

Failure to achieve 2010 biodiversity's target in developing countries: How can conservation help?

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Abstract Conservation and wise management of biodiversity is critical for better livelihoods, especially in developing countries. Given the failure to achieve the global target set under convention on biological diversity (CBD) and Millennium Development Goals (MDGs) to reduce the rate of biodiversity loss by 2010, developing countries more than ever need better technologies to conserve and manage biodiversity. Despite billions of poor people depending on biodiversity as their main source of health care needs and food the lack of effective strategy or coherent policy instrument for biodiversity conservation remains a key issue. The importance of biodiversity conservation for the benefit of developing countries is inextricably linked to developments in biotechnology, particularly genetically modified organisms (GMOs). The Rio+20 meeting in June 2012 and CBD conference of the parties 11 in October 2012 are the next real opportunities to strengthen existing frameworks and prioritize types of technological innovation to enhance biodiversity conservation and development.

Keywords Biodiversity · Conservation · Technological innovation · Policy instrument · Developing countries

Introduction

By providing food, medicines, clean water, fuel and job creation (e.g., tourism) biodiversity is important everywhere but especially so in developing countries. For example, biodiversity in protected areas in Namibia contributes 6 % of Gross Domestic Product (GDP) through tourism; with a significant potential for future growth (CBD 2010).

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But can biodiversity conservation really resolve the plight of poor people? I believe it can, simply because biodiversity helps deliver ecosystem goods and services on which poor people depend, through underpinning health care, agriculture, forestry and fisheries. As an example, much of the population of China and India use over 10,000 different plant species in traditional medicine (CBD 2002). The World Health Organization (WHO) estimates 80 % of Africans rely solely on traditional medicine as their main source of health care needs (CBD 2010). In addition, marine and coastal biodiversity remains the key source of livelihood and food for more than 3 billion people in developing countries (CBD 2010). According to “The Economics of Ecosystems and Biodiversity (TEEB)” report (TEEB 2012), the relative economic contribution of biodiversity to poor people—referred to as the ‘GDP’ of the poor—can be greater than its contribution to national economies in general. But concerted effort is required to conserve, understand, and manage the global biodiversity resource wisely.

Biodiversity is endangered by a combination of factors including climate change, spread of invasive alien species, pollution, uncontrolled urbanization, land-use change and unsustainable agriculture and forestry practices (Ayyad 2003; Bellard et al. 2012). Loss of biodiversity can increase poverty, food insecurity and undermine sustainable development (CBD 2010). As stated in the leading journal *Science*, “biodiversity is still being lost as fast as ever, and we have made little headway in reducing the pressures on species, habitats and ecosystems” (Butchart et al. 2010). Given the limited ability of poor people to purchase basic goods and services otherwise offered by biodiversity, the need to conserve and manage biodiversity is basic to their very survival and an important contributor to their aspirations for a better quality of life.

The UN conference on sustainable development (Rio+20)¹ taking place in June 2012 Brazil, will be focusing on “green economy in the context of sustainable development and eradication of poverty” while the Conference of the Parties (COP 11)² to the Convention on Biological Diversity (CBD) taking place in October, India will be focusing on sustainable management as part of its agenda to conserve, share and sustainably use biodiversity, particularly for developing countries. As I write this draft of the Rio+20 declaration covers biodiversity only briefly.

Given the rate of biodiversity loss (Butchart et al. 2010), there is urgent demand for technological innovation to help resolve and stem that loss. The role of Science and Technology (S&T) is fundamental to sustainable development of biodiversity as emphasized in Agenda 21 of the “zero draft” for Rio+20 (Roehrl 2012). Biotechnology is vaguely mentioned in that draft as part of S&T for improving biodiversity and agriculture without raising important issues on the benefits of biotechnology and controversy surrounding the use of modern biotechnology such as Genetically Modified Organisms (GMOs) around the world particularly in developing countries.

Below, I discuss the conservation approach to sustainable development of biodiversity, and explore the prospect of application of GMOs to conserve biodiversity based on relevant literature and recent interviews conducted with stakeholders on GMO issues in South Africa.

What is a conservation approach?

