

Dr. Tune Usha

B.E, M.Tech, Ph.D, M.Sc (Env.), MBA
Scientist – G
National Centre for Coastal Research (NCCR)
Ministry of Earth Sciences, Government of India
Pallikaranai, Chennai – 600 100

Professional Profile:

- Presently working as Scientist-G in National Centre for Coastal Research (NCCR), Ministry of Earth Sciences (MoES) and in MoES since 1999. Previously in the Institute for Remote Sensing, Institute for Ocean Management, Anna University.
- 25 years of experience in the fields of Geoinformatics, satellite data processing, Coastal Zone management, Coastal hazards and vulnerability mapping & modelling and capacity building.
- Contributed significantly towards developing applications and tools with societal and ecological implications such as GIS based information system for critical habitats, multi hazard decision support systems for coastal areas, modeling and mapping coastal hazards such as tsunami, storm surge, oil spill, climate change, operational flood Warning systems etc. These tools are being used by the State government in their disaster mitigation and management operations.

Educational Profile :

- B.E, Instrumentation & Control Engg, Government College of Technology
- M.Tech, Remote Sensing, College of Engineering, Anna University
- Ph.D, College of Engineering Anna University
- M.Sc, Environment and Ecology from S.M. University
- M.B.A General Management, Anna University.

Important Scientific Contributions:

- Development of GIS information system for Coastal critical habitats along the Indian Coastline
- Tsunami inundation mapping and modeling using ALTM and Cartosat data for the entire Indian Coast and generation of large scale Tsunami hazard maps for the entire Coastline.
- Involved in the development of two operational Coastal Flood Warning System for the coastal cities of Chennai and Mumbai. Integrated Flood warning systems are end-to-end web GIS based decision support systems comprising of data from weather models, field data and inundation generated using a combination of numerical models and translated to GIS based ward level informations. Both the systems are being used by the State Governments for mitigation operations.
- For the Safety of the fishing community specially during times of coastal hazards, a Dashboard and app (Thoondil) was developed along with the Department of Fisheries, GoTN and is being used across the state, the realtime data is being received at DoF office

and NCCR. Similar system was also developed for Kozhikode, Kerala in their vernacular language.

- Development of biophysical vulnerability for Andhra Pradesh, Maharashtra, Odisha and Tamil Nadu using Invest model
- Development of a multi-hazard decision support system for coastal hazards
- Training and capacity building activities of NCCR and have conducted about 80+ training programmes to the coastal stake holders.

Domain Expertise :

- Applications and development of Geospatial solutions for addressing issues related to coastal areas including vulnerability and risk.

Awards:

- Recipient of the Vel's University award "Achiever in Science – 2017"
- Received Esri India Award for "Achievement in GIS" for the work done on developing the Chennai Flood Warning System (C-FLOWS)

Professional Recognitions :

- National Focal Point for the Belmont forum CRA on Ocean sustainability and participated in two panel of experts meeting for selection of projects related to India.
- Member of the advisory Board for the South Asian Nitrogen Hub (SANH),
- Member in the MoEF Expert Committee constituted to review the IPZ Notification, 2011 and the draft IPZ Notification, 2018. Member of the Consultant Evaluation Committee(CEC) for "Hydro meteorological Resilient→ Action Plans (HmRAP), for evaluation of technical and financial proposals of NDMA.
- Nominated as member for revision of Tamil Nadu State Action Plan on Climate→ Change (TN-SAPCC) and expert member in the group constituted by Tamil Nadu State disaster→ management Agency (TNSDMA) for setting up the state GIS cell.
- Recognized as Ph.D Research Guide in Anna University and Bharathidasan University
- Member, Indian Society of Geomatics
- Member of Ocean Society of India

List of Publications :

Referred Journals

- M. Iyyappan, S.S. Ramakrishnan, Shanmugam S, **Tune Usha**, (2019) Incorporating of textural information with SAR and optical imagery for improved land cover mapping, Springer , Environmental Earth Sciences, Volume 78, number 22, doi:10.1007/s12665-019-8654-9.
- M. Iyyappan, **Tune Usha**, S.S. Ramakrishnan, K. Srinivasa Raju, G. Gopinath, S. Chenthamil Selvan, S.K. Dash, P. Mishra **(2018)** "Evaluation of tsunami inundation using synthetic aperture radar (SAR) data and numerical modeling",**Natural Hazards:** 1-14. doi:10.1007/s11069-018-3257-4.

