

**NARENDRAN KODANDAPANI**  
Asian Nature Conservation Foundation  
III Floor Biological Sciences Building  
Center for Ecological Sciences  
Indian Institute of Science  
CV Raman Avenue  
Bangalore 560012  
India  
Email: [naren@ces.iisc.ernet.in](mailto:naren@ces.iisc.ernet.in)  
Tel: 91-897-184-3610

**Career Objective:** I am especially interested in the application of geospatial methods such as GIS and remote sensing to improve planning and conservation strategies in landscapes.

**General overview:** My interests are multi-disciplinary and can be grouped into two broad categories both relating to planning and conservation of biodiversity. The first broad research effort is related to changes in the environment due to human transformations. I apply geospatial techniques such as remote sensing and GIS to map, monitor, and assess environmental change in the environment. A critical component of my work strives to link information obtained from remotely sensed techniques to actual field measurements. The second broad interest of mine is human dimensions of environmental change. I am especially interested in assessing and modeling the magnitude climate change. I have well developed database management skills, specifically with geodatabases. I possess sound understanding of biophysical concepts and their relationship to conservation. I am highly motivated to succeed and am flexible and reliable.

#### **EDUCATIONAL QUALIFICATIONS:**

**Ph.D.** (Geography)  
Michigan State University  
East Lansing  
USA  
2006

**M.Sc.** (Environmental Sciences)  
Bharathidasan University  
Tiruchirapalli  
Tamil Nadu, India  
1995

**B.Sc.** (Environmental Sciences)  
Bangalore University  
Bangalore  
Karnataka, India  
1992

## **WORK HISTORY:**

**Environmental Impacts of the Proposed thermal power plant at Jayankondam, Tamil Nadu, India, 1994 to 1995:** This work was a part of my M.Sc. thesis and I examined the environmental impacts of a thermal power plant. The fate of the water and air pollutants was assessed using environmental models. I predicted the spatial and temporal distribution of these pollutants from the proposed thermal power plant. I developed an index of relative attractiveness from an EIA model. The model involves probabilistic linear vector analysis and provided the best option under current pollution mitigating technologies. An economic analyses using cost benefit analysis was also conducted to assess the socio-economic impacts of the project on the environment.

**Climate Change and Forests: Impacts and Adaptation, A Regional Assessment for the Western Ghats, India, 1995 to 1997.** Along with other colleagues, I was involved in a large project that examined the potential impacts of climate change on tropical forests over the next 50 to 100 years. The study was conducted in two regions in the Western Ghats. The objectives of the study were to assess the vegetation responses to climate change and also the socio-economic effects of climate change on the livelihoods of communities dependent on forests. A simple model based on present day correlations between climatic (mean annual temperature and precipitation) and vegetation types for these regions was developed. Geographical information systems and remote sensing data were extensively utilized for the study. The study revealed significant effects on the spatial distribution and extent of forests in these two regions. The study has also examined the likely impact of climatic change on the local people and their economies.

**Mapping Landscape Element Types in the Nilgiri Upper Plateau, 1997 to 1998:** The Nilgiri plateau is endowed with two unique vegetation forms, the high elevation evergreen forests or the Sholas and the grasslands. These two vegetation types have been subjected to severe anthropogenic pressures leading to degradation and loss of forest habitat. I have mapped the last few remnants of these two forest types and eco-restoration measures have been suggested. I applied satellite data to map the extent and spatial location of these two vegetation types. This was a part of the McArthur Foundation Project for Biodiversity conservation in the Western Ghats.

**Probability of Fire Occurrence in the Mudumalai Wildlife Sanctuary, 1998 to 1999:** I examined the probability of fire occurrence in the Mudumalai Wildlife Sanctuary (MWLS), southern India. I have mapped the extent of fire in different parts of the sanctuary, fire maps obtained from surveying and satellite data have been utilized to obtain a fire frequency map for the MWLS. Along with the fire map, I have also mapped the different vegetation types using satellite data. My study has revealed forest fires are large scale disturbances with effects on the structure, regeneration, and diversity of these forests.

