

# Conservation of Biological Diversity and Sustainable Use of Natural Resources

Capacity Building for Interdisciplinary Research and Application

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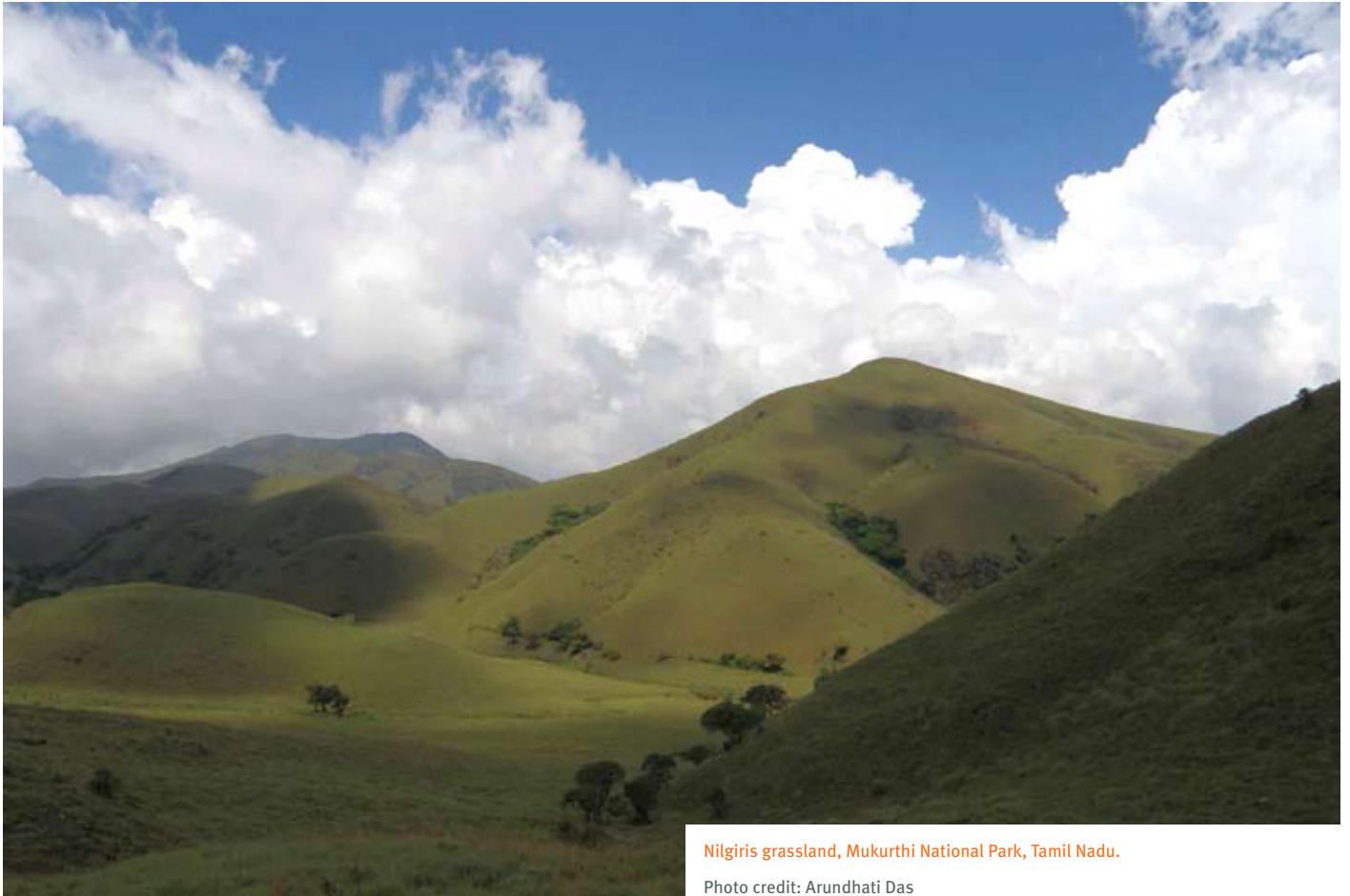
Funded by The Royal Norwegian Embassy, New Delhi.

