A COMPARATIVE STUDY OF BIODIVERSITY CONSERVATION COPING WITH CLIMATE CHANGE IN CHINA AND CAPE VERDE

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Abstract

Climate change is a real and urgent challenge that is already affecting people and the environment worldwide. Significant changes are occurring on Earth, including increasing air and ocean temperatures, widespread melting of snow and ice, and rising sea levels.
Biodiversity loss and ecosystems degradation are being accelerated by climate change. The link between biodiversity conservation and climate change flow both ways: Biodiversity conservation increases the resilience of the physical and biological systems to changing environmental conditions and changes in climatic variables as genetically rich populations and species-rich ecosystems have greater potential for adaptation. This study aimed to find out how climate change affects the choice of instruments used to promote biological conservation in Cape Verde and China, to compare the policies and measures for Climate Change: adaptation and mitigation existent in both countries with respect to their applicability and sustainability. The findings of this study show that Cape Verde and China need more efforts to adapting and mitigating the impacts of climate change. Some progress has been made in promoting biodiversity conservation coping to climate change as well in both countries, but more improvements are required to sustain it and to get the sustainable development.

Keywords: Biodiversity Conservation, Climate Change, Adaptation, Mitigation, sustainable development

Introduction

The concern of the twenty-first century is the big issues related to environment and ecology like climate change. The constant environmental threats that jeopardize the survival of many species of animals and plants including the man himself have claimed that there are qualified people in that area to try to mitigate this problem.

Cape Verde is highly vulnerable to climate change, with a low capacity to adapt. In the more immediate planning horizon (next 10-20 years), climate induced changes include seasonal water shortages at an increasing number of economically important sites and year round shortages at other sites. In addition, climate variability is predicted to increase, with more storms, floods and droughts and a shorter rainy season. This situations are similar to China.

Africa and South Asia are the most vulnerable continents to climate change variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is already taking place. However, this may be insufficient for future change in climate.

Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism.

Biodiversity conservation increases the resilience of the physical and biological systems to changing environmental conditions and changes in climatic variables as genetically rich populations and species-rich ecosystems have greater potential for adaptation.

The impacts of climate change pose fundamental challenges for current approaches to biological conservation. Changing temperature and precipitation regimes will interact with existing drivers such as habitat loss to influence species distributions despite their protection within reserve boundaries (Hagerman and Chan, 2009).

Biodiversity loss matters because species and habitats are the building blocks on which human livelihoods depend, the foundation for production forests, fisheries, and agricultural crops. Enhanced protection and management of biological resources will also contribute to solutions as nations and communities strive to adapt to climate change (World Bank, 2008).

Habitat loss and fragmentation, overexploitation, pollution, the impact of invasive alien species and increasingly, climate change all threaten global biodiversity. Climate change may thus further accelerate both the ongoing impoverishment of global biodiversity, caused by unsustainable use of natural capital, and the degradation of land, fresh water and marine systems (CBD, 2009).

Moreover, this degradation and disturbance in terrestrial and aquatic ecosystems generate niches that can be exploited by invasive exotic species (World Bank, 2008).

Global climate change is a change in the long-term weather patterns that characterize the regions of the world. Scientists state unequivocally that the earth is warming (S. Viajaya *et al*, 2012).

Although climate change can not be avoided entirely, the most severe impacts of climate change can be avoided by substantially reducing the amount of heat-trapping gases released into the atmosphere. However, the time available for beginning serious action to avoid severe global consequences is growing short (S. Viajaya *et al*, 2012).

According to UNDP (2012), a good ecosystems healthy like forests and bogs - contain massive carbon reservoirs and are vital to regulating the global climate.

The sustained supply of certain ecosystem services such as stream flow regulation in drought prone areas will be critical in buffering human populations from the adverse impacts of climate change, which include coastal flooding, droughts and other hazards. Healthy and diverse natural ecosystems are expected to be more resilient in the face of climate change than ones that have been degraded (UNDP, 2012).

Increasing evidence shows that shifts in China's climate have already occurred and the changes will continue in the coming years. The average surface air temperature across China increased 0.5-0.8ºC during the 20th century. The upper end of this range is higher than the global average during the same period (PRC, 2007).

The potential for developing synergies between climate change mitigation and adaptation has become a recent focus of both climate research and policy (S. Viajaya et al, 2012). .

Climate change is one of the causes of biodiversity loss. At same time, climate change will accelerate further if biodiversity and ecosystems are not effectively protected (European Commission, 2009).

