



ISCAR

Proceedings of the
ISCA Webinar - International Symposium on Coastal Agriculture:
Transforming Coastal Zone for Sustainable Food and Income Security
16th March – 19th March 2021

The International Symposium on Coastal Agriculture (ISCA Webinar): Transforming Coastal Zone for Sustainable Food and Income Security was organized by Indian Society of Coastal Agricultural Research (ISCAR) in collaboration with ICAR-Central Soil Salinity Research Institute, Karnal, India during March 16-19, 2021 in virtual mode.

Inauguration, Themes and Sessions

The symposium was inaugurated by Dr. Trilochan Mohapatra, Secretary DARE & DG, ICAR, New Delhi, India as Chief Guest in the presence of Dr. Luke York, Counsellor (Agriculture) Australian High Commission, New Delhi, India as Guest of Honour. Dr. Shaikh Mohammad Bokhtair, Executive Chairman, Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh, Dr. S.K. Chaudhari, DDG (NRM), ICAR, New Delhi, India and Dr. A.R. Khan, Chief General Manager, NABARD, Kolkata, West Bengal, India were the Special Guests. The welcome address was delivered by Dr. P. C. Sharma, Director, ICAR-CSSRI, Karnal, Haryana, India and the opening remarks by Dr. H.S. Sen, President, ISCAR, Canning Town, West Bengal, India.

The symposium was held across 4 days with different sessions under each theme that dealt with various aspects of coastal agriculture as follows:

Theme I: *Systems approach for coastal zone development: agriculture, horticulture & plantation crops and their tolerance to biotic & abiotic stresses*

- Session I: Agricultural crop improvement including biotechnological approaches, genetic resource management, abiotic stress tolerance
- Session II: Agricultural crop management and cropping system intensification
- Session III: Horticulture & plantation crops and grassland ecosystems: crop improvement including biotechnological approaches and their management
- Session IV: Plant protection measures: use of nanotechnology and integrated practices including natural therapies

Theme II: *Technological developments in fisheries, livestock and poultry management, water pollution trends, and ecological security for coral reefs, farming system modules*

- Session I: Fresh and brackish water aquaculture: technological innovations and emerging options including fish health and water management
- Session II: Estuarine and marine fisheries: resource management & technological innovations, fish processing technologies

- Session III: Water pollution: sedimentation, eutrophication & formation of dead-end zones - threat to fisheries, corals & coral reefs
- Session IV: Livestock & poultry: technological innovations & options for management and production developments
- Session V: Farming system approach: rice-cum-fish culture & homestead production system including social-