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EVALUATION OF CONSERVATION COSTS AND BENEFITS OF DEVELOPING CONSERVATION STRATEGIES

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ABSTRACT

Due to environmental degradation, depletion and overexploitation of natural resources caused by human activities resulted in development of strategies for conservation of species, habitats and resource. Hence, this paper thus examines the advantages of financial investment and critical elements associated with creating strategies for the conservation of various species. Interdependent to one another are fish, wildlife species, natural habitats as well as natural resources. It rightly observed that the most efficient environmental benefits will be gained through understanding of economic aspects of the costs side of biodiversity which will lead to novel and creative ways. The paper, therefore, concludes that it is better to recognize and incorporate costs at the outset of the planning process, rather than belatedly incur the higher costs of a less efficient plan.

Keywords: Biodiversity, Conservation cost, Conservation strategy, Environmental degradation, Species.

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Contribution/ Originality

This study originates new formula for biodiversity conservation through the incorporation of cost implication at the onset of developing conservation strategies. It takes cognizance of various species like fish, natural habitats, natural resources and wildlife species that are interdependent to each other so as to obtain most efficient environmental benefits.

1. INTRODUCTION

Environmental degradation, depletion and overexploitation of natural resources caused by human activities have become of great concern globally. These concerns resulted in development of strategies for conservation of species, habitats and resources. This called for Millennium Ecosystem Assessment to conclude with paramount objective to halt the rate of biodiversity loss being one of the biggest challenges facing the world by 2010. The world's nation leaders met at the Rio Convention in 1992 and adopted the Convention on Biological Diversity and the World Summit on Sustainable Development. Target was set to halt biodiversity loss by 2010 which could not be achieved despite all the efforts, the decline still continues (Thomas *et al.*, 2004; Van

Swaay *et al*., 2010).However, new target has been adopted as headline target of stopping the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, as well as restoring them as far as feasible (Council of the European Union, 2010). Many countries have taken action by designating vast land areas as nature reserves or national parks for conservation purposes in Europe. For example, 26,000 protected areas were created through the EU Habitats Directive which has led to the network of sites, referred to as Natura 2000 (http://ec.europa.eu/environment/nature/index_en.htm).

The main change in environment is the rate of change which in many cases, it greatly exceeds the evolutionary adaptive powers of wild species. Ranges of factors that causes biodiversity changes include land cover and land use, fragmentation and isolation, harvest or removal of species use of chemicals as well as introduction of invasive which is either alien or genetically modified species and restoration (International Association for Impact Assessment (IAIA) & Capacity Building for Biodiversity Impact Assessment (CBBIA) (Uprety, 2005). With the current climate of economic instability, declining appropriations, increased transparency and deteriorating conditions posed before vital and critical resources, the proposal to adopt a more strategic approach to species and habitat conservation is a timely one. Biodiversity impact can be discussed with respect to composition changes, or structural changes or biophysical changes. For example, in Nepal assessment of environmental impact of forestry was carried out to know the biophysical changes as related to species composition changes and biodiversity impacts of specific aspect. The forestry changes for instance, resulted into selective removal of trees which definitely affected the composition of species as such conservation principles in forest activities was recommended (Uprety, 2005).

2. CONSERVANCY AND FINANCIAL INVESTMENT

There are various levels of financial investment associated with conservation interventions have associated costs, contingent on the degree of intervention. Financial investment for interventions can be comprised of elements such as land acquisition costs, management costs and transaction costs. Though some elements of financial investment intervention that are incurred may be high, not necessarily all elements will have the high value attached to them also. A tract of heavily forest land may have a low management fee associated with it, for it has it is to easily accessible. Case in point; a parcel of forest close to a road might have low management costs, because it is easily accessible, but have high acquisition expense as a result of being situated in a region that has beneficial infrastructure which can be utilized for potential development and economic gain (Cullen *et al*., 2005).

In most instances, a conservancy acts as the representative in the acquisition of land tracts dedicated for public conservation. There is a situation sometimes, which mandate conservation but does not impose a financial investment on the conservancy seeking acquisition. A case in point is that a situation may arise whereas State and Federal wetlands regulations and jurisdictions might prohibit conversion of natural habitat, which thereby accomplishes the conservancy's

objectives and require no financial investment. The Biodiversity Action Plans (BAPs) and Species Action Plans (SAPs) availability provide biodiversity strategy. For example, wetland ecosystem, priority habitats and species priority are well demonstrated in BAPs. Another example is Scheldt River in Belgium which demonstrates the restoration and conservation of biodiversity was soughed as a way to optimize other ecosystem services provided by the river indicating social and economic values.

