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Abstract: This paper draws on the lessons learned from CCF education program, and challenges facing predator conservation in Namibia. With the participation of people from various backgrounds, CCF wishes to identify steps, obstacles and challenges in developing and implementing predator education. Participants therefore could contribute towards identifying methods and processes for predator curricula development, and implementation. The participants could also adopt similar approaches elsewhere in their respective countries, and could facilitate access to resource materials, and networking.

Challenges in developing predator conservation education in Namibia

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1. Introduction

The Cheetah Conservation Fund (CCF) has its mission "to be an internationally recognised centre of excellence in research and education on cheetahs and their ecosystems, working with all stakeholders to achieve best practise in the conservation and management of the world's cheetahs". CCF was formally established in Namibia during 1991, and has its base of operations on Farm Elandsvreugde # 367, Otjiwarongo. CCF programs are multi-disciplined in approach, with integrated scientific research programs in areas such as population biology, ecology, health and reproduction and human impacts. CCF researchers develop, test, and promote alternative land management practices such as; non-lethal predator controls, relocation of problem cheetahs, and eco-tourism. Additionally CCF maintains a vitally important national and international public education programs; and, commits to increasing prosperity of the Namibian community and farmers via proven successful land management practices, and develops a global network of cheetah conservationists.

Cheetah are an endangered species, and are listed in the Convention on International Trade in Endangered species of wild flora and fauna (CITES), and classified as vulnerable or endangered by the World Conservation Union (IUCN) (Marker et. al, 1995). Significant decline in cheetah populations were recorded over the past century, with numbers dropping from an estimated 100 000 in 1900 to 15 000 by 1990 (Marker, 1998). Namibia supports the largest free ranging cheetah population of the world, estimated at 2 500 individuals (Marker-Kraus et al., 1996). The majority of the cheetah population (over 95%) lives on commercial livestock farmland. Conflict with livestock and wildlife farming exist between cheetah and farmers. This conflict is primarily economically oriented, as farmers perceive cheetah as competitors and a threat to their livestock (Marker 2000). Predator species are vital for the health of the ecosystem since the integrity of the ecosystem could be measured by their presence. Amongst the role performed by these species include: interaction with the demography of prey populations by means of prey selection, and the control of population explosions. This acts as a buffer against overgrazing and is critical in maintaining the natural balance in an intact ecological community (Terborgh et al., 1999). In addition to this inherent

value, predators have economic value to countries and individuals by providing the opportunity for activities such as ecotourism and trophy hunting (Marker, 2002).

Despite these beneficial factors, predator populations worldwide are in sharp decline due to a myriad of factors, including habitat degradation and fragmentation, culling to protect livestock and game, disease and persecution (Weber and Rabinowitz, 1996; Sillero-Zubiri and Laurenson, 2001; Woodroffe, 2001). As the human population has grown and expanded to practically all habitats and ecosystems, many larger carnivores have been forced out, suppressed or eradicated (Nowell and Jackson, 1996; Woodroffe et al., 1997). All 36 species of felids are now classified as either threatened or endangered, with the sole exception of the domestic cat (*Felis catus*), (Nowell and Jackson, 1996, Marker, 2002).

The conservation of endangered species such as the cheetah, and their habitats remains a challenge for their present and future existence. Environmental education could be used as a process through which the human perceptions and attitudes towards predators could be changed to benefit these species. Additionally, education has been identified by the Namibian government as central to the development and prosperity of Namibia. Key to this aspect is the inclusion of environmental conservation within the Namibian constitution (Article 95, Promotion of the Welfare of the People, Namibian constitution).

CCF recognizes the importance of developing a predator conservation education curriculum for Namibia, and the implementation of such a curricular into the formal school curricula. The cheetah could be used as a "learning model" for predator education, since the protection of predators creates an "umbrella effect" whereby additional wildlife species are conserved. In turn, biodiversity conservation could be safeguarded for sustainable management.

This paper draws on the lessons learned from CCF education program, and challenges facing predator conservation in Namibia. With the participation of people from various backgrounds, CCF wishes to identify steps, obstacles, and challenges in developing and implementing predator education. Participants therefore could contribute towards identifying methods and processes for predator curricula development, and implementation. The participants could also adopt similar approaches elsewhere in their respective countries, and could facilitate access to resource materials, and networking.