A conservation approach to biodiversity has always been central to CBD implementation. But before there can be an effective conservation approach mechanisms such as building

¹ Rio + 20 Conference: <http://www.uncsd2012.org/about.html>.

² COP11 Conference: <http://cbd.cop11india.in/home.html>.

capacity, finance and technological innovation coupled with enabling policy environment must be put in place, particularly in developing countries. Financial resources and technology transfer are part of potential benefits offered by developed countries through the CBD to achieve its objectives in developing countries (Diaz 2000).

An opportunity to reach an agreement by increasing financial resources for the global south failed at COP 10 (2010) clearly indicating the divide between global North and South (Paul and Lorch 2011). As I write these arguments are also in view in the Rio+20 discussions, with very uncertain outcomes, but perhaps a better opportunity to discuss these important issues may arise at CBD COP 11 in October 2012. Aspects of sustainable use and benefit-sharing are included as part of a conservation approach, but implementations of these aspects have largely failed. Moreover, lack of capacity at the national level in formulating regulatory policies for biodiversity conservation represents a significant setback for the implementation of CBD in the past decade (Artuso 2002; Burgiel 2004).

While there is general agreement that conserving biodiversity is a good idea and the issue of how to implement adequate conservation is hotly debated, there remains a lack of consensus on how to achieve conservation (Gonzalez 2007; Paul and Lorch 2011; Tellez 2005). Tellez (2005) points out that CBD “lacks credible enforcement mechanisms” to implement its decisions and this viewpoint is consistent with (Gonzalez 2007). As a result, implementation of the CBD remains lackluster and problematic, partly because of a lack of appropriate technology to enhance its development.

With the recent agreement on Nagoya Protocol,³ Access and Benefit Sharing (ABS) is confirmed as a fundamental biodiversity strategy that can contribute to biodiversity conservation, particularly through access to genetic resources and transfer of relevant technologies (UEBT 2012). Although the Nagoya Protocol is yet to develop fully, so far it does not emphasize the range of technologies needed to promote and enhance biodiversity conservation. In particular biotechnology is part of the array of modern technologies that has great potential to implement three the main objectives of CBD—especially utilization of genetic resources (UNEP 2012). Opposition to the use of GMOs (due to their suspected negative impact on biodiversity) particularly by well coordinated Non-Governmental Organizations (NGOs) such as Greenpeace and Friends of the Earth have contributed to slow the adoption of this new technology in all countries, especially so for developing countries.

Against the backdrop of possible negative impacts of GMOs on agricultural biodiversity, recent well documented evidence has shown positive environmental impacts of GMOs on biodiversity over the past decade (Brookes and Barfoot 2010; Carpenter 2011; Lui et al. 2012). For example, recent data analysis from 1990 to 2010 in six provinces in China shows a decreased abundance of aphid pests associated with widespread adoption of GM cotton and reduced levels of chemical spray (e.g., insecticide) for cotton production (Lui et al. 2012). This study demonstrates how GM crop in terms of its ecological benefits can promote the use of biocontrol services in agricultural landscapes in China. China is a lead example in Asia where adoption of GM crops has continued to grow in the past 10 years with good record of safety and risk assessment of GMOs (Huang et al. 2005; James 2012).

³ The Nagoya Protocol was adopted October 29, 2010 in Nagoya, Japan. It provides a transparent legal framework for the effective implementation of one of the three objectives of the Convention on Biological Diversity (CBD): the fair and equitable sharing of benefits arising out of the utilization of genetic resources. <http://www.cbd.int/abs/about/>.

South Africa is another good example where GM crops have been cultivated over the past decade with appropriate safeguards (Morris 2011). In recent interviews with different stakeholders on GMOs and biodiversity, it was clear protection of biodiversity is clearly spelt out in South Africa's bio-safety regulatory frameworks regarding the potential impact of GMOs. No reported case has been documented regarding negative impact from GMOs in the country since 1998 when GM crops were first cultivated. This is consistent with a recent report based on 15 years of intense research and risk assessment, that GM crops do not pose greater risks for human health or the environment than traditionally bred varieties (Fagerstrom et al. 2012). The authors noted that "it is time to look at the other side of the equation and gauge the possible benefits of adopting and growing GM crops, risk research on GM crops is a dead parrot: it is time to start reaping the benefits of GM".