In this case, safety from flooding, navigability and accessibility of the Antwerp port is guaranteed. The freshwater tidal are of paramount important to North-western Europe. Sigma Plan a land safety against 250km river undulating valley. Construction of dikes leads to biodiversity loss as well as its flood capacity retention as an ecosystem services. Hence, restoration of biodiversity and flood retention capacity is being embarked upon at the site (Mar Van, 2005). These legislated government standards, absolve conservancy's and other authorities of incurring payment, an imposition of 'opportunity costs' may be placed on society because of foreseeable or anticipated opportunities to use the land in a manner that reaps financial gain or economic prosperity in a private or public entity (Cullen *et al*., 2005).

Conservation costs can be applied in a myriad of ways in conservation planning. Addressing a cost–benefit scenario, the costs and the benefits of conservation are calculated spanning a landscape or region for individual land parcels. This allows for an absolute comparison between costs and benefits, with the net benefits (benefits–costs) used to serve as a framework for decisions on where conservation versus residential or commercial development should proceed. Cost-effectiveness analyses is utilized when situations involve conservation planning and costs, as there is extensive comprehension and complexities in appraising the financial and economic gain that conservation may reap, such as in determination of the value of existing bio-diversity (Tear *et al*., 2005). Since enhancement of the quality of existing nature and increasing the protected areas are the important values of National Ecological Network (NEN), its focus can never be over emphasized.

This form part and parcel of European Natura 2000 network of areas protected. NEN aims include networking all nature restoration measures that centred on ecosystem such as restoration of hydrological processes that already exist in the protected areas. Netherlands demonstrated this important aspect of NEN (Arend and Roel, 2005).

This type of analyses demonstrates the financial terms of conservation, though the benefits remain stationary with regard to their original inventory (e.g. numbers of species or area of forest). The most efficient plan is the one that delivers a given conservation target for a minimal price or, as an alternative avenue, maximizes the conservation target level at a specific price platform (Armsworth and Roughgarden, 2001).

In many European countries, butterflies and moths have declined seriously due to human activities which include rapid changes in land use as a result of marginal land abandonment, loss of grassland, woodlands, rapid urbanization as well as climate change in recent decades (Settele *et al*., 2008; Van Swaay *et al*., 2010). Agricultural intensification and abandonment have been

recognised as the two biggest threats to butterflies as discovered by the European Red List of Butterflies (Van Swaay *et al*., 2010). The Agricultural Policy of EU has subsidised European agriculture which enhanced intensification, resulting to loss of habitat. This also led to unsustainable systems that provide high carbon emissions as well as rely on cheap oil for many decades (Leng, 2009).

To halt further decline in both butterfly and moth population conservation of *Lepidoptera* was developed so as to enhance biodiversity. Maintenance of biodiversity by farmers through conservation of landscapes has been discovered that it would bring great benefits for wildlife, communities in rural areas and tourism as well serve as preserving an important cultural heritage. More sustainable systems that are less reliant on cheap oil and have lower carbon emissions would also be achieved and of benefits (European Environment Agency (EEA), 2004; Paracchini *et al*., 2008).

With the introduction of Capacity Agricultural Payment (CAP) reform recently (referred to as pillar 2), which means paying for public goods such as biodiversity and clean water is a welcome development. In maintaining environmentally sustainable production as well as wildlife habitats on farmland an improved system of agricultural payments was introduced which is of High Nature Value (HNV) farmland (EEA, 2004; Paracchini *et al*., 2008). These systems support over half of Europe's butterflies; otherwise, they could have been loss in a generation.

With contemporary progress in conservation science, many relative agencies and authorities are re-addressing their focus towards a strategic pursuit of sustainable landscapes. Such progress has resulted from a digital era of data regarding conservation biology, landscape and population ecology, and adaptive resource management, along with improvements in remote sensing, database management, and geographic information systems. Activity based conservation with an emphasis on "more" gives way to the science of "how much more" and "where", and the consideration as to how best to pursue our mission (National Ecological Assessment Team Strategic Habitat Conservation, 2006).