## Collaborators

NORAGRIC, Norwegian University of Life Sciences, Aas, Norway

ATREE, Bangalore, India





Nilgiris grassland, Mukurthi National Park, Tamil Nadu.

Photo credit: Arundhati Das

## BACKGROUND TO COLLABORATION

**GLOBAL ENVIRONMENTAL CHANGE** is posing serious challenges to humanity. Three fundamental changes that constitute such environmental and economic transformations are biodiversity, land-use, and climate change. These elements have complex links, particularly in the tropics, where our understanding of such environmental and economic changes, forces driving these changes, and their impact on biodiversity and humanity remains deficient. Researchers are struggling to find interdisciplinary approaches to address these challenges and mitigate their negative impacts.

Greenhouse gas-driven global climate change is expected to continue and intensify for at least several human generations. Biodiversity changes are already exerting severe impacts on livelihoods, especially in marginal or stressed habitats. Biodiversity loss in agricultural landscapes, for instance, is having

direct effects on the production of food, fuels, and fiber, as well as indirect effects on other ecological services such as clean water supplies, soil retention and fertility, and carbon sequestration. The loss of habitats for wild species, including pollinators and natural predators of pests, may also have negative impacts on agricultural productivity. Climate change is expected to exert particularly strong effects on the biodiversity of ‘frontier’ zones, such as mountain tops and ridges, and the forest canopy.

To help address these multidimensional issues, we need to educate a new generation of scholars capable of generating interdisciplinary knowledge that combines concepts and methods of social and natural sciences. The knowledge will throw light on complex linkages between biodiversity loss, land use changes and climate change.



The scholars supported under this collaboration are expected to be intellectually flexible in dealing with varying social, political, economic, and ecological conditions on the ground. Accordingly the Department of International Environment and Development Studies (NORAGRIC), Norwegian University of Life Sciences in Åas, Norway and the Ashoka Trust for Research in Ecology and Environment (ATREE) in Bengaluru, India, proposed such a model interdisciplinary program. NORAGRIC and ATREE have separately amassed considerable research experience in issues of tropical biodiversity. An academic exchange program between the two institutions provides participating students and faculty with opportunities for interaction and synergy.

## The Academic Exchange Program

### Integrating Research and Education

The collaboration seeks to integrate research and education. Accordingly two programmes have been envisaged.

