

Director
Central Water and Power Research Station, Pune

Dr. M. Selva Balan



Profile

Dr. M. Selva Balan is a distinguished scientist with nearly three decades of professional experience in water resources engineering, hydraulic instrumentation, hydroinformatics, reservoir sedimentation, dam safety and advanced measurement technologies. He has made significant contributions towards integrating Artificial Intelligence, Machine Learning (ML), remote sensing, smart instrumentation and digital technologies into water resources planning, monitoring and management, thereby strengthening India's capabilities in sustainable water infrastructure.

Dr Balan holds Bachelor's and Master's Degrees in Electronics & Communication Engineering and a Ph.D. in Computer Science & Engineering. His doctoral research on AI-based underwater acoustic techniques for reservoir sedimentation assessment led to the development of an Image Processing-based Optical Flow Measurement System, for which he was granted an Indian Patent, establishing an indigenous technology for non-contact water surface velocity measurement.

Dr Balan's areas of expertise include hydraulic instrumentation, hydrographic and bathymetric surveys, reservoir sedimentation studies, dam instrumentation, canal automation, SCADA systems, structural health monitoring, flood forecasting, environmental flow assessment, disaster risk reduction and hydroinformatics. He has pioneered the application of AI, ML, computer vision, IoT, MEMS, fibre optic sensing and remote sensing technologies to address complex challenges in water resources engineering.

Dr. Balan has played a pivotal role in several flagship national programmes, including the National Hydrology Project (NHP), Dam Rehabilitation and Improvement Project (DRIP) and Comprehensive Dam Safety Evaluation (CDSE). His contributions span reservoir sedimentation assessment, hydrographic investigations, intelligent dam instrumentation, early warning systems, reservoir and canal automation, digital monitoring systems and advanced field measurement technologies. He has also served as a technical expert for several nationally significant river valley and reservoir projects across India, including Polavaram, Mullaperiyar, Cauvery, Bharathapuzha, Palar, Sardar Sarovar, Tawa, Barna and Indira Sagar.

A strong advocate of indigenous technology development, Dr. Balan has led pioneering research in Satellite-Derived Bathymetry, AI-enabled flood forecasting, image-based discharge measurement, Remote Operated Vehicles (ROVs) for underwater inspection, GNSS-guided

autonomous survey boats, fibre optic-based dam health monitoring, smart sensing systems, hydro-acoustic sediment profiling and other advanced non-contact measurement technologies. He has also fostered collaborative research and technology development with premier national institutions, driving multidisciplinary initiatives in digital water resources management, intelligent hydrological assessment and decision-support systems.

An accomplished researcher, Dr. Balan has published 17 papers in peer-reviewed journals, presented 31 papers at national and international conferences, delivered over 85 invited lectures and holds one Indian Patent, with additional patents under process. He has guided over 50 undergraduate and postgraduate research projects and is actively associated with doctoral research, contributing significantly to academic excellence and capacity building in advanced water resources technologies.

Dr. Balan has represented India at the India-Canada Conclave on Dam Safety and Resilient Infrastructure (ICONDAM 2026) under DRIP Phase II & III, promoting international collaboration and knowledge exchange in dam safety and resilient water infrastructure. His multidisciplinary contributions to hydraulic instrumentation, dam safety, hydrographic surveying, reservoir sedimentation, digital water technologies and intelligent engineering solutions have significantly advanced hydraulic research and strengthened India's capabilities in sustainable water resources development and management.