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Role of Information and Communication Technology in Wildlife Conservation

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ABSTRACT

Information and Communication technology (ICT) makes the monitoring and conservation of wild life in a more efficient manner than the traditional methods. The information and communication tools like remote sensing, satellite tracking, Global positioning system (GPS) mapping, Global information system (GI S), radio tracking, automated footprint identification techniques , Image sensor network , advance mobile technology help in understanding the threatened species to prevent their extinction and to revitalize their population. ICT helps in creating threatened wildlife database and to monitor and visualize its population and distribution, habitat use and preferences, planning and management of conservation programmes , progress of conservation activities and comparison of historical and present wildlife diversity. The social media helps in increasing wild life database and providing a forum for discussing wild life conservation and community led conservation initiatives.

KeyWords: ***Information and communication technology ,Wildlife , conservation***

Introduction

Wild life is highly valued as a resource by society and at the same time it is very important in maintaining ecological balance and providing a diverse gene bank(1). Moreover it has a great aesthetic and cultural value(2). With the development of society, the conflicts between man and nature are increasing day by day(3). The areas reserved for wild life are encroached upon by human beings. The wild fauna is threatened due to habitat destruction, deforestation, pollution , hunting(4) and global climate change(5,6). The global mammal assessment, 2008 indicated that 25-36% of the mammalian species may be in danger of extinction which is quite alarming(7). This has necessitated the need of increase in use of innovative technology. Understanding threatened species is important in preventing their extinction and revitalizing their population. To achieve this the wild life conservationists study the location, movement, activities, food habits, social behaviour and breeding patterns of the animal. Developments in information and communication technology (ICT) make the monitoring of the wild life in all the above said parameters in a way not possible earlier through traditional means where the human observers with their binoculars , field notes and hand drawn maps play the role.

In the present paper, the role of various Information and communication tools are discussed which make it easier and more efficient for the wild life researchers to improve wild life conservation efforts.

Applications of ICT in wild life conservation

1.Basic data collection

ICTs have many uses in the field of data collection, either in the form of laptop computers, palm top computers or Personal Digital Assistants (PDAs). Cybertracker allows non-ICT-literate users to accurately log and record wild life data using a specially designed icon-driven system. It is a hand-held device that allows rangers and animal trackers to record what they see at that very moment The device will then plot maps showing exactly where the observations were made, using GPS.

2.Creating Database for endangered species

ICT is also being used to build up databases or catalogues of a wide range of species. A database of critically endangered, vulnerable and rare species can also be created.

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There is an array of digital tools such as instant messaging, text messaging, blogs, videos, and social networking sites that are inexpensive ,easy to use and enable people to upload pictures, videos and views about wild life which can help in increasing database on wildlife and the identification of animals from existing database(8).

3.Tracking and monitoring Wildlife

Along with GIS systems, satellite and radio tracking is a widely used and popular technology in the conservation world(9,10). The advances in the technology, principally in the reduction of the size and weight of 'collars', an increase in battery life and the incorporation of solar cells, has meant that tracking and monitoring capability is being extended to include smaller species as well.. Further advances mean that environmental data can also be collected, such as air temperature and, for marine animals, depth and heart rate, all of which contributes to a much greater understanding of a species. Depending on the type of system used, tracking and monitoring technologies enable the monitoring of animal movements over vast distances, often providing data which would either simply not be available, or would take a considerable amount of time and effort to gather. Through the ability to locate specific animals, or groups of animals, and monitor their movements over a period of time, conservationists are able to draw conclusions of various parameters related to their behaviour which can be the basis of their conservational strategies.

4. Estimation of population size and composition.

The demography of a species is the most powerful tool in assessing its status.GIS and satellite tracking help in quantification and monitoring of a species. FIT is an effective censuring and monitoring tool especially for nocturnal and otherwise elusive species. This method is used effectively in identifying and monitoring Rhino in South Africa, Indian Bengal tiger, Cheetah in Namibia and polar bear in Canada (11,12)

5. Home Range Determination

Locations of each animal are used to calculate a home range size which is recalculated each time the animal is relocated. Graphs for different ages/sexes/individuals may be

compared to see how much variation exists between different groups, and what number of relocations is necessary to differentiate between groups. The distances between consecutive radio locations of an individual are often used as an index of the total daily movement for that individual .

6.Habitat Utilization Studies

Radio-telemetry can provide detailed information about an animals use of habitat like habitat preference , different habitat of males and females ,circadian patterns of habitat use :occupying nocturnal or crepuscular habitats which differ substantially from daytime ones (9).