The application of biotechnology is introducing new genetic traits into crops and animal herds, which, while possibly beneficial, does need consideration for its possible effects on biodiversity. While evidence-based intervention is required to address poverty reduction and environmental sustainability through biodiversity conservation (Sachs et al. 2009), biotechnology has been proven to play a significant role in enhancing biodiversity conservation (Carpenter 2011). However, regulation of GMOs in the light of the CBD use of the precautionary principle can limit application of this new technology in developing countries. Limited access to modern biotechnology in developing countries, partly due to extensive protection by intellectual property right and controversy surrounding the use of GMOs between United States and European Union, is problematic in its application to conserve biodiversity (Stewart 2009).

Modern biotechnology is often mentioned as part of potential or relevant technological innovations to achieve CBD implementation but yet little attention is given to this new technology to resolve GMO issues, particularly by the UN agencies and other international organizations. What can be observed is a lack of coherence and focus on how technological innovation for biodiversity conservation should be pursued to ensure rapid implementation of CBD, leading to a need for a re-think and more pro-active debate is needed to resolve GMO issues and their potential to assist biodiversity conservation. However, at the time of writing the extent, attention or priority given to this important discussion at Rio+20 is unclear. Past performance suggests little dialogue may be expected in this direction given the lack of detail on biotechnology in the draft document for approval.

Failing on promises and targets

No country achieved the target set under CBD to significantly reduce the rate of biodiversity loss by 2010 (CBD 2012b), the year declared as the International Year of Biodiversity. CBD COP 10 did however reach agreement on a set of targets for 2020, clustered in goals (the Aichi targets) with goal A to address underlying causes of biodiversity loss through mainstreaming biodiversity across government and society (CBD 2012a). Given the failure to deliver on biodiversity target in 2010, and in spite of promises and targets, this raises important- and awkward-questions as to whether governments really place value on conserving biodiversity for the benefits of the poor. Gathering from literature and the interview, limited funding, inadequate capacity, lack of knowledge, lack of priority action and appreciation of biodiversity on the part of many governments all contributed to the 2010 target being missed.

Through the species lens, the world greatest concentration of biodiversity occurs in tropical developing countries, giving rise to the notion that the international community may expect more commitment from developing countries. As the human population, and

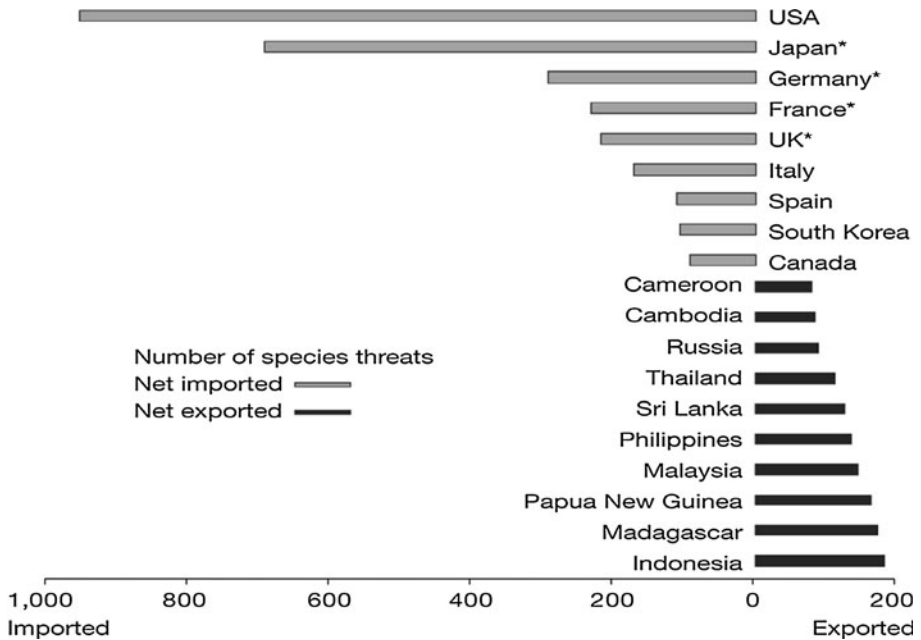


Fig. 1 The leading net importers and exporters of biodiversity threats. Countries represented with an asterisk have more species (biodiversity footprint rests) threatened by their implicated imports than are threatened by domestic production, *Source:* Lenzen et al. (2012)

human aspirations, continues to grow in developing countries, more and more natural resources are being consumed; for example, China and India together will soon become the largest users of planetary natural resources (Greenfield et al. 2007).