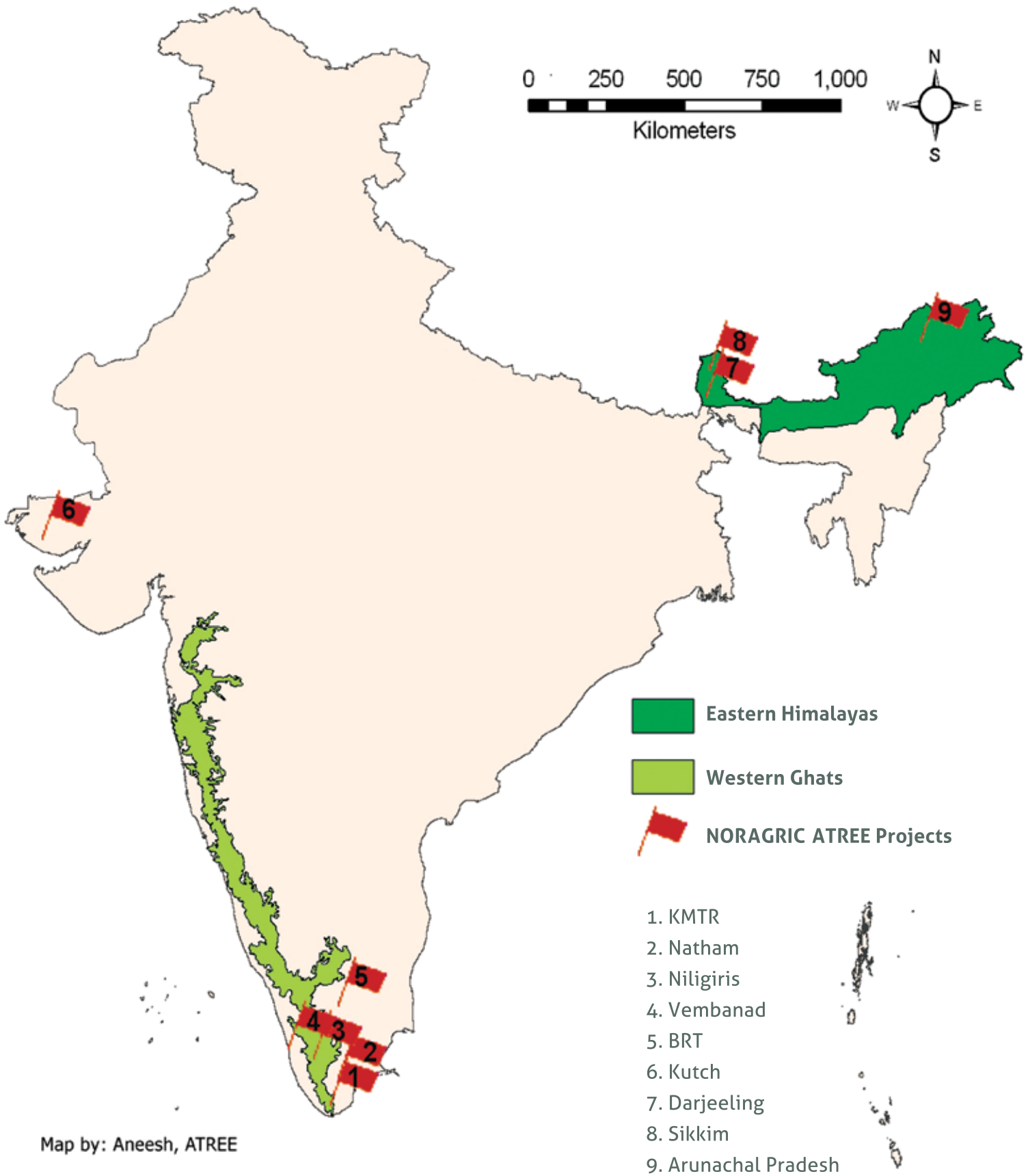
The research programme, undertaken by researchers, doctoral students and postdoctoral Fellows from the two countries, addresses problems arising from agricultural intensification and climate change. One suggested interdisciplinary theme is to examine effects of biodiversity change in agro-ecosystems and climate change on rural livelihoods. Student dissertation and postdoctoral projects will also be encouraged to address effects of climate change on tropical forest-agricultural landscapes and 'interface' zones of tropical mountain tops and forest canopies. These areas are expected to become increasingly vulnerable to climate change. However generally, the research program will be flexible and will offer a range of possibilities for thesis research. The educational component of the programme will foster a community of scientists in the two countries to work synergistically to address and better understand issues related to global environmental change.

ATREE and NORAGRIC are mutually hosting doctoral and Masters Students. Faculty members, doctoral and post doctoral candidates are collaborating with each other. NORAGRIC faculty offer guest lectures to students in ATREE, faculty from ATREE reciprocate. The project seeks to solidify the foundation for a permanent partnership, in which the Indian and Norwegian institutions will exchange scientific personnel and reciprocate. carry out international collaboration on a long term basis.



Collaboration in BRT on climate change and soil gas fluxes  
Photo credit: Siddhartha Krishnan







"karma for my deeds", Monpa hunter reflects on the bear attack that left him disabled.

Photo credit: Anirban Dutta Roy

## ONGOING CLIMATE CHANGE, BIODIVERSITY AND AGRO-PASTORAL LIVELIHOOD STUDIES

PhD student research supported through fellowships and small grants awarded as part of the project, is in progress in two socio-economically and ecologically significant regions in India. One is the Western Ghats and the other the Eastern Himalayas.