- Mageswaran T , Ram Mohan V , Chenthamil Selvan S , Arumugam T, **Tune Usha** and Kankara R.S (2015) : Assessment of shoreline changes along Nagapattinam coast using geospatial techniques, International Journal of Geomatics and Geosciences, Volume 5, No 4, 2015, Page 555-563.
- Mishra, P., **Tune Usha**, M V Ramana Murthy (2014) : Evaluation of Tsunami vulnerability along northeast coast of India. Continental Shelf Research, Continental Shelf Research (2014), Elsevier
- Shailesh Nayak, **Tune Usha**, R S Kankara, N T Reddy, (2012), Tsunami inundation modeling and mapping using ALTM and CARTOSAT derived coastal topographic data, Marine Geodesy, Taylor & Francis, Volume 35, Issue 4, Page 429 – 440.
- V. Ramana Murthy , N. T. Reddy, Y. Pari, **Tune Usha**, P. Mishra, (2011), Mapping of seawater inundation along Nagapattinam based on field observations, Natural Hazards, springer, ISSN 0921-030X, Volume 60, Number 1, pages 161-179
- **Tune Usha**, M. V. Ramana Murthy, N. T. Reddy, Pravakar Mishra, (2012), Tsunami vulnerability assessment in urban areas using numerical model and GIS', Natural Hazards, Springer, ISSN 0921-030X, Volume 60, Number 1, page 135-147.
- M.V.Ramanamurthy, **Tune Usha**, Y.Pari and N T Reddy, (2011), 'Tsunami Vulnerability Assessment of Cuddalore using Numerical model and GIS', Marine Geodesy, Taylor & Francis, Volume 34, Number 1, Page 16-28.
- **Tune Usha**, M V Ramanamurthy, N T Reddy, T S Murthy, (2009), 'Vulnerability Assessment of Carnicobar to tsunami hazard using numerical model', Science of Tsunami Hazards, Vol.28, No.1, Page 15-34.
- C Sateeshkumar, P Arul Murugan, R R Krishnamurthy, B Prabhu Doss, **Tune Usha** and Y Pari (2008), 'Inundation mapping – a study based on December 2004 Tsunami Hazard along Chennai coast, Southeast India', Natural Hazards and Earth System Sciences, 8, pg. 617-626, 2008.
- Ramanamurthy M.V., Sundaramoorthy S., Pari Y., Ranga Rao V., Mishra P., **Tune Usha**, Venkatesan R. and Subramanian B.R. (2005), 'Inundation of seawater in Andaman and Nicobar islands and parts of Tamilnadu coast during 2004 Sumatra tsunami', Curr. Sci., Vol.88, No.11, pp.1736-1740.
- **Tune Usha**, Subramanian B.R. (2006), 'Tourism and Landuse changes in Goa', The Indian Geographical Journal, Vol.81, No.2, pp .103-109.
- Arumugam T, Suresh Gandhi M, Mageswaran T, **Tune Usha**, suresh N (2017), 'GIS based methodology to assess the relative vulnerability index of buildings to coastal hazards - Coastal Karaikal, A case study', Indian Journal of Geo Marine Sciences, Vol 46(08), august 2017, pp.1641-1646.