**Landscape Ecology of the Western ghats, 1999 to 2001:** With other colleagues at the Centre for Ecological Sciences, we have established a series of study sites all along the Western Ghats. I have utilized remote sensing and geographical information techniques to map the different landscape element types of the Western ghats. I also analyzed the various landscape metrics for each of these landscapes by applying the software Fragstats. Apart from analyzing the various landscape attributes, the study generated information on the ecology of various taxa which was incorporated into the geographical information system of the Western Ghats.

**Habitat Mapping and Assessing Human Elephant Conflicts in Buxa Tiger Reserve, 2001 to 2002:** The Buxa Tiger Reserve and surrounding areas in North Bengal, India are a vital area for conserving

Asian elephants and biodiversity. Asian elephants are found in eight forest divisions in the region, the prominent areas being the Buxa Tiger Reserve, Gorumara National Park, and the Jaldapara, Mahananda and Chapramari Wildlife Sanctuaries. I was involved in the mapping of crucial elephant habitat in these forest areas as well as in mapping the different vegetation types in these forests. A number of elephants have been radio collared in these forests and elephants are currently being monitored by colleagues at the Asian Nature Conservation Foundation, India. The research involved extensive application of GIS techniques, remote sensing data, and radio telemetry methods to mitigate the elephant human conflict in the region.

**Monitoring Forest fire dynamics in the Amazon, Brazil, 2002 to 2006:** I worked as a graduate research assistant at the Center for Global Change and Earth Observation, Michigan State University. I was involved in monitoring, analyzing, and assessing the ecological effects of forest fires in the “Arc of Deforestation” in Brazil. The research involved extensive field work in the Amazon in the summer of 2003 and 2004, here I measured the structure, regeneration, and composition of burnt and unburnt forests in four states of Brazil, namely Para, Matto Grosso, Acre, and Rondonia. The study also included the use of GIS, GPS, and remote sensing techniques to relate spatial and ecological characteristics from remotely sensed data with field sampled data.

**GIS Coordinator/Instructor, Grays Harbor College, 2007 to 2009:** I worked as an instructor in the natural resource program of the Grays Harbor College. I taught introductory as well as advanced courses in GIS, these courses were focused towards GIS applications in environment and natural resources management. Apart from courses in geospatial techniques, I also taught an introductory course in ecology. In addition to teaching, I managed and coordinated a GIS clearinghouse that disseminated spatial information of various environmental themes in the Pacific Northwest.

**Modeling tree species distribution in the Western Ghats, 2009 to 2011:** I worked in a project that designed, developed, and deployed tools to enhance the dissemination of biodiversity data that was available at the French Institute of Pondicherry. The project titled PI@ntnet is managed by several agencies including AMAP, INRIA, Tela Botanica and funded by the Agropolis Foundation.

**Senior Scientist, Asian Nature Conservation Foundation, 2011 to present:** I am currently working at the Asian Nature Conservation Foundation, Indian Institute of Science. I am preparing grant proposals for research in the broad areas of conservation of biodiversity in the tropics.

#### **PAPERS/POSTERS PRESENTED AT NATIONAL/INTERNATIONAL CONFERENCES:**

**Non timber forest product utilisation, valuation and implications: A case study in the Nilgiri Biosphere Reserve.** Presented at the National conference on Biodiversity and Sustainable Development, as a part of the Capacity 21 project. The conference was held at the Indira Gandhi Institute for Development Research, Mumbai.

**Grasslands and Sholas in the Nilgiri Upper Plateau, the need for conservation.** Presented at the conference on the recent research findings in the field of wildlife, habitat and biotic pressure in the Nilgiri Biosphere Reserve and adjoining areas. The conference was held at the Mudumalai Wildlife Sanctuary and organized by the forest department of Tamil Nadu, India.