Adaptation is a way of reducing vulnerability, increasing resilience, moderating the risk of climate impacts on lives and livelihoods, and taking advantage of opportunities posed by actual or expected climate change. Adaptation options will evolve as knowledge relating to climate change increases, and information is gathered on the success or failure of adaptation options (POST, 2006).

Improved protection of high biodiversity forests, grasslands, wetlands, and other natural habitats provides benefits for biodiversity as well as carbon storage. Integrating protection of natural habitats and improved management of natural and agricultural resources

into adaptation plans can contribute to cost-effective strategies for reducing vulnerability to climate change (World Bank, 2008).

The aim of this study was compare the responses from Cape Verde and China and to documenting the principles politicizes and measures for Climate Change: adaptation and mitigation strategies between China and Cape Verde; Learning lessons that China and Cape Verde could used to promote biological conservation in coping with climate change.

Methodology

The study was developed in Beijing Normal University – Beijing from October 2011 to December 2012.

The research methods include mainly the questionnaire, desktop research and interviews. The questionnaires were issued out to different groups of people ranging from University students, faculties, citizens, NOGs, governmental officials, right up to those involved in carrying out climate change, biodiversity conservation and publics. In this way, the questionnaires cover competent authorities, research /educational institutes and relevant environmental agencies and NGO.

One survey questionnaire from teachers, students, experts/Officials Government and NGOs, and public generated the data. These sectors differed in characteristics such as age, gender, profession and level of education.

To make sure that all people interviewed have a good understanding about the questionnaire, were translated it into Chinese as well in Portuguese. All questionnaires applied were checked for errors and corrected unclear answers as needed such as incomplete, mistakes, and redundant answers. Out of 300 questionnaires applied to students, teachers, and experts/Officials Government and NGOs, and public 180 returned valid questionnaires: Cape Verde (51) China (136) questionnaires.

Interviews

Formal and informal interviews were conducted with key informants within formal and local institutions. Open and close questions were designed in order to identify the key constraints of the climate change: adaptation and mitigation practice and biodiversity conservation in those countries.

Data analysis

The key information's form all questionnaires and interviews were then combined to provide a summary of the results.

All data obtained was put in Excel and described with measure tendency and central and measure variability. Analysis of correlation and comparatives were realized with the auxiliary of the computer software. One-way and multi-one way ANOVA (Analysis of Variance) were used R Commander (R Gui) to examine differences in attitudes and beliefs among the biodiversity conservation and climate change: adaptation and mitigation. Analytical results was expressed as means and standard deviation (SD). Differences were considered statically significant at $p<0.05$ for all ANOVA.

Results & Discussions

The evaluation criteria to climate change: adaptation and mitigation follow the international standards but every region has its own criteria that depend of their social, climate vulnerability and building capacity. For that the criteria are different from Cape Verde and China.

Biodiversity conservation can promote the food security and sustainable development. Chinese's and Cape-Verdeans are agreed that to get a sustainable development we need to protect our biodiversity.

According to Department of Environmental Conservation of New York, 2012 conserving as many plants and animals as possible is important for the benefit of humans and of other species. Individual species help us to meet our basic needs. We literally need to conserve biodiversity as our lives depend on it.

Adaptation to climate change and sustainable human development are inextricably linked because development can both contribute to climate change and reduce vulnerabilities to its impacts (UNDP, 2011).

The respondents claimed that decline of population size, species loss and mutation are the principals effects of global change on species. There are not different responses between interviews from the two countries. This is due to the respondents of the two countries already having knowledge's on effects of climate change on biodiversity because most them were students, teacher and also they are young. They only need take her own responsibility in protect biodiversity.

Analysis of Interviews Results: According to respondents of the interviews, biodiversity protection is necessary because it is the foundation of ecosystems as well it can provide service for the human beings. Biodiversity can be catalogued at different levels including species, community, ecosystem and landscape. All different types of ecosystems have their unique functions. Clearly, life plays a major role in the function of ecosystems, and the variety, or diversity, of this life has played a major role in the evolution of the world. Through protecting biodiversity, we can promote the sustainable development of our planet.

Climate change can affect the temperature and rainfall distribution, so the vegetation distribution can be affected. Biological conservation shouldn't focus only on species. Biodiversity conservation can be achieved at both species and habitat protection. The habitat protection including vegetation protection and landscape conversation is also important.