Conference papers

- **Tune Usha**, Sundaramoorthy S., Shunmugaraj T., Gupta G.V.M. and Kankara R.S. (2003), 'Application of GIS in management of coastal critical habitats', Proc. of COT'03, International Conference on Coastal and Ocean Technology, pp.15-24.
- Subramanian B.R., Ramanamurthy M.V., Gupta G.V.M. and **Tune Usha** (2005), 'Integrated coastal zone management plan for Chennai coast', In: Ramachandran S. (ed.), Proceedings of International Conference on Coastal and Fresh Water Issues, Institute for Ocean Management, Anna University, Chennai.
- Subramanian B.R., Ramanamurthy M.V., Sundaramoorthy S., Gupta G.V.M. and **Tune Usha** (2005), 'Inundation of seawater in A&N Islands and along Tamilnadu coasts during 2004 Indian Ocean tsunami', Proc. Workshop on 'Tsunami effects and mitigation measures' held at IIT Madras, Chennai, 26.12.2005, pp.287-305.

- Shunmugaraj T, Sundaramoorthy S, **Tune Usha**, Mohanraj J, Bhuvaneswari V P, John Elizebeth, Rekesh Renjan, Salini Sanjay, Reshmi V D, Renjini T N, Sanjeevan V N and Subramanian B R (2008), 'Studies on coral reef ecosystem of Gulf of Mannar (Southeast coast of India)', Proc. of NACCRES 2008, National Conference on Coral Reef Ecosystem.
- Shunmugaraj T, Sundaramoorthy S, **Tune Usha**, Jayalakshmi K J, Divya M P, Padmakumar K B, Fanimil C L, Meera S, Dhanya Sethunarayanan, Sanjeevan V N and Subramanian B R (2008), 'Status of coral reefs in Mahatma Gandhi Marine National Park at Wandoor (South Andaman), India', Proc. of NACCRES 2008, National Conference on Coral Reef Ecosystem.
- Shunmugaraj T, Sridhar P N, **Tune Usha**, Jasmine P, Jafer Hisham, Smitha B R, Sirenjima G, Thomas Lathika, Kishore Kumar B, Sanjeevan V N and Subramanian B R (2008), 'Resources Information system on Kadmat Island, Lakshadweep', Proc. of NACCRES 2008, National Conference on Coral Reef Ecosystem.
- Shunmugaraj T, **Tune Usha**, Pary Y, Ganesh T, Ashadevi C R, Abdul Jaleel K U, Sreedevi K H, Gopal Aiswarya, Subramanian M, Sanjeevan V N and Subramanian B R (2008), 'Resources Information system on coral reef habitat of Malvan (Maharashtra, India)', Proc. of NACCRES 2008, National Conference on Coral Reef Ecosystem.
- M V Ramana Murthy, **Tune Usha** and N T Reddy, "Modeling and Mapping of Tsunami along the Cuddalore Coast" paper presented in Joint International Workshop of ISPRS WG IV/1, WG IV/3 and WG VIII/1 on "Geospatial data Cyber Infrastructure and Real-time Services with special emphasis on Disaster Management", held between Nov., 25-27, 2009 at INCOIS, Hyderabad.
- **Tune Usha**, Tsunami inundation modelling and mapping along the Indian coast, National Conference on Climate Change: Coastal ecosystems" with a special session on Planetary Geomatics and Annual Convention of Indian Society of Geomatics, 04 - 06 February, 2010 at Ahmedabad, Gujarat.
- Pravakar Mishra, M. V. Ramana Murthy, **Tune Usha**, U.S. Panda and P. K. Mohanty, "Probable Causes for recent Phases of Coastal Erosion along Orissa, India", Proceeding of the National Conference on Coastal Processes, Resources and Management, Organised by CESS, Trivandrum, Feb.5-7, 2010, PP 238-241
- **Tune Usha** and R S Kankara, Relative Vulnerability index for assessing the vulnerability of buildings to coastal hazards, on "Natural hazards and climate change" is being organized by Dept. of Geology, University of Madras from 11-13, March 2010
- R S Kankara and **Tune Usha**, Numerical simulation of storm surges inundation around Nagapattinam coast for Nov.1977 cyclone, on "Natural hazards and climate change" is being organized by Dept. of Geology, University of Madras from 11-13, March 2010
- Ram Mohan, V, Sriganesh, J, Divyalakshmi, K.S. and Ramanamurthy, M.V, Kankara, R.S. and **Tune Usha**, Tsunami Hazard for the East coast of India and Tsunami Propagation Modelling for risk reduction, on "Natural hazards and climate change" organized by Dept. of Geology, University of Madras from 11-13, March 2010
- Pravakar Mishra, **Tune Usha** and M V Raman Murthy, Tsunami run up height and inundation using Tsunami N2 model at selected sites in Orissa and West Bengal, East coast of India, on "Natural hazards and climate change" organized by Dept. of Geology, University of Madras from 11-13, March 2010
- **Tune Usha**, Applications of GIS in Disaster Management, Proceedings of the workshop on Geographical Information System (GIS) and Public Health: Practice of good mapping" National Institute of Epidemiology (ICMR), 6-8 September 2010
- Pravakar Mishra, **Tune Usha**, Evaluation of Tsunami Vulnerability along North East Coast of India, Proceedings of the Indian Ocean Tsunami Modelling Symposium, Fremantle, Australia, 12-15 October 2010