**Spatial and temporal variability of forest fires: A case study in the Mudumalai wildlife sanctuary, S. India:** Paper presented at the proceedings of the 12<sup>th</sup> National Data Center- User Interaction Meet, held at National Remote Sensing Agency, Hyderabad, India, January, 2002.

**Spatial and temporal variability of forest fires: A case study in the Western Ghats, India.** Paper presented at the Second International Wildland Fire Ecology and Fire Management Congress, Orlando, Florida. November, 2003.

**Spatial and Ecological processes of change in dynamic landscape: A case study in the Western Ghats, India.** Presented at the Association of American Geographers centennial meeting at Philadelphia, March, 2004.

**Increasing fire frequencies in the Western Ghats, India: A growing conservation threat.** Presented at the symposium on fire in tropical ecosystems, in the Association of tropical biology meeting, Miami, July, 2004.

**Spatial, temporal, and ecological components of forest fires in seasonally dry tropical ecosystems in the Western Ghats, India.** Paper presented at the Association of American Geographers, Chicago, March, 2006.

**Application of Marginal and Variogram Models to Assess Spatio-temporal Autocorrelation in Predicting Forest Fire Occurrence in Landscapes.** Poster presented at the conference on multivariate methods in environmetrics, Chicago. October, 2006.

**Spatial, temporal, and ecological components of forest fires in the Western Ghats, India.** Paper presented at the Third International Wildland Fire Ecology and Management Congress, San Diego, November, 2006.

**Forest Fires in India.** Presentation at the S-290 Intermediate Wildland fire Behavior Workshop, Forks, Washington, 2007.

**Comparative analysis of forest fires in human dominated landscapes in the Western Ghats, India.** Paper presented at the Association of American Geographers, Las Vegas, March, 2009.

**Interactions between fire and climate in the Western Ghats, India.** Paper presented at the Association of American Geographers, Washington, DC, April, 2010.

**Spatial pattern of human-elephant conflict in Mysore division, India.** Talk presented at workshop on GIS for forest officers in Karnataka, India, 3-4 February, 2012.

**Forest fires in the Western Ghats: Perspectives from a protected area.** Talk presented at workshop for Sri Lankan forest managers at the Indian Institute of Science, Bangalore, 24<sup>th</sup> August, 2012.

**Contrasting fire regimes in a seasonally dry tropical forest and a savanna in the Western Ghats, India.** Paper presented at the Second Indian Biodiversity Congress, Bangalore, 9-11 December, 2012.

**Forest fire regimes in the Nilgiri Biosphere Reserve, India.** Paper presented at the Nilgiri Biosphere Reserve Silver Jubilee conference, Ooty, 28-30 August, 2013.

**Amplified fire occurrences in response to drought and vegetation stress in the Western Ghats of India.** Paper presented at the Joint International Workshop of ISPRS WG VIII/1 and WG IV/4 on Geospatial Data for Disaster and Risk Reduction, November 21-22, 2013, Hyderabad, India.

**Forest Fires as Natural Disasters: Current trends and future threats.** Paper presented at the International Conference on Disaster Mitigation and Management Towards Sustainable Development (IDMS – 2013), 2-4, December, 2013, Tanjavur, India.

#### **SELECTED PUBLICATIONS:**

**Kodandapani, N.** 1995. Environmental Impacts of the proposed thermal power plant at Jayankondam, Tamil Nadu India. M.Sc. thesis, Bharathidasan University, Tiruchirapalli, India.

Ravindranath, N.H, Sukumar, R., Desingkar Priya, Suresh, H.S., Dattaraja, H.S., Sudha, P., Sujatha, R., Bhat, P.R., Indu K. Murthy and **Kodandapani, N.** 1997. Climate Change and Forests: Impacts and Adaptation, A Regional Assessment for the Western Ghats, India. Stockholm Environment Institute, Sweden.

**Kodandapani, N.** Sreenath, S., and David W. Martin. 1999. Environmental impacts of the proposed thermal power plant at Jayankondam, Tamil Nadu, India. Published in the proceedings of the national seminar on environmental impact assessment of urban development projects.

