

# IN SEARCH OF BIOHAPPINESS

Biodiversity and Food, Health and Livelihood Security

**M S Swaminathan**



 World Scientific

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# Foreword

It is with great humility that I write this Foreword for a book authored by such a distinguished personality who continues to be a source of inspiration to all of us. Dr. M. S. Swaminathan is a legend and his manifold contributions particularly in the field of agriculture are well-known. In the last few years, he has been an indefatigable campaigner for what he has so felicitously called the “Evergreen Revolution” — the revolution that combines productivity increases through modern technology with ecological sustainability. He has been a crusader for food security and for the ending of malnutrition and hunger. He has championed the cause of biodiversity conservation and regeneration which has assumed even greater significance in the context of climate change.

Dr. Swaminathan has been more than a scientist and a thinker. Through the M S Swaminathan Research Foundation (MSSRF), he has put many of his ideas on sustainable development, adaptation to climate change and sustainable use of biodiversity into actual practice, never losing sight of the fact that ultimately whatever we do in these areas must impact positively on the daily lives of local communities and enhance their livelihood security. In the last twenty months that I have been the Minister of State (I/C) Environment & Forests, I have had the good fortune of being guided by him on a

variety of issues and this Foreword is a very small token of my deep gratitude to him.

  


25 January 2011

Jairam Ramesh  
Minister of State (Independent Charge)  
Environment & Forests  
Government of India

# Introduction

How can we define biohappiness? I would say that it is the sustainable and equitable use of biodiversity leading to the creation of more jobs and income. When the use of biodiversity leads to sustainable livelihood security, the local population develops an economic stake in conservation. It means that growth and progress must be reliable and dependable and maintained at an even and steady pace. In farming, it is the production of high yields *in perpetuity*, without associated social or ecological harm. Sustainable development must be firmly rooted in the principles of ecology, social and gender equity, employment generation, and economic advance.

Biodiversity provides the building blocks for sustainable food, health and livelihood security systems. It is the feedstock for both the biotechnology industry and a climate-resilient farming system. Because of its importance for human well-being and survival, a Convention on Biological Diversity (CBD) was adopted at the UN Conference on Environment and Development held at Rio de Janeiro in 1992. The Convention's triple goals are: conservation, sustainable use, and equitable sharing of benefits. CBD defines biological diversity as follows:

Variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

The Convention stresses the need for respecting, preserving and maintaining the knowledge, innovations, and practices of indigenous

and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. It also calls for the promotion of their wider application with the approval and involvement of the holders of such knowledge, innovations, and practices and for the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations, and practices (Article 8J).

The Convention also recognises that the biodiversity existing within a country is the sovereign property of its people. India is a signatory to CBD and has enacted a National Biodiversity Act which has been in force since 2002. India is classified as a mega biodiversity area from the point of view of species richness and agro-biodiversity. However, two of the major biodiversity rich areas, north-east India and the Western Ghats region, are also classified as “hot spot” areas from the point of view of threats to biodiversity.

In spite of the importance given to the conservation of biodiversity, genetic erosion is progressing in an unabated manner, both globally and nationally. For example, 12 per cent of birds, 21 per cent of mammals, 30 per cent of amphibians, 27 per cent of coral reefs and 35 per cent of conifers and cycads are currently facing extinction. According to the World Conservation Union (IUCN), over 47,677 species may soon disappear. A comprehensive study published in *Science* (29 April 2010) has revealed that there has been no notable decrease in the rate of biodiversity loss between 1970 and 2010. Even a very unique species like the orang-utan, the closest relative of man, is threatened with extinction in the island of Borneo.

To generate awareness of the urgency of genetic resources conservation, 22 May of every year is being commemorated as the International Day for Biological Diversity. 2010 has also been designated by the United Nations as the International Year of Biodiversity. The challenge now is for every country to develop an implementable strategy for saving rare, endangered and threatened species through education, social mobilisation and regulation. Meaningful results can be obtained only if biodiversity conservation is considered in the context of sustainable development and poverty

alleviation. Indira Gandhi pointed out at the UN Conference on the Human Environment held at Stockholm in 1972 that unless we attend concurrently to the needs of the poor and of the environment, the task of saving our environmental assets will not be easy. Biodiversity loss is predominantly related to habitat destruction largely for commercial exploitation as well as for alternative uses like roads, buildings, etc. Invasive alien species and unsustainable development are other important causes of genetic erosion. How can we reverse the paradigm and enlist development as an effective instrument for conserving biodiversity? Let me cite a few examples to illustrate how biodiversity conservation and development can become mutually reinforcing.