- T.Maheswaran, T.Arumugam, **Tune Usha**, R.S.Kankara, V.Ram Moham, GIS based methodology to assess the relative vulnerability index of builds of coastal hazards using numerical model and GIS- Coastal Karaikal, A case study, Proceedings of the national seminar on “Basins of India, their resources and management”, Department of Earth Sciences, Annamalai University, 17-18, February, 2011.
- T.Arumugam, T.Maheswaran, **Tune Usha**, R.S.Kankara, V.Ram Moham, Vulnerability Assessment of Nellore District to Tsunami hazards using numerical model and GIS, Proceedings of the national seminar on “Basins of India, their resources and management”, Department of Earth Sciences, Annamalai University, 17-18, February, 2011.
- T.Arumugam, T.Maheswaran, S.Chentamilselvan, **Tune Usha**, R.S.Kankara, V.Ram Mohan, Tsunami vulnerability mapping using numerical modelling and GIS for the coastal areas of Orissa, National Seminar on Emerging Frontiers in Geomatic Applications, School of Earth and Atmospheric Sciences, Madurai Kamaraj University, 21-22, March, 2011.
- R.S.Kankara, S.Chentamilselvan, **Tune Usha**, V.Ram Moham, Tsunami Inundation Modelling and Mapping along Marina Beach, Chennai using Cartosat-1 data, National Conference of Ocean Society of India – Technologies for Ocean Exploration, National Institute of Ocean Technology, 13-15, July, 2011.
- T Maheswaran, T.Arumugam, S Chentamilselvan, **Tune Usha**, R.S.Kankara, V.Ram Moham, Tsunami Atlas for the coast of Nagapattinam using numerical modelling and GIS, Proceedings of the national seminar on “Geospatial Technology for Resource Evaluation and Management, School of Earth and atmospheric Science, Madurai Kamaraj University, 17-18, February, 2012.
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- S.K. Dash, Shafique Matin, **Tune Usha** and Pravakar Mishra, Monitoring of water quality along chennai coast using remote sensing data, *Proceedings of HYDRO 2013 INTERNATIONAL, 4-6 Dec 2013, IIT Madras, INDIA, Pg-1-4*
- Goipnath G, SrinivasaRaju K, **Tune Usha**, Ramalingam M, Subbaraj L, Tsunami inundation simulation of landuse/landcover changes after a decade; a case study of Chennai Coast, IOTSUNAMI 2014 International Conference on "A decade after the Indian Ocean Tsunami, Pondicherry, 10-13, Dec, 2014
- Mohammed Abdul Azeez M A, Shumugam M, **Tune Usha**, Gopinath G, Subbaraj L, “Integrated approach to assess the vulnerability of coastal region of Tamil Nadu using the Invest model”, Proceedings of International conference on Recent trends in Science, Engineering & Management, 10-11, March, 2017, Karpaga Vinayaga College of Engineering and Technology, Kanchipuram, Pg-50
- Harish Kumar K S, Shunmugam M, **Tune Usha**, Gopinath G, Subbraja L, Flood Vulnerability assessment in urban areas using numerical modelling and geospatial tools – a case study of Chennai floods 2015, Proceedings of International conference on Recent trends in Science, Engineering & Management, 10-11, March, 2017, Karpaga Vinayaga College of Engineering and Technology, Kanchipuram, Pg-51
- Gopinath G, **Tune Usha**, Dash S K, Iyyappan M, Ramana Murthy M V, Development of Web-GIS based Tsunami inundation mapping service for the Indian Coast. Proceedings of 5th National Conference of Ocean Society of India (OSICON), p165.
- M V Ramana Murthy, **Tune Usha**, S K Dash, U S Panda, G Gopinath, M Iyyappan, Sujith Kumar S, Karthika R, Vivek G, Aleena M, Disaster risk reduction using impact based early warning systems, Impacts-based Forecasting (IBF) Workshop IITM Pune during 29-30 Nov 2019.

