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Biodiversity and Protected Areas

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Abstract

The benefit of biodiversity to mankind is more than its contribution in terms of livelihoods and material benefits. Protected areas are the prime foundations of national and international biodiversity protection and conservation strategies. They serve as shelters for different species and biological processes that cannot endure in intensely managed habitats and ecosystems. Protected areas are places of natural evolution and forthcoming ecological restoration. Given the solid and growing emphasis on the role of biodiversity and its linkage with protected landscapes development and management in many parts of the world, it would end up being a tragedy of survival if the role of protected areas in the conservation of biodiversity is downplayed through lack of attention or interest by the development actors. Therefore, different views and arguments on the subject were reviewed in this article with the major objective of exploring the roles of biodiversity and its development and conservation in the protected area setting.

Keywords: biodiversity, protected areas, ecosystem services

1. Introduction

Ecological diversity offers a natural capital of plant and animal species. Biodiversity constitutes the genetic diversity (biochemical units of hereditary information), the species diversity (total number of species in a given area) and the ecosystems diversity (consisting of communities of plants and animals and the non-living elements of the environment such as water, soil, minerals, air including their functional relationships and the ecological processes). It is the end result of four billion years of evolution (Swara, 1992; UNEP, 2006).

Humans depend on biodiversity for numerous life nourishing courses of action which are taken for granted that includes but not limited to – formation of soil, recycling and cycling of different nutrients, oxygen supply, disaster prevention, climate regulation and waste management and cleansing. Our daily life is also reliant on biodiversity to attain water, fiber, food, medicine, fiber, energy and many more manufactured goods and services. Hence, is it possible to afford the massive losses of biodiversity? The degradation of biodiversity is equally incorrect and hazardous. It is incorrect since all species do have the right to exist. It is also hazardous for the mere fact that, the world's ecosystems are the support for humanity's life systems (Swara, 1992; Braat & Brink, 2008; Jeffrey & Neely, 2001).

It is impossible to restore a species once extinct. An effort to preserve a single species forms the broader effort of conserving the wider biodiversity. Pharmaceuticals that assist the wellbeing of humanity are produced from the wealth of natural resources. However, as we dwindle the biological capital due to habitat obliteration, correspondingly, the magnitude of new medical inventions will be reduced significantly. Curare, a muscle relaxant used in surgery, Quinine, to treat malaria, and vincristine, used to treat leukaemia, are just three vital remedies derived from medicinal plant species of the tropical forestry. It is also actual fact that, numerous additional pharmaceuticals will be discovered if we are able to conserve the forest trees along with their associated different life forms and habitats (WWF, 1990).

It is however, a sad fact that the biodiversity which supports the very existence of mankind is being eradicated from the face of the earth. Human interference is fast-tracking the degradation and extinction of species at an alarming rate of concern.

Humans are driving species to extinction 1000 times than the natural rate of extinction. Scientists estimate that the planet earth is losing a species a day. Even though, it is uncertain about how many species exist presently, based on the current trend of extinction scientists estimate that up to 25 % of the world's fauna and flora could

extinct by the middle of the next century (Swara, 1992; Braat & Brink, 2008; Jeffrey & Neely, 2001).

If not protected and conserved properly, protected areas can't be a guarantee in maintaining the already endangered wealth of biodiversity. Though the degradation of the natural resources within protected areas is less as compared to their vicinity unprotected areas, many of the protected areas not more than 'paper parks', and numerous world's flagship protected areas, like the World Heritage sites listed by UNESCO, are increasingly endangered by human interference and for lack of acceptable protection (Braat & Brink, 2008).

Hence, conservation and maintenance of the remaining vegetation cover from deforestation are some of the vital issues that which need to be addressed by decision makers if the remaining land resources are to be conserved and used in an integrated and sustainable manner (Mastewal, 2006).

2. Objective

The objective of this paper is to explore the roles of biodiversity on ecosystem services and analyze the role of protected areas for the development and conservation of biodiversity.

3. Methodology

To the success of this work, different sources like journals, reports, books and proceedings were reviewed to form a critical analysis and discussion part of the paper. The article explored the role of biodiversity on ecosystem services. As protected areas are playing the dominant role in protecting the remaining biodiversity, the paper analyzed its link with the indigenous people living in and around protected areas. The article also attempted to summarize some of the basic policy and strategy issues that need the attention of decision makers.

4. Results and Discussion

4.1 Definition and Scope of Biodiversity

Braat and Brink (2008) explained biodiversity as the diversity of species, populations, genes but also communities, and ecosystems. It is also considered as an element in and an indicator of the health of all ecosystem and ecological process. Biodiversity constitutes not only the big fauna and flora but also the small and insignificant organisms along with their habitats. Therefore, biodiversity is the natural/ecological capital of the globe. As a result of its ecological diversity (rift valley, highlands, lowlands, etc.), the horn of Africa is usually considered as an important hot spot of global biodiversity in relation to the amount of plants and animals species as well as the diversity of the ecosystems it comprises (Swara, 1992; UNEP, 2006).