Some would say rich countries consume up to 10 times or more natural resources per capita than poor countries. There is another argument that biodiversity conservation is being used as “bait” for luring poor countries into an agreement which in effect provides benefits for developed countries. This argument is supported by the tendency in international debate to project developed countries as users of biodiversity (genetic resources) while developing countries are “primary producers” (Overwalle 2005). This effectively contributes to biodiversity loss in developing countries. And there is some evidence to show that it is truly happening. A recent publication shows that consumers in developed countries represent a significant threat to biodiversity through their demand of natural resources (commodities) that are produced in developing countries (Lenzen et al. 2012). According to the analysis of Lenzen et al. (2012), the USA, the EU and Japan (Fig. 1) represent the main final destination of biodiversity-implicated commodities imported from developing countries.

Added to this, 50 and 60 % of all domestically recorded biodiversity threats are attributed to export activities among five selected developing countries; Honduras, Sri Lanka, Madagascar, Malaysia and Papua New Guinea. This report is consistent with (Hertwich 2012) who showed biodiversity loss is directly linked to pressures exerted by economic activity and demand from developed countries.

Given increasing commercial values of natural resources controlled by developed countries, debates over access to, users and ownership of biodiversity continues to intensify. And there is the question of how much biodiversity conservation is needed, and

the most effective way to deliver it, and who benefits from it. To guide this process and ensure that the owners benefit, CBD initiated a paradigm shift that stipulates that States have sovereign right over the use of their biological resources (Hassemer 2004). This was echoed recently at the United Nations University headquarters, by the Former CBD Executive Secretary, Ahmed Djoghlaif who emphasized the importance of new strategic plan for biodiversity 2011–2020 that was adopted at COP 10, Nagoya Japan. He emphasized especially that there must be equitable sharing with biodiversity “owners”-local communities and indigenous people. Developing countries have sovereignty over their natural resources, and they must pursue effective stewardship of those resources, while advocating for sustainable use and equitable sharing of biodiversity.

Conclusion

It is clear that the policy-making framework to help develop strategies and suitable technologies for biodiversity conservation is a complex challenge at the heart of CBD; particularly in getting different governments and intergovernmental organizations together to pursue a common goal.

But given the potential benefits of GMOs for developing countries and yet the paradoxical controversy surrounding the adoption of GMOs in developed countries, international intervention is needed urgently to resolve these issues to enhance both conservation and development. While country government should encourage the use of GMOs, effort should be directed towards identifying and promoting indigenous technologies within local communities. For example, scaling up and improving existing technologies including forest management, water resources management, crop protection and conservation tillage can play a significant role in biodiversity conservation. Give lack of well computerized comprehensive list of the world’s species as indicated by the Global Biodiversity Information Facility (GBIF)⁴, scientific effort must be increased to facilitate access to the links between biodiversity and human and well being for a wider community of users.

To ensure successful achievement of the Aichi targets in 2020, considerable effort will be required from the international community and national governments through prioritising technological innovation investments, funding and implementing biodiversity policies from local to national government, promoting education and awareness creation among wider community, especially women and youth. Moreover, increased participation through informed debates that engage decision-makers, scientists and local communities, and institutional support is fundamental to biodiversity conservation and conflict management (Young et al. 2012).

The Rio+20 and CBD COP11 meeting later in the year are golden moments to strengthen existing frameworks and facilitate the development of a consensus of key aims, targets and action plans which build on the 2020 Aichi targets, yet foster collaboration and synergy at all levels of government towards better biodiversity conservation, and promoting thus both equity and sustainability. Let us hope the moments are of real, not fools, gold!

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⁴ See: <http://www.gbif.org/>.

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