In 2006, the United States Fish and Wildlife Service leadership endorsed the Strategic Habitat Conservation as the conservation plan that would be employed to achieve its mission in the new millennium. In response to the unprecedented scale and complexity of challenges facing the earth's natural resources, management of the United States Fish and Wildlife Service determined that there was need to develop and implement a landscape approach to conservation (National Ecological Assessment Team Strategic Habitat Conservation, 2006).

It would have to be more deliberate and planned, science-driven at a contemporary level, a collaborative effort, adaptive to existing scenarios, and be able to easily comprehend. Throughout the scientific and conservation community, personnel are becoming more dependent on progressive approaches that apply advanced science and technologies to situations towards engaging conservation to sustain the fish and wildlife populace nationwide (National Ecological Assessment Team Strategic Habitat Conservation, 2006).

Strategic Habitat Conservation is a framework that is scientific application for generating practical, relevant, adept and obvious determinations regarding the expenditure of United States Fish and Wildlife Service resources for species, which are confined by habitation quality and occupational domain. It is an adaptive management framework integrating concept, design integration, presentation and evaluation (United States Fish and Wildlife Service, 2013).

The United States Fish and Wildlife Service have adopted the parameters and guidelines of the Strategic Habitat Conservation to implement and assess progress toward achieving optimum biological or ecological conditions and outcomes. Numerous programs of varying sizes were assembled into coalitions to collaborate in an attempt to magnify the impact of the intent of the Strategic Habitat Conservation's platform towards achieving outcomes at the larger landscape, regional, or continental scales (United States Fish and Wildlife Service, 2013).

3. STRATEGIC HABITAT CONSERVATION APPROACH

The Strategic Habitat Conservation approach is comprised of five (5) components that engage the Fish and Wildlife Service to coordinate expertise, capability and operations across various programs in a collaborative manner to achieve mutually aspired biological outcomes for species, habitats and resources:

(1) *Biological planning* – a collaborative effort amongst partners to determine mutual conservation targets and gaugeable biological objectives, such as population for these outcomes, and determine restrictions affecting mutual conservation targets;

(2) *Conservation design* – generating applications that position conservation actions to be of most benefit to measurable biological outcomes,

(3) *Conservation delivery* – in conjunction with others, collaborate to establish and initiate conservation strategies with optimum benefit at diversified spatial scales.

(4) *Outcome-based monitoring* – assessing the capability of conservation actions towards achieving biological outcomes as well as configuring future plans.

(5) *Assumption driven research* – verification of beliefs during biological planning to redefine future initiatives. Monitoring and research promote further investigation, assessment and analysis for additional revelation (United States Fish and Wildlife Service, 2013).

On a global scale, the World Wildlife Fund has two approaches for conserving biodiversity towards conserving the Earth's most outstanding places and conserving species that are particularly important for their habitat or for people. Strategically focusing efforts on these global priority places and species will also help conserve the many other species which share these habitats and/or are vulnerable to the same threats.

As opposed to policies in the United States, the World Wildlife Fund involves involve local communities and indigenous peoples in the planning and execution of field programmes, respecting their cultural as well as economic needs, strive to build partnerships with other organizations, governments, business, and local communities to enhance our effectiveness run our

operations in a cost effective manner and apply donors' funds according to the highest standards of accountability.

4. CONCLUSION/RECOMMENDATIONS

As important and critical as it is to reclaim, preserve and enhance the species, habitant and natural resources that are essential for the survival of the Earth, due consideration must be given to cost and benefits associated with such reclamation and conservation.

A growing importance and emphasis on the integration of economics and biology in the conservation sciences means that economic ideas and techniques will become increasingly instilled in conservation planning methodologies. Indeed, the lack of implementation of most conservation plans suggests conservation planners have historically not been overly concerned with practical factors that will influence implementation, such as the costs of plans

It is better to recognize and incorporate costs at the outset of the planning process, rather than belatedly incur the higher costs of a less efficient plan. If a consensus still suggests that conservation costs are more variable than the biodiversity and environmental service benefits that conservation funds seek to obtain, they imply a need for a radical shift in conservation research. Balancing research on biodiversity features with a greatly strengthened understanding of economic aspects of the costs side will lead to novel and creative ways to obtain environmental benefits in the most efficient manner possible.

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