Table 1. The biodiversity features of Eastern Africa

		Biodiversity opportunity						Threat	Response
	Area	Mammals		Birds		Plants		% of land	% of land
Country	km²	Endemic	Total	Endemic	Total	Endemic	Total	Transformed	protected
Burundi	27 830	0	107	0	451	Not known	2 500	37	5
Djibouti	23 200	0	61	1	126	6	826	1	1
Eritrea	117 600	0	112	0	319	Not known	Not known	19	4
Ethiopia	1 104 300	31	277	28	626	1 000	6 603	39	5
Kenya	580 370	23	359	9	844	265	6 506	13	6
Rwanda	26 340	0	151	0	513	26	2 288	52	8
Somalia	637 660	12	171	11	422	500	3 028	6	0
Uganda	241 040	6	345	3	830	Not known	4 900	36	7
All countries	2 758 340	72		52		1 797		24	4

Source: UNEP, 2006

4.2 Biodiversity and Ecosystem Services

Biodiversity is the sum total of species diversity and variability of all living things as well as a reflection of the pattern of diversity across different ecological zones. It encompasses the diversity within species, among species and also across different ecosystems. Basic needs for life (food, clean air and water) are the end results of healthy

ecosystem services. In one way or another, ecosystems also protect from the hazardous effects of natural disasters, outbreak of diseases, and help to sustain the essential life processes of the planet (CBD, 2006).

Even though every life form in the planet has a contribution towards ecosystem services, the level and magnitude of contribution varies considerably from organism to organism. Each individual species has its own contribution for the very complex and entire mode of ecosystem services. Hence, the health of the entire ecosystem services and the process is governed by the combined contribution of each and every life form. It is also often challenging to identify the relative contributions of each distinct species to the overall ecosystem processes. As for instance, with in a given ecosystem, browsing and grazing animals, grasses, nitrogen fixing bacteria, small and large predators, etc. may at times be considered functionally similar amidst of their distinctiveness in life form, genetic makeup, life history, and other forms of traits (ESA, 1999).

The wellbeing of humanity is therefore dependent on the proper functioning of biodiversity. A healthy and properly functioning biodiversity provides the basic and essential services of life. The formation, recycling and protection of soil, nutrients and water resources; the disintegration and absorption of pollutants; weather and climate stability; recovery from disaster; fiber; food; medicinal sources; timber and related products; aesthetic values; breeding grounds; etc. essential services that ensure the survival of mankind all depend on the wellbeing and healthier functioning of biodiversity. Apart from these, its contribution for science and research, tourism and economic development and for many culture related values and assets is very magnificent. Tremendous services are being offered by biodiversity for free (Anup, 1998).

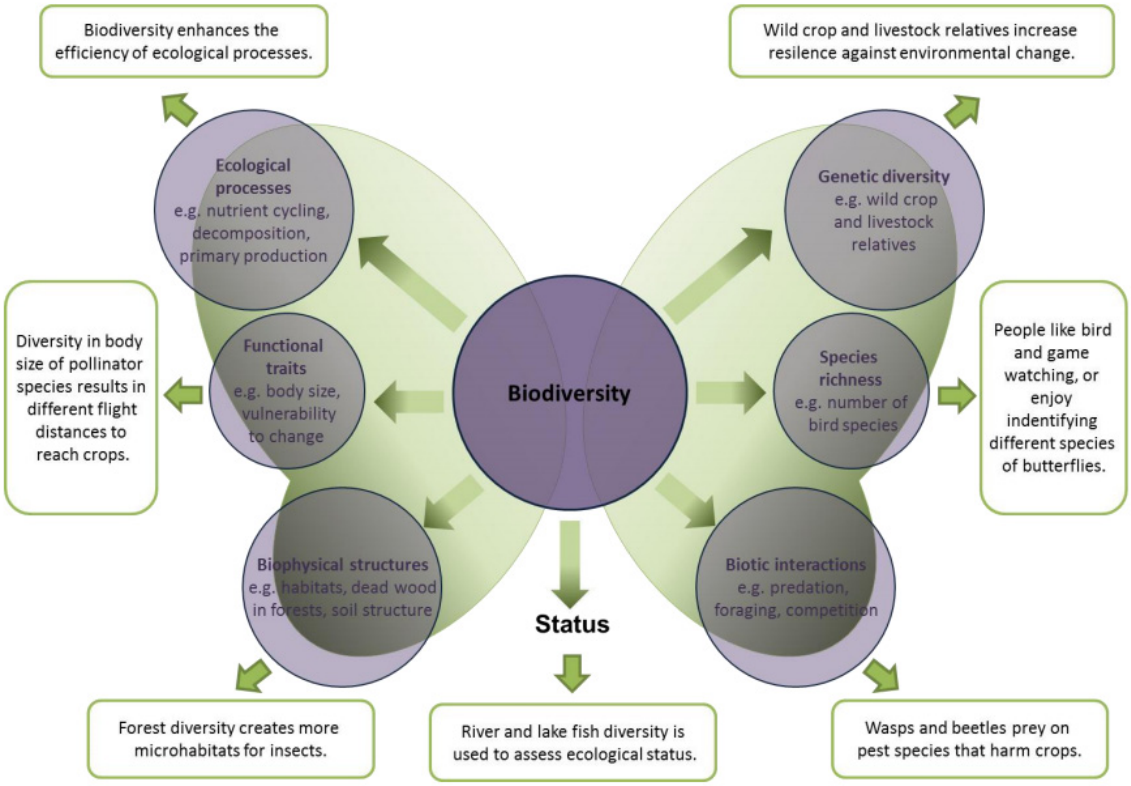

Figure 1. The multi-faceted role of biodiversity to support the delivery of ecosystem services and to assess the status of ecosystems (BISE, 2016)