The question

How biodiversity conservation helps adaptation in other sector like social, cultural, economic and scientific to climate change? They are a conscience that biodiversity can be regarded as an ecosystem service. It is related to other social services such as educational services, cultural heritage and so on. It also helps increase public consciousness, which is very essential in our society. Sometimes the effectiveness of biodiversity conservation is reduced. Some respondents think there is still a long way to go.

NGO is very important for protect biodiversity in some extent. Some NGOs help increase public awareness for biodiversity protection through education programs. Some NGOs carry out protection project, and others conduct propaganda for biodiversity protection.

The weaknesses in China are the human disturbance that is too expensive to avoid the impact, also, some laws and regulation cannot be fully executed due to economic considerations. In Cape Verde, island biodiversity conditions will become fragile if the human disturbance increases. Biodiversity will be affected by other natural shocks including sea level rise, some hurricanes or other extreme weathers.

Some weakness from both two countries

The main threats to biodiversity in China include: overconsumption of wild animals and plants; destruction and overexploitation of habitats; lack of protection of some wild animals and plants; invasive alien species; deforestation; pollution; and overuse of land. Anthropogenic factors with direct and indirect consequences on the vegetation include: pluvial farming; fire wood; overgrazing and the introduction of exotic species are the mainly weakness for Cape Verde.

Either the two countries have vulnerable species or endemics species that should be monitored both for early warning signs of climate change or empirical tests of predictions.

They need to increase the scientific and technological knowledge of biodiversity conservation coping climate change: adaptation and mitigation.

Combination of climate change impacts and unsustainable human management practices are the biggest weakness from China and Cape Verde to coping biodiversity conservation with climate change.

The multiple pressures of developing the economy, eliminating poverty and mitigating the emissions of GHGs constitute difficulties for China in its efforts to cope with climate change, since the country is undergoing rapid economic development.

Lessons learned each other: Cape Verde could learn from China his increasable to extent of tree plantations with reforestation and afforestation programmes in special the urban afforestation. According to Secretariat of CBD (2008), the extent of tree has often been proposed as both mitigation and an adaptation measure. Cape Verde as arid region the afforestation will help in to mitigating the soil and coastal erosion also helps in avoiding desertification. Forests are an important part of the global carbon cycle since trees and plants absorb CO_2 through photosynthesis.

The plan the energy efficiency adopt to China is an example that many country could follow up like Cape Verde. China is already the world leader in renewable energy capacity and Cape Verde could cooperate with China in order to learn or import his technology for renewable energy to supply his energy demand.

China could support and assist Cape Verde in human resources development and technical cooperation on environmental protection.

Conclusion

Addressing climate change requires two types of responses. Firstly, and importantly, we must reduce our greenhouse gas emission (take mitigation action) and secondly we must take adaptation action to deal with the unavoidable impacts. The severity of the impacts of climate change varies by regions.

Based from the results of the survey questionnaires, the education, involvement of whole society play an important role in promotes the biodiversity conservation coping climate change adaptation and mitigation. The law provides a forum to mediate disputes over resources because as impacts of climate change intensify, there will be increasing conflicts over scarce resources. Many wild species will likely need more protection, not less, to help them adapt to the effects of climate change.

Building more corridor ecology, zoos, botanic garden and protect areas may reduce extinction risk enabling the passive shifting of some species to new geographic range, and reinforcing species distributions. Some species may not be able to track changing climatic conditions quickly enough because they are natural or human barriers in the way.

Cape Verde need more efforts to adapting and mitigating the negatives consequences of climate change because is an island biodiversity!

The evidence from this study proved that some progress have made in promoting biodiversity conservation coping to climate change in both countries, but more improvements are required to sustain it and to get the sustainable development. More impacts assessment and identifies changes on biodiversity input by climate change to promoting biological conservations. The difference between China and Cape Verde concerning the protection of biodiversity are great since China has more financials and technologies resources to promote the conservation of its mega-biodiversity than Cape Verde. However, China iniquities with regard to the involvement of the society in protecting thereof. Cape Verde for their already fragile economic stake more in human resources for the promotion of biodiversity conservation. Clearly, the tools used to conserve biological diversity differ between the two countries since the geographical, climatic and vulnerabilities are different. The face up to China now is how to balance economic development with sustainable development.

Public education is the essential key to promote biodiversity conservation and consequently mitigate and adapt to extreme conditions resulting from climate change.

The integration of whole society in conserving biodiversity and its coping with climate change made effectiveness to adapting and mitigating the pressure of the climate change.

Restoration ecology, improve the living conditions and training in special in rural areas will help Cape Verde and China to warrantee biodiversity conservation at social, economic and political dimensions.

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