**Kodandapani, N.** 2001. Forest Fires: Origins and ecological paradoxes. *Resonance*. 6(11):34-41.

**Kodandapani, N.,** Indu K. Murthy, Suresh, H.S., Dattaraja, H.S., Ravindranath, N.H., and Sukumar, R. 2001. Non timber forest product extraction, utilisation and valuation: A case study from the Nilgiri Biosphere Reserve, Southern India. *Econ. Bot.* 55(4): 528-538.

**Kodandapani, N.,** Sreenath, S. and David W. Martin. 2002. Guassian dispersion model - a method for predicting air pollution due to developmental projects. *Indian Chemical Engineer.* 44(2):100-103.

**Kodandapani, N.,** Mark A. Cochrane and Sukumar, R. 2004. Conservation threat of Increasing fire frequencies in the Western Ghats, India. *Conservation Biology.* 18(6):1553-1561.

**Kodandapani, N.** 2006. Fire regimes and ecological effects in seasonally dry tropical ecosystems in the Western Ghats, India. Ph.D. Dissertation, Michigan State University, East Lansing, USA.

**Kodandapani, N.,** Sreenath Subrahmanyam, and David W. Martin. 2007. Environmental Impacts of Thermal Power Plant Case Study - Tamil Nadu. Pages 279-293 in Behnam Ta'i, Peter Murphy, P.S. Rana, editors. *Environmental Impact Assessment: An Indo-Australian Perspective.* Bookwell, New Delhi.

**Kodandapani, N.,** Mark, A. Cochrane and Sukumar, R. 2008. A comparative analysis of spatial, temporal, and ecological characteristics of forest fires in a seasonally dry tropical ecosystem in the Western Ghats, India. *Forest Ecology and Management.* 256: 607-617.

**Kodandapani, N.**, Mark A. Cochrane and Sukumar, R. 2009. Forest fire regimes and their ecological effects in seasonally dry tropical ecosystems in the Western Ghats, India. In Cochrane, M.A. (Editor), Tropical Fire Ecology: Climate change, Land use and Ecosystem Dynamics. Springer-Praxis, Heidelberg, Germany.

Renard, Q., Pélissier, R., Ramesh, B.R., **Kodandapani, N.** 2012. Environmental susceptibility model for predicting wildfire occurrence in the Western Ghats of India. International Journal of Wildland Fire. 21(4): 368-379.

**Kodandapani, N.**, Satheesh, N., Ashutosh, S. S., 2012. Spatial pattern of forest characteristics and fire susceptibility in the Sathyamangalam landscape. Jointly published by ANCF/TNFD.

Baskaran, N., Kannan, V., Senthil Kumar, K., Saravanan, M., Mohan, M., Avinash, K.G., **Kodandapani, N.**, Nanjappa, V., Christopher, G. 2013. Conservation of the Periyar-Agasthyamalai landscape in the Southern Western Ghats: Knowledge generation, dissemination, and capacity building for key stakeholders. Report submitted to the Critical Ecosystem Partnership Fund.

**Kodandapani, N.** 2013. Contrasting fire regimes in a seasonally dry tropical forest and a savanna ecosystem in the Western Ghats, India. Journal of Fire Ecology 9(2):102-115.

**Kodandapani, N.** 2013. Amplified fire occurrences in response to drought and vegetation stress in the Western Ghats of India. Earthzine. <http://www.earthzine.org/2013/10/01/amplified-fire-occurrences-in-response-to-drought-and-vegetation-stress-in-the-western-ghats-of-india/>

**Kodandapani, N.**, Satheesh, N., Ashutosh, S. S., Raj Kumar, K. 2014. Human Dimensions of Forest Degradation in the Sathyamangalam Landscape: Spatial pattern of disturbances, socio-economic status, and sustainability. Jointly published by ANCF/TNFD/CASER.