In the Western Ghats, students are carrying out interdisciplinary research across a topic repertoire that ranges from:

- ✦ socially sensitive ecological restoration of abandoned tea estates within the Agasthyamalai Protected Area (PA) ranges in southern Tamil Nadu
- ✦ carbon sequestration in these PAs
- ✦ forest species range alteration under climate change in the Nilgiris of Northern Tamil Nadu
- ✦ carbon gas fluxes in the Billigiri Rangan Wildlife Sanctuary (BRT) in Karnataka



Toda hamlet in Nilgiris Shola forest  
Photo credit: Arundhati Das





Vembanad lake, Kerala.  
Photo credit: Ramesh Kannan

On the western coast of Kerala, changes in zooplankton community dynamics and its implications for fishery is being studied. In Western Ghats portions that occur in Gujarat, fleshy fruit resource use by semi-arid communities is being researched.

Climate change science and policy requires local legitimacy, which can be acquired through local livelihood and conservation links. Agrarian communities need to be engaged with and recruited as climate partners. In Natham, Dindigul district, Tamil Nadu, the project is supporting postdoctoral research on generating local knowledge that the agricultural Valaiyars possess on climate change, recording oral climate histories and facilitating Valaiyar participation in developing risk adaptation strategies.

**On the Eastern Himalayas, the interdisciplinary topical repertoire ranges from**

- ✦ hunting in Arunachal Pradesh
- ✦ climate change implications on pastoral livelihoods in Sikkim and Darjeeling
- ✦ climate change impacts on natural resource utilization patterns by Alpine communities in Sikkim.



Photo credit: Anirban Dutta Roy



Photo credit: Anirban Dutta Roy

Hunting is a way of life in Northeast India. The complexity of factors influencing hunting is illustrated by the photographs above. Black-necked cranes in the predominantly Buddhist West Kameng district are not harmed or hunted and are regular migratory visitors, even in the crop fields. On the right is a picture of the inside of a typical hunter's house and his collection of trophies in the animist Upper Siang district of the Adi hills. Culture, religion, economy and a host of other factors contribute to these divergent approaches and require research attention that can help unravel the reasons and motivations behind hunting.

### Noragric, Norwegian University of Life Sciences Aas, Norway

[www.umb.no/noragric](http://www.umb.no/noragric)

On 1 February 2005, Noragric became the Department of International Environment and Development Studies at the renamed Norwegian University of Life Sciences (UMB). Noragric staff and students are engaged in interdisciplinary studies on a wide range of issues concerned with poverty, livelihoods, gender, property rights, environmental management, conflict, peace building and post-conflict development in Sub-Saharan Africa, South and Southeast Asia and South America.

Noragric's vision is a world where human inequality, conflicts, environmental degradation and poverty has been substantially and sustainably reduced.

### Ashoka Trust for Research in Ecology and the Environment (ATREE)

Bengaluru, Karnataka State, India

[www.atree.org](http://www.atree.org)

The Ashoka Trust for Research in Ecology and the Environment (ATREE) is a research institution established in 1996, to focus on the application of science to the conservation of nature and the management of natural resources. ATREE is a regional centre in conservation and sustainability sciences, with linkages to other centres of excellence across the world. ATREE's unique interdisciplinary approach brings together scientists, government officials, business leaders, civil society organisations, and local people for addressing major environmental issues arising from India's current pace of economic development.

### The Royal Norwegian Embassy

New Delhi

[www.norwayemb.org.in](http://www.norwayemb.org.in)

The Government of Norway, through the Royal Norwegian Embassy, New Delhi, supports the NORAGRIC-ATREE project. Such research cooperation takes place through organised research programmes and networks, as well as informal contact between researchers. Over the past 30 years, Norway has joined a number of international cooperation projects based in Europe. Bilateral research cooperation at institutional level has been strengthened. Cooperation agreements have been entered into with the USA, South Africa and Japan, among others, while agreements with India, China and France are being developed. Norway's ties with India are expanding and developing rapidly. The Government's India strategy is designed to strengthen, deepen and further develop contacts in several important areas, such as climate change, health, international issues, business and culture. In connection with the launch of strategy, the Government will establish an India forum and a research programme under the Research Council of Norway to promote Norwegian research in India and research cooperation between Norway and India.





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