In 1990, I visited MGR Nagar, a village near Pichavaram in Tamil Nadu, for studying the mangrove forests of that area. The families living in MGR Nagar were extremely poor and were still waiting for the benefits of government schemes to be allocated to them. The children had no opportunities for education, the schools were far away and getting admission was difficult. I then told my colleagues that saving mangrove forests without saving the children for whose well-being these forests were being saved made no sense. With the help of a few donors, we started a primary school in the village for all the children, irrespective of their age. A few years later, the State government took over the school and expanded its facilities. It now needs to be upgraded into a higher secondary school. After the 2004 tsunami, the hutment dwellings have been replaced by brick houses and the whole scenario of MGR Nagar has totally changed. During the tsunami, the mangroves served as speed breakers and saved the people of the village from the fury of the tidal waves. Everyone in the village now understands the symbiotic relationship between mangroves and coastal communities, that the root exudate from the mangrove trees enriches the water with nutrients and promotes sustainable fisheries. It is clear that hereafter mangroves in this region will be in safe hands.

Another example relates to the tribal families of Kolli Hills in Tamil Nadu. The local tribal population had been cultivating and



conserving a wide range of millets and medicinal plants. However, due to lack of market demand for traditional foods, they had to shift to more remunerative crops like tapioca and pineapple. The millet crops cultivated and consumed by them for centuries were rich in protein and micronutrients. They were also much more climate resilient, since mixed cropping of millets and legumes minimises risks arising from unfavourable rainfall. Such risk distribution agronomy is the saviour of food security in an era of climate change. How then can we revitalise the conservation traditions of tribal families, without compromising on their economic well-being? M S Swaminathan Research Foundation (MSSRF) scientists started a programme designed to create an economic stake in conservation, by both value addition to primary products and by finding niche markets for their traditional foodgrains. Commercialisation thus became the trigger for conservation. Today many of the traditional millets are once again being grown and consumed. They now proudly sing, “Biodiversity is our life”, which is also the key message of the International Year for Biodiversity.

A third example relates to the tribal areas of the Koraput region of Odisha (formerly Orissa), which is an important centre of diversity of rice. Fifty years ago, there were over 3500 varieties of rice in this area. Today this number has come down to about 300. Even with these three hundred varieties, it is essential that the tribal families derive some economic benefit from the preservation of such rich genetic variability in rice. Now, they, in partnership with scientists, have developed improved varieties like *Kalinga Kalajeera*, which fetches a premium price in the market. For too long, tribal and rural families have been conserving genetic resources for public good at personal cost. It is time that we recognise the importance of promoting a genetic conservation continuum, starting with the simple situation of *in situ* on-farm conservation of landraces by local communities, and extending to technological breakthroughs like the preservation of a sample of genetic variability under permafrost conditions at locations like Svalbard near the North Pole maintained by the Government of Norway or Chang La in Ladakh where our Defence Research and Development Organisation has established a conservation facility.

While giving operational content to the concept of sustainable development, we should ask some of the questions Dudley Sears asked decades ago<sup>1</sup>:

The questions to ask about a country's development are: What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three of these have become less severe, then beyond doubt this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if all three have, it would be strange to call the result "development", even if per capita income doubled.

In dealing with issues relating to biodiversity, we should also ask similar questions. Is the biodiversity management system conducive to the reduction of poverty, promotion of gender equity, and the generation of livelihood opportunities? The need for gender and social equity in sharing benefits from the commercial use of biodiversity cannot be overemphasised, if we are to succeed in preventing further genetic erosion. Biodiversity rich countries are characterised by agro-ecological variability. In addition, there is a strong positive correlation between cultural diversity and agro-biodiversity. Women, in particular, tend to conserve and improve plants of value in strengthening household nutrition and health security. It is, therefore, imperative to give explicit recognition to the role of women in genetic resource conservation and enhancement.

How can we harness biodiversity for poverty alleviation? Obviously, this can be done only if we can convert biodiversity into jobs and income on a sustainable basis. Several institutional mechanisms have been developed at MSSRF for this purpose, such as biovillages and biovalleys. In biovillages, the conservation and enhancement of natural resources like land, water and biodiversity become priority tasks. At the same time, the biovillage community aims to increase the productivity and profitability of small farms and

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<sup>1</sup>Sears, D., 1969. "The Meaning of Development". *International Development Review* 11(4).

create new livelihood opportunities in the non-farm sector. Habitat conservation is vital for preventing genetic erosion. In a biovalley, the local communities try to link biodiversity, biotechnology and business in a mutually-reinforcing manner. For example, the herbal biovalley under development in Koraput aims to conserve medicinal plants and local foods and convert them into value-added products based on assured and remunerative market linkages. Tribal families in Koraput have formed a “Biohappiness Society”.