## **TEACHING EXPERIENCE:**

**Coordinator remote sensing and GIS segment of Western Ghats Biodiversity Network:** I coordinated a training program for college lecturers at institutions all along the Western Ghats in India. As a part of this training I taught remote sensing and GIS techniques to process remote sensing data, preliminary processing, interpretation, classification, analysis of remote sensing data, and accuracy assessment. Products generated included landscape element maps in the Western Ghats in India.

**Laboratory Instructor for M.Tech students of space applications program offered by the Indian Institute of Science, Bangalore:** I conducted laboratory classes for graduate students in processing digital remote sensing data. The laboratory classes included techniques to read digital data, preliminary processing, classification, and accuracy assessment. An important component included visiting field sites and linking remote sensing data with field data.

**GIS Coordinator/Instructor, Grays Harbor College, 2007 to 2009:** I worked as an instructor in the natural resource program of the Grays Harbor College. I taught introductory as well as advanced courses in GIS, these courses were focused towards GIS applications in environment and natural resources management. Apart from courses in geospatial techniques, I also taught an introductory

course in ecology. In addition to teaching, I managed and coordinated a GIS clearinghouse that disseminated spatial information of various environmental themes in the Pacific Northwest.

## **INTERNSHIPS**

**Two month summer fellowship at Tall Timbers Research Station, Florida,USA:** I researched at the tall timbers research station, Florida during the summer of 2000. I spent two months at the plant ecology lab applying techniques in grid plots and assessing the impacts of fire on vegetation. I also worked on a project that used radio telemetry techniques to understand the movement pattern, sex ratio and population dynamics of gopher tortoises (*Gopherus polyphemus*) in Florida.

## **CERTIFICATES**

### **Certificate program in environmental resource management:**

I have successfully completed a six-month certificate course offered by the United States Educational Foundation of India. Prof. David Martin offered the course in collaboration with the department of environmental sciences, Bishop Heber College, Tiruchirapalli, India. The syllabus included specific lecture material on environmental economics, natural resource management, pollution abatement methods, and methods of valuing environmental resources.

### **Intermediate wildland fire behavior, S-290:**

I successfully completed a one week course during March 2007 on assessing wildland fire behavior in the Pacific Northwest offered by the Department of Natural Resources, Washington, USA.

### **Certificate of completion for Introduction to ArcGIS server:**

I successfully completed a two day certificate course in Introduction to ArcGIS Server offered by ESRI Olympia, USA during April 2007.

## **RESEARCH GRANTS**

2012 “Spatial pattern of forest characteristics and fire susceptibility in the Sathyamangalam landscape”, USD 1000.00, funding obtained from Tamil Nadu Forest Department.

2013 “Novel techniques to map and monitor forest degradation in the Nilgiri Biosphere Reserve” USD 23 000.00, funding obtained from ISRO-IISc Space Technology Cell, (co-PI with Prof. R. Sukumar, Dr. C.S.Jha, and Dr.Sudhakar Reddy).

2013 “Human dimensions of wildland fire in the Sathyamangalam landscape”, USD 1000.00, funding obtained from Tamil Nadu Forest Department.

2013 “Biodiversity intactness and forest degradation in the Nilgiri Biosphere Reserve”, USD 94 000.00, submitted to the Ministry of Environment and Forests.

## **AWARDS**

1. **Graduate Research Assistantship**, Department of Geography, Michigan State University, 2002 to 2005.
2. **Dissertation completion fellowship** by the graduate school, Michigan State University.
3. **Sir Ratan Tata Trust travel grant**: I received USD 1500.00 to attend the Association of American Geographers annual meeting 2010 at Washington, DC. I presented my research on the interactions between fire and climate in the Western Ghats, India.

## **MEMBERSHIP**

1. Association of American Geographers

## **REVIEWER**

1. International Journal of Wildland Fire
2. Current Science
3. National Science Foundation (Proposal)
4. Indian Chemical Engineer
5. Forest Ecology and Management