7.Monitoring migrational patterns of birds

The birds show varied difference in their migration. Some species take long journey with many stopovers so the habitat of these areas are crucial in conservation of migratory birds. The migratory patterns of 15 species of Asian birds were studied by the use of radio transmitters placed on birds and PTT with ARGOS satellite(13) .The data was used to determine migration routes and stopovers to examine habitat use. Locational data was overlaid with topographic and vegetation layers to find priority areas for conservation.

8.Mortality and survival

Radio-telemetry techniques are enable to find the cause specific mortality factors because tagged animals can be located soon after death and the agent of mortality ascertained in lesser time(9) .

9.Long term patterns of habitat use

To understand patterns over time that may be related to habitat changes or human activity,it is needed to look back over decades. This means archival maps, photographs, field notes, and other relevant data acquired in the field by numerous researchers in the past is required. So the researchers digitized historic database and compare it with the current information to reveal the long-term patterns of habitat use. In the conservation plan of mountain gorilla (Gorilla *beringei beringei*) in central East africa,the hand drawn maps made about two decades before of daily gorilla group locations were digitized and compared with current ranging

patterns.This helped to understand the changing patterns of gorilla behavior and the gorillas relationship to their environment and to quantify and understand the impacts of poaching and encroachment.(14)

10.Group ranging pattern

Using GPS the group movements of the animals are logged from which group ranging pattern of that species can be established(15).

11.National park management and planning

Key in the process of creating protected areas is first determining the range and migration routes of the species in question. Without this information it is difficult to identify the most crucial, ecologically relevant sites. Niassa in Mozambique is one of the last sites containing a vital gene pool of tuskers (large bull elephants with tusks) and satellite tracking of individual elephants was crucial in determining their range, prior to establishing the boundry of Niassa National park.

12.Evaluating Population Dispersal

Population dispersal is a highly valued measurement for conservation biologists because it can indicate the period at which the species headed for trouble. Although large population declines have been projected, very little is known about the movements and threats faced by individual albatross at sea, especially during their post breeding dispersal. The post breeding movements of 18 black-footed albatross tagged in California's Cordell Bank National Marine Sanctuary were tracked. Albatross are known for flying long distances, and the study confirmed these incredible journeys. Overall, four out of nine males traveled west of the international dateline (180º W) yet only one of the nine tracked females ventured into the western North Pacific. This preliminary data suggests that male and female birds segregate at sea. So, albatross remain

threatened because they travel well beyond the safe zone into unregulated waters. This is an exciting observation with important conservation implications(16).

13.Evaluating distribution

Using GIS, scientists can assess the distribution of the endangered animals relative to management zones and protected regions particularly in the far ranging species. This can help in making the multiple nations accountable for their conservation. The world's largest seabird, the albatross,is critically endangered. Each year, thousands of albatross die at the end of fishing hooks. Using the satellite-tagged birds and remotely sensed information from satellites, scientists are investigating and quantifying movements of black-footed albatross(16). Findings showed that postbreeding black-footed albatross do not remain within the Cordell Bank National Marine Sanctuary or the U.S. EEZ waters but range widely across high seas areas harvested by pelagic longline fisheries. Based on the known breeding colonies, Japan and the United States have jurisdiction over the black-footed albatross. During the postbreeding season, however, the birds tracked during this study ranged within territorial waters of Canada, Japan, Mexico, and Russia..By overlapping albatross satellite telemetry tracks with boundaries of jurisdictional waters and fishing effort data, GIS graphically highlights those fisheries and countries with responsibilities for albatross conservation. So , the integration of satellite tracking, remote sensing, and GIS mapping is empowering resource managers to tackle large-scale conservation questions.

14. Assesment and reduction of human and wildlife conflict

Identifying, tagging and tracking problem animals can reduce human/wildlife conflict by providing an early warning that an animal is near a village or populated area. Endangered species can then be darted and relocated without the loss of human or animal life.

15. Identification of farm-bred and wild-caught specimens

A major problem facing conservation initiatives that seek to promote the ‘controlled farming and breeding’of endangered species (in order to relieve the pressure

on wild populations) is finding ways of determining whether individual specimens are genuinely captive bred, or caught in the wild(17). By injecting small electronic

tags into the scales of ranch-bred crocodiles, conservationists working in South-east Asia are able to identify individuals taken from wild stock. This discourages the poaching of wild crocodiles, since the implementation of such a system makes them harder to sell.