2. CCF Education program

Since its inception, over ninety thousand Namibian learners have actively participated in CCF education program. CCF education is conducted by means of center based, and outreach programs. CCF education aims to create awareness about the plight of the cheetah, its importance in the ecosystem, and alternative methods of livestock and predator management. Additionally, CCF is also involved with providing tertiary education training, for students from the University of Namibia, Polytechnic of Namibia, and colleges from around the country. International collaborations have also led CCF to host conservation Biology training for students from Round River Conservation Studies (RRCS), University of Namibia (UNAM), Polytechnic of Namibia, officials from the Ministry of Environment and Tourism (MET), and tourism travel organisations. CCF continues to sponsor Namibian students each term in order to complete their in-service training.

His Excellency Dr Sam Nuyoma, president of the Republic of Namibia, officially dedicated CCF education centre during 22 July 2000. Tourists, schools, farmers, and the general public regularly visit the centre. The centres consist of main a section that deals with cheetah history, biology, ecology, and conservation efforts. Information and facts surrounding the cheetah and its environment are displayed by means of exhibits, video, and audio. Additionally, a basic education program for schools has been developed, and is currently used by visiting schools. Evaluations for the basic program, is done in order to contribute towards program development. Learners are also provided with activity sheets and a questionnaire as they make use of the education centre. CCF basic education program is cross curricular, and can be adapted to any subject taught. This effort facilitates satisfying the various needs of learners and teachers.

*** figures for visiting schools, and daily visitors.

Visiting schools are accommodated at two main tented camps, which were developed with the assistance of youth groups, and learners. Efforts are done to collaborate with educators at national and international level. Such collaborations ensure that CCF education programs are shared. These relations also promote the development of resource materials, and improve access to resources and information.

Outreach programs are based on interactive methods of exhibit, video, role-play, presentations, and feedback, aimed to maximize the relevance of the information presented to participants. It is key for the presenter to assess the level of awareness before, and after the presentation. CCF currently present outreach to individual school classrooms or clubs, and assembly presentation. The outreach program is considered vital since a larger audience is reached. Participants of such programs have an opportunity to learn about the cheetah and are environment. CCF education staff also makes an effort to use the cheetah resource materials and provide cross-curricular examples that relates to the subjects taught at schools. Although this effort is achieved, these presentations cannot stop with a "one-off" visit because people and situations change.

Teaching cross curricula subjects also requires an effort, time, and resource materials. In addition, visiting schools within various locations ^{and} ~~are~~ destinations could be costly, since feedback, monitoring and evaluation may not be done successfully. This emphasises the need to incorporate predator education into the formal school curriculum. A consistent effort is done in order to provide teachers with resources, and ability to teach, and utilise CCF resource materials, such as the Teachers Resource Guide. These efforts are demonstrated by the half-day workshops conducted for teachers during the outreach programs, and teacher training workshops at Teacher Education Colleges. Often, teachers are confronted by the lack of resource materials, and awareness about conservation. This factor may be regarded as a challenge, since teacher training in conservation subjects or a background in conservation is necessary. Namibian teachers often perceive teaching beyond the formal curriculum as a demand in effort, hence the lack of resources, and awareness. CCF attempts to maximize resource availability and accessibility by donating resource materials and activity sheets to participating schools, teacher resource centers, and youth centers.

CCF works closely with the Ministries of Basic, and Higher education. In addition, comprehensive farmer surveys, and interactions with schools, the public, and teachers have aided the classification of the needs applicable to the conservation of predators. The inadequacies of predator education may lead to variable opinions, knowledge, and attitudes towards the conservation of predator species, which are perceived as competitors with human livelihood. Through intensive investigation and survey of the human population at the forefront of the human-cheetah conflict, social and economic aspects of predator conservation in Namibia were identified as underpinning obstacles to efficient predator management. At the core of this issue was a

fundamental deficiency in ecological knowledge and understanding of the role of predators in the ecosystem.

3. Resource material development

During 1994, CCF developed a cross-curricular teachers resource entitled "*The predators role in the ecosystem*". The resource guide integrates the cheetah as a predator species into cross-curricular modules for grades X – X. Cheetah facts consisting of its history with humans, threats, ecology, and biology. These cheetah facts are integrated with the formal school curricular subjects such as Life science, Social science, English, Mathematics, physical education, and arts. Cheetah facts are presented in the form of exercises, assignments, and activities, in order to increase the usefulness of the guide. The guide is also accompanied by a vocabulary list, in order to ensure that learners understand the terminologies used, and thereby promote their vocabulary, and usage of these terms.