- G Vivek, M Iyyapan, G Gopinath, R Karthikaa, S K Dash, **Tune Usha**, Impact assessment of tropical cyclone on coastal district: A case study of Fani cyclone, Odisha, India using Geospatial modelling techniques, International symposium on advances in coastal research with special reference to Indo-Pacific ,17th-19th 2019
- M Iyyapan, **Tune Usha**, R Karthikaa, G Vivek, G Gopinath S K Dash, C Lakshumanan, Assessing impact of GAJA cyclone using geospatial techniques for coastal districts of Tamil Nadu, International symposium on advances in coastal research with special reference to Indo-Pacific ,17th-19th 2019
- Aleena Elsa Mathew, S Sujithkumar, G Vivek, M Iyyapan, R Karthikaa, P Dineshkumar, S K Dash, G Gopinath and **Tune Usha**, Flood impact assessment using field investigation and post-flood survey, International symposium on advances in coastal research with special reference to Indo-Pacific ,17th-19th 2019
- G Gopinath, **Tune Usha**, S K Dash, M Iyyapan, S Sujithkumar, G Vivek, R Karthikaa,
- Habitat risk assessment due to climate change along the coast of Andhra pradesh using InVest model, International symposium on advances in coastal research with special reference to Indo-Pacific ,17th-19th 2019.
- **Tune Usha**, S K Dash, U S Panda, G Gopinath, M Iyyappan, Sujith Kumar S, Karthika R, Vivek G, Aleena M, M V Ramana Murthy, City Scale Flood Forecasting System for Chennai, WCSSP India, I Annual Science Workshop, Indian Institute of Tropical Meteorology - 5 th - 7 th February 2020 IITM, Pune, India

Articles

- Shafique Matin, Sisir Kumar Dash, **Tune Usha** (2018) "A Semi-analytical Approach to Understand Remote Sensing-based Backscattering Characteristics for Kerala Coast Using In Situ Observation", Applications and Challenges of Geospatial Technology, Springer Nature publication group.
- Dr. T. Shunmugaraj, Dr. **T. Usha**, Dr. K. Ramu, Dr. M.V. Ramana Murthy (2017), "Need for Conservation and Management of Indian Coral Reefs in Light of Changing Climate" Blue Waters Newsletter, Jan 2017 Vol XVIII Issue 1.
- Pravakar Mishra, **Tune Usha**, "Conserving the Coastline", a cover story article was published in GeoSpatial Today, September 2011. FICCI-Geospatial Today Publication "Empowering India through Geospatial Technologies - Select Stories"
- T.Shunmugaraj, **Tune Usha**, V N Sanjeevan and B R Subramanian (2011), "The Ecosystem, biodiversity and Resource Information system" in The IUCN publication "Towards Conservation and Management of Mangrove Ecosystems in India" edited by J R Bhatt et.al; ISBN 978-2-8317-1263-5.