16.Community-led conservation initiatives

Many conservation programmes are community based. The World Conservation Union (IUCN) has implemented a pilot project to see how ICTs can promote conservation and resource management in remote conservation areas of Mozambique. ICT is providing rangers with a means of communication, allowing them to contact their base station and each other, monitor threats to the wildlife and signs of deforestation, and alert communities to any dangers posed by wildlife(18) .

17.Fund raising

The social media helps in fund raising for wild life conservation. It provide a forum to wildlife lovers to discuss wild life conservation and help in fundraising through online giving .(8)

18.Prevention of wild life trafficking

Wildlife enforcement monitoring system is an application of ICT to prevent the transboundry wild life trafficking using data gathered through a national data compilation and analysis**.**Wild life and Forest crime Analytic Toolkit is designed to assit the government officials in wildlife administration and customs to conduct comprehensive analysis of possible measures related to the protection and monitoring of wildlife and to identify technical assistance(19).

Conclusion

Characterisation, quantification and monitoring of wild life is a major challenge in conservation. The traditional methods are not sufficient to tackle the conservation strategies of the threatened species whose number is increasing at an alarming pace. The ICT is helpful not only in tracking and monitoring the threatened wildlife but also in planning and management of their conservation efforts. It is a great tool in sensitizing people towards wildlife and create awareness about their conservation and need of sustainable management.

References

1. Kasso M and Balakrishnan M. Ex situ conservation of biodiversity with particular emphasis to Ethopia .ISRN biodiversity. 2013, doi/org/10.1155/2013/985037.
2. Pinho JR, Grilo C, Boone R B et. al. Influence of aesthetic appreciation of Wildlife species on attitudes towards their conservation in Kenyan agropastoralist communities . PLOS Published: February 14, 2014 ,DOI: 10.1371/journal.pone.0088842
3. LeBal S, Mapuvire G and Czudek R. Human wild life conflict toolkit, comprehensive solutions for farmers and communities. Unasylvia. 2010, 61, 236-237.
4. Di Marco M. and Santini L. Human pressures predict species geographic range size better than biological traits. Global Change Biology 2015, doi:10.1111/gcb.12834
5. Root TL, Price JT, Hall KR et.al. Fingerprints of global warming on wild animals and plants. Nature.2003, 421,57-60.
6. Pacifici M, Foden WB , Visconti P et al. Assessing species vulnerability to climate change. Nature Climate Change, 5(3), 215-224. doi:10.1038/nclimate2448.
7. Baille JEM, Taylor CH and Stuart SN. A global species assessment. IUCN –The world and conservation Union,2004.
8. Elizabeth, M. , Leveraging social media for fundraising in Kenya. WildlifeDirect, 2010,
9. Keating KA,Brewster WG and Key C H. Satellite telemetry: performance of animal tracking systems. The Journal of Wildlife management, 1991,55;1, 160-71.
10. Habib B , Shrotriya S, Shivkumar K et al. Three decades of wildlife radio telemetry in India : a review. Animal biotelemetry , 2014,2 ; 4.
11. Jewell Z and Alibhai S. Electronic imaging and signal processing identifying endangered species from footprints . SPIE Newsroom .2013, Available from url http://spie.org.

12. James C R, Nils H, Reinhard ,K. et al. Automatic track recognition of footprints for identifying cryptic species.Ecology, 2009, 90;7, 2007–2013.
13. Higuchi H and PierreJ P. Satellite tracking and avian conservation in Asia. Landscape Ecol Eng,2005, 33-42.
14. Steklis H D , Scott ,M, Netzin, GS, and Nick F. GIS Applications for Gorilla Behavior and Habitat Analyses , reprinted from *Arc News*, 2005.www. ESRI.com
15. Schofield H and Gail C .Novel GPS tracking of sea turtles as a tool for conservation management. Journal of Experimental Marine Biology and Ecology.2007,307 , 58–68.
16. Scott E. GIS application in wild life management and habitat analysis. Annnotated bibliography. 1999. Available at http// www.edc.uri.
17. Thomson J. Captive breeding of selected taxa in Cambodia and Vietnam : a reference manual for farm operators and CITES authorities.2008, Traffic Southeast asia, Vietnam.
18. Banks K and Richard B. Mobile phones: An appropriate tool for conservation and development?2004, Fauna and Flora International, Cambridge , UK.
19. Wildlife and Forest Crime Analytic Tool kit United Nations office on Drugs and crime(UNODC) Vienna International Centre, 2012.http:// www.unodc.org>Toolkit_e.