Degradation of biodiversity negatively affects ecosystem services as it lowers down their capability of providing the valuable services to humans (CBD, 2006). Human interference on the natural ecosystem is however increasing at an alarming rate, by causing a significant obliteration and posing a threat in the sustenance of natural habitats for the past 50 years than at any point of time. Land use and land cover change, the development of invasive species, habitat modification, population growth, the severe impact of fertilizers on the environment, climate change and over exploitation of natural resources are among the primary causes of the threat. Though protected areas are not in different to these challenges, they are however, vital elements in conserving and maintaining the remaining biodiversity resources in the natural ecosystems (CBD, 2006).

4.3 Biodiversity and Protected Areas

IUCN (World Commission on Protected Areas) (1994) defined protected areas as areas of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means. Based on management objectives, it has also classified protected areas in to six broad categories and National Parks belongs to category II.

Category II: **National park: protected area managed mainly for ecosystem protection and recreation** – natural area of land and/or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

The total number of protected areas has consequently have grown from 1,000 as reported in 1962 by the UN to 12,754 in 1997. According to the 2003 United Nations list of protected areas the total number of protected areas also reached 102,102 (Chape *et al.,* 2003).

Protected areas are, and will remain to be the cornerstones for the conservation of biodiversity. Given the fact of the increased reliance on the natural resources as a result of the ever increasing population pressure that has created a sever biodiversity crisis, an effective protected area system is the preeminent courage and option for the conservation of biodiversity and ecosystem services (CBD, 2005).

Protected areas support natural systems that can provide measurable as well as achievable environmental benefits. Prioritizing this in the development and management of policies and strategies is both ethical and practical (Nigel, 2009).

4.4 Indigenous People and National Parks

Among others, forests, fiber, water fertile soil, green pasture, minerals, wild animals, etc. are some of the land resources which can easily be found in protected areas. These areas could also characterize many of the cultural, aesthetic and spiritual values in the local context. In the history of mankind, imperative decisions with regard to the use and conservation of land resources have been made, at times inflaming protracted conflicts in the ecosystem (Ghimire & Pimbert, 1997).

The natural resources of protected areas can't co-exist with societies which are hostile to them. Knowledge about and understanding the livelihoods context of the community that are affected by the existence and management arrangements of parks is very vital as information about the fauna and flora species which are aimed to be protected. For instance, the role of women as primary care givers of the household has to be considered as an essential element for the protection and management of land resources since societies living in or around protected areas do have an important and long-standing attachment with the natural resources for their very existence (IUCN, 1992).

The management and conservation of protected areas along with the associated biodiversity can only be sustainable if and only if the native societies are going to be part of the protection ventures that can be of help to improve their livelihoods.

Proper partnership arrangements have to be placed in order to attain the sustained amalgamation of protection arenas with sustainable development. Hence, participatory planning and implementation is a key element for the success of protected areas management since considering local contexts and rights over and access to the natural capital will bring strong commitment for the sustained management and development of protected areas (Mackinnon, 2001).

However, the challenging questions that need to be addressed would be which type of resources can be used by the indigenous people so that they will be able to generate income to support their livelihood? What will be the role of park authorities in building partnerships with other relevant stakeholders for the creation of enabling environment for the ecofriendly livelihoods development? The development of rules, regulations and law enforcement arrangements are also among the issues the needs to be addressed in a participatory fashion.

Thus, it is very vital to contemplate the complex relationship among human-vegetation-wildlife in and in the vicinities of National Parks as they are established to attain the sustained development and management of the natural capital.

5. Conclusion

Mankind depends on biodiversity for several life sustaining courses of action which are taken for granted that includes but not limited to – formation of soil, recycling and cycling of different nutrients, oxygen supply,

disaster prevention, climate regulation and waste management and cleansing. The wellbeing of humanity is therefore dependent on the proper functioning of biodiversity. Human interference on the natural ecosystems is creating a significant obliteration and posing a threat in the sustenance of natural habitats. Land use and land cover change, the development of invasive species, habitat modification, population growth, the severe impact of fertilizers on the environment, climate change and over exploitation of natural resources are among the primary causes of the threat. Even though, protected areas are not in different to these challenges, they are however, vital elements in conserving and maintaining the remaining biodiversity resources in the natural ecosystems. Therefore, owing to the severe degradation of protected areas natural resources, there is a desperate need for an immediate interference by the side of development actors by being backed by applicable policy, strategy and legislation mechanisms, which could prevent the rate of deforestation and enhance the sustained utilization, conservation and development protected areas.

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