand ? Have you seen an elephant in person? Where? When?
10. Est-ce que tu as vu un éléphant dans une livre ou a la télé ? : Have you seen an elephant in a book or on the television ?
11. Aimes-tu les éléphants ? : Do you like elephants ?
12. Si je dis éléphant, à quel mot tu penses ? : If I say the word elephant, what word do you think of ?
13. En trois mots, décris un éléphant. : Describe an elephant in three words.
14. Quels sont les problèmes entre les éléphants et les hommes? : What are the problems between elephants and people ?
15. Les éléphants ont besoin de quoi pour survivre ? : What do elephants need to survive ?
16. Pourquoi les éléphants vivent en familles ? : Why do elephants live in family groups ?
17. Penses-tu que les éléphants risquent de disparaître de la région ? : Do you think that elephants might disappear from the region ?
18. Quel est la plus grande menace sur les éléphants (Quel est le plus grand danger sur les éléphants) ? What is the biggest danger that elephants face ?
19. Que peux-tu faire pour aider les éléphants ? : What can you do to help elephants ?
20. Quel est le rôle des éléphants ? (à quoi servent les éléphants ?) : What is the role of the elephant?
21. Comment les éléphants prennent soin les uns des autres ? How do elephants take care of each other ?
22. L'année dernière dans cette classe un élève a reçu la troisième note d'arithmétique. Il rentre à la maison et dit à son père qu'il est classé troisième. Son père lui dit premier est mieux que troisième. Et l'élève sort rapidement de la pièce. Pourquoi sort-il rapidement de la pièce? :
Last year, in this class, a student received the third highest grade in math. He went home and said to his father that he got third. His father said to him that first is better than third. The student quickly left the room. Why?
 - a. Il veut terminer ses devoirs et va travailler : He wanted to go finish his homework.
 - b. Il est énervé car son père l'a humilié et le rabaisser : He was annoyed because his father humiliated and embarrassed him.
 - c. Il est triste car il aurait aimé que son père le félicite : He was sad because he wished his father would congratulate him.
 - d. Il regrette de ne pas être premier de rendre son père heureux : He regrets not having placed first to make his father happy.
23. En brousse, tu vois deux éléphants qui ont leur trompe entrelacées (montrer photo). Pourquoi se tiennent-ils par la trompe ? :
In the bush, you see two elephants with their trunks entwines (show photograph). Why are they holding each other's trunks like this?
 - a. Ils essaient de se protéger et de se rassurer : They are trying to protect and comfort each other.

- b. Ils essaient de me faire rire : They are trying to make me laugh.
 - c. L'un des deux à quelque chose sur sa trompe que l'autre essaie de nettoyer : One of them has something on his trunk that the other is trying to clean.
 - d. Ils sont amis et se tiennent la trompe parce qu'ils s'apprécient : They are friends and they are holding trunks because they like each other.
24. Je suis triste quand je vois une personne pleurer. Oui, non, ça dépend. : I am sad when I see another person cry. Yes, no, it depends.
25. Quand je regarde une personne je sais s'il est content ou pas. Oui, non, ça dépend : When I look at someone I can tell if they are happy or not. Yes, no, it depends.
26. Je suis gêné quand quelqu'un se met en colère. Oui, non, ça dépend : It bothers me when someone gets angry. Yes, no, it depends.
27. Quand tu seras grand, vas-tu garder le bétail au village pour laisser les forêts aux éléphants ? Oui, non, je ne sais pas : When you grow up will you keep your cattle by the village to leave the forest for the elephants? Yes, no, I don't know.
28. Je suis fier de vivre dans une région où il y a des éléphants. Oui, non, je ne sais pas : I am proud to live in a region where there are elephants. Yes, no, I don't know.
29. J'ai planté un arbre. Oui, non : I planted a tree. Yes, no.
30. J'ai demandé à mes parents comment protéger les animaux. Oui, non : I asked my parents how I can protect animals. Yes, no.
31. J'ai peur des éléphants. Oui, non, je ne sais pas : I am afraid of elephants. Yes, no, I don't know.
32. Je suis en colère si les gens chassent les éléphants pour leur viande et l'ivoire. Oui, non, je ne sais pas : I am angry when people hunt elephants for their meat and ivory. Yes, no, I don't know.
33. Seras-tu triste si les éléphants disparaissent de la région ? Oui, non, je ne sais pas : Will you be sad if elephants disappear from the region? Yes, no, I don't know.
34. Les éléphants prennent soin de leurs familles. Vrai, faux, je ne sais pas : Elephants take care of their families. True or false ?
35. Chez les éléphants qui est la chef du groupe ? : Among the elephants, who is the leader of the group?
- a. Papa : Father
 - b. Maman : Mother
 - c. Petit Frère : Little Brother
 - d. Je ne sais pas : I don't know
36. Pour vivre, les éléphants ont besoin de quoi : What do elephants need to live ?
- a. La nourriture : Food
 - b. Leur famille : Family
 - c. L'eau : Water
 - d. L'espace : Space
 - e. Tout ce qui précède : All of the above
37. Si l'éléphant disparaît : If elephants disappear,
- a. Rien ne changera : Nothing will change
 - b. Tous Les hommes seront heureux : All people will be happy
 - c. les animaux seront touchés sauf les hommes : All the animals will be affected except for people
 - d. Tous les hommes seront tristes : All people will be sad
 - e. Les hommes et les animaux seront touchés : People and animals will be affected (Tu peux mettre plusieurs réponse – ce que tu semble d'être vrai) : (You may choose more than one response – all the appears to be true to you)
38. Tourne la page et dessine un éléphant et une personne. : Draw an elephant and a person.

39. (Classe Nature) Qu'as-tu appris de plus important pendant la classe nature? : (Nature Class)
What was the main thing you learned from the nature class ?
40. (CN) Qu'as-tu appris sur les éléphants ? : (NC) What did you learn about elephants?
41. (CN) Si tu as vu un éléphant étais tu content de le voir ? : (NC) If you saw an elephant, were you happy to see it?
42. (Livret) Est-ce que l'histoire t'a plu ? : (Booklet) Did you like the story ?
43. (L) Quel est le message le plus important que tu retiens ? : (B) What is the most important message that you took from it ?

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