3.1 Aims of the cross-curricular teachers resource guide:

- a) **Life science** is aimed at increasing the understanding of the ecosystem. Learners could learn more about predators, adaptations, other predator species, human impacts on the environment, and the coexistence^{of} man and predators.
- b) **Social science** is aimed at increasing the understanding of the cheetah's geography, history, and relations with the ancient human cultures. The subjects promotes problem solving, research and essay writing.
- c) **English** is aimed at increasing the awareness, and understanding of the cheetah, and other predators. Learners are encouraged to improve their language usage through vocabulary, essay writing, grammar, letters, and presentations. These activities are necessary since language skills are enhanced.
- d) **Mathematics** is aimed at enhancing the learning and understanding of basic mathematical skills and functions by making use of the cheetah as a subject.

e) **Physical education** integrates the significance of the cheetah as the fastest land mammal, into learning. Learners are exposed to the unique adaptations of the cheetah such as its speed, which is demonstrated by physical activities.

f) **Arts**: is aimed at increasing the learner's pride of towards Namibia natural heritage. Learners are encouraged to use predator species and their environment in arts. This module promotes predators through arts.

Another resource book developed was a poem book entitled “ *The orphan calf and the magical cheetah*”. This resource material was produced for children, and aimed at promoting English, as Namibia's official language. This book was developed with the focus of conservation, and many children presented poems, stories and illustrations via an art competition. In addition, various activities sheets, and activity guides were developed. CCF is currently developing activity guides for upper and lower primary learners in partnership with the Cincinnati Zoo & Botanical Garden, U.S.A. The development of the teacher's resource guide was followed by various workshops with teachers concerning the use of the resource guide. The relevance of the contents of the guide was examined via workshops with teachers, and feedback concerning its use by teachers was maintained.

4. *The carnivore environmental education workshop 2002*

Education and Communication was identified as a priority for the conservation of the cheetah (*Acinonyx jubatus*) during a Global Master Planning workshop in August 2001. Environmental education (EE) was deliberated as a key point of divergence for the promotion of environmental stewardship across the board. As a result, the Education Working Group of the Cheetah Interest Group was formed and the 2001 Cheetah Outreach, Smithsonian, Western Cape Education Department workshop was endorsed as a model to increase resources in Africa in order to enhance the development and implementation of multi-level education.

After discussions with environmental educators and scientists at the Global Master Planning Workshop, CCF and its international partners took the initiative to expedite a workshop for Namibian teachers, as an expansion to their long-term education program during June 2002.

A focusing question“ *What are the challenges in utilizing predator education to support environmental education in schools to increase pride in Namibian biological heritage?*” was formulated. This question was formulated in order to aid in directing discussions pertaining to the development and amplification of environmental education and carnivore awareness in Namibian schools and communities. The objectives of the workshop were to provide educators in Namibia with a platform upon which to clarify and report the current issues precluding effective environmental education in Namibian classrooms. Namibian teachers, youth officers, Namibia environmental Education Network (NEEN), local conservation NGOs, government officers, representatives from the Cincinnati zoo and Cheetah outreach attended this workshop. The Cincinnati Zoological and Botanical Gardens, U.S.A generously sponsored this event. Strategies to address challenges pertaining to the priority issues were proposed and were found to be critical to the success of environmental education in Namibia. These were classified into promising solutions and were categorized as according to priority, and matter of urgency. Various persons and deadlines were assigned to these promising solutions, and a follow up workshop was proposed in order to assess the implementation process of these promising solutions.

4.1 Classification of three priority issues to the impedance of environmental education in Namibia

4.1a, Resources and Teacher Training: Inadequate accessibility or irrelevant environmental education resources inhibit teachers from incorporating environmental education into their lessons. Teachers are not skilled in the underlying knowledge necessary for proficient dissemination of environmental education themes and information. Insufficient marketing of resources and a lack of networking is also an issue.

4.1b. Motivation and Attitudes: Teachers and learners are not motivated to incorporate EE into the classroom because it is not compulsory in the system. Therefore, it becomes an after hours burden in an overloaded work situation lacking incentives. There is a lack of commitment to and interest in EE due to a misunderstanding of EE through a lack of awareness, resulting in no sense of responsibility toward the environment. Many learners also do not have the opportunity to experience nature, environ, and predators.

4.1c, Curriculum: The current curriculum is inflexible and environmental education cannot be easily incorporated into the required learning objectives”.

4.2 Proposed strategies to address challenges pertaining to priority issues:

4.2a. Resource and teacher training:

- i) Environmental education courses for teachers, students, in-service training for student teachers is a fundamental solution in increasing and improving current EE resources and classroom inclusion.
- ii) Resources such as environmental directories and conservation information must be published and made accessible to the teachers, hence advertising through appropriate media is critical.
- iii) Educators must be made aware of their role as environmentalists so that this can be passed onto future generations but at this stage there is no incentive for teachers to include EE in their classes. The Smithsonian Institutions EE Fellowships have been successfully operating in South Africa for the past two years, whereby teachers are exposed to EE in America and provided with advanced training opportunities with which they are tasked to disseminate amongst their colleagues upon their return to South Africa. A similar scheme would be highly desirable in Namibia and investigations as to its feasibility are being made. Accreditation and reward for EE initiatives should also be encouraged by the Namibian Education system.
- iv) In-school initiatives and partnerships or collaborations with NGO's are recommended as vital in improving this situation.
- v) Resources should be built through an educator team so that information is relevant to them. For example, information is presented in appropriate languages, though not excluding English, for educators of primary grades.

An environmental directory that provides contact information and descriptions of courses and resources available to educators should be produced and distributed and updated effectively.

4.2b. Motivation and attitude:

- i) Teachers must communicate amongst each other and schools are encouraged to develop partnerships or liaisons with environmental organizations for support and information.
- ii) The identification of key contact people at various schools or organizations will enhance the networking of teachers and a process will be put in place to ensure regular communication between relevant and interested parties.

- iii) The National Association of Science Teachers, as well as Cheetah Conservation Fund Outdoor Schooling opportunities and Cheetah Outreach are primary resources, which must be utilized more efficiently and fully. Teacher associations and resource libraries are critical in ensuring the sharing of information to encourage participation.
- iv) Grade-specific EE topics are required to increase impetus for the inclusion of EE in the classroom. Programs such as "Future Farmers" and Youth Expos will also encourage learner and teacher participation and broaden awareness of opportunities for career development as well as fundamental environmental ethics.
- v) Workshops and the media must be utilized to ensure all teachers and stakeholders are included in EE activities and initiatives.
- vi) Educators should be made aware of their role in and dependence on the environment, including predators, and that they have a responsibility to future generations.
- vii) Offer incentives, such as nature trips, game drives, workshops, fellowships, awards, certification, accreditation and education resources, to educators for incorporating EE in their classrooms.
- viii) EE should be compulsory within the system.
- ix) EE resources should be correlated with current learning objectives.

4.2c. Curriculum:

⇒ Teachers are assigned the responsibility of familiarizing themselves with the science syllabus in order to find methods to align predator ecology and conservation with the principles that they are mandated to include in classroom lessons. Existing resources are currently underutilized and teachers must make a concerted effort to increase their awareness and application of these resources. Similarly, the organizations producing these resources must increase their audience and targeted markets so that more educators are exposed to learning opportunities and have occasion to provide feedback for enhancement of the resource.

The CCF and Cincinnati Zoo have begun developing an education resource aligning predator conservation with Namibian curriculum. This resource will be accessible to Namibian learners and educators through the CCF. However, teachers must not become complacent and are held accountable for the submission of proposals to relevant NGO's and governmental ministries for further curriculum-correlated resources.

5. Conclusions

Namibia has the largest free ranging cheetah population of the world. About 95% of the population is found on the commercial farmlands, where they are in constant conflict with livestock farming. Although the survival of this species is in the hands of the farmers, predator conservation is interconnected to social, economic, and environmental factors, which are of national concern. The integration of predator education within the formal education system could represent a step towards teaching about their role in the ecosystem, and the coexistence with the farming interests.

A formal predator education curriculum could be used as a strategy to promote carnivore conservation. Integrating predator conservation within the formal education curricula should be considered an agenda for discussion, and implementation amongst the government, CCF, collaborators, and conservation advocates. This therefore requires that relevant procedures be followed, whereas recognition for a wider consultation with the relevant structures in governments, conservation partners, and education authorities is considered. Access to information and a lack of resources were identified as challenges. CCF recognise that collaborations, and networking could facilitate access to information, whereas there is a need to develop relevant curricula, and training.

In its effort to support the development of a formal predator education curricular for Namibia, CCF intends to identify key partners, and involve consultations with the relevant authorities. CCF also intends to identify processes and steps and associated challenges that pertain to curricula development in Namibia and elsewhere, and formulate mechanisms, which could enhance the development and utilization of predator education in Namibia.