There is need for launching a Biodiversity Literacy Movement, so that right from childhood everyone is aware of the importance of diversity for the maintenance of food, water, health and livelihood security as well as a climate-resilient food production system. The Government of India has started programmes like Deoxyribonucleic Acid (DNA) and Genome Clubs to sensitise schoolchildren about the importance of conserving biodiversity. The Government has also started recognising and rewarding the contributions of rural and tribal families in the field of genetic resources conservation through Genome Saviour Awards. We need similar awards for those who are conserving breeds of animals, forests and fishes.

The Biodiversity Act envisages action at three levels: the Panchayat Biodiversity Committee (responsible for conservation as well as for operationalising the concept of prior informed consent and benefit sharing), the State Biodiversity Board and the National Biodiversity Authority. These three units of the bioresources conservation movement should ensure that all development programmes are subjected to a **biodiversity impact** analysis, so that economic advance is not linked to biodiversity loss. The Biodiversity Day and the Biodiversity Year remind us that we should do everything possible to spread bioliteracy among the public and usher in an era of biohappiness in biodiversity rich areas. Then, “biodiversity hot spots” will become “biodiversity happy spots”. This should be our commitment to the generations yet to be born.

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**Section I**  
**Conservation, Cultivation,**  
**Consumption and Commerce:**  
**Pathways to Biohappiness**



## Chapter 1

# Towards an Era of Biohappiness

The global food security situation is entering a critical phase. International prices of wheat, rice, maize and other food crops are going up due to the gap between demand and supply. Petroleum prices are going up steeply. As a consequence, there is diversion of both farm land and grains for fuel production. The State of Iowa in USA, which used to be known as a State that feeds the world, is now proud of calling itself as the State that fuels the world. Compounding these factors is the growing threat of climate change resulting in more frequent drought, floods and pest epidemics. Further there is a danger to coastal agriculture and communities arising from sea level rise. It is in this context that the conservation and sustainable and equitable use of biodiversity assume urgency. It would therefore be useful to consider some of the major issues relating to biodiversity conservation and use.

Biodiversity conservation is a continuum. Two ends of this continuum, namely *in situ* conservation and *ex situ* preservation, receive both political and public attention and support. However, the vast amount of *in situ* on-farm conservation work being carried out by tribal and rural women and men remains largely unrecognised and unrewarded. It is this segment of conservation of genetic diversity which contributes significantly to food and health security. This is the most value-added component of biodiversity conservation, since



the material conserved by local communities undergoes both selection for desirable qualities and knowledge addition through observation, experimentation and experience. Yet, this component received little attention or appreciation until the Food and Agricultural Organisation (FAO) promoted the concept of Farmers' Rights and the Convention on Biological Diversity (CBD) accorded explicit recognition to the conservation traditions of tribal and rural families.

Article 8(j) of the CBD calls on the contracting parties to respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles. It also calls for the equitable sharing of benefits arising from the utilisation of such knowledge, innovations and practices. The absence of an internationally-agreed methodology for sharing economic benefits from the commercial exploitation of biodiversity with the primary conservers and holders of traditional knowledge and information is leading to a growing number of accusations of biopiracy committed by business and industry in developing countries. Biopiracy can be converted into biopartnership only if the principles enshrined in Article 8(j) of CBD are adopted both in letter and in spirit by public and private sector institutions and commercial enterprises.

Equity in benefit sharing is fundamental to the retention and revitalisation of the *in situ* on-farm conservation traditions of rural and tribal families. Material and information transfer agreements should safeguard the interests of those providing the concerned material/information. The institutions that fall under The Consultative Group on International Agricultural Research (CGIAR) are already adopting a Material Transfer Agreement which will prevent the monopolistic exploitation of public-funded research on Plant Genetic Resources (PGR) for commercial profit. Benefit sharing procedures will have to be developed at the individual and community levels. The same procedures for seeking recognition and reward as those available to professional breeders can be used at the level of an individual farmer conserver/innovator, with assistance provided in obtaining patents/plant variety protection in accordance with the prescribed national legislation. The problem is more complex in the case of benefit sharing with entire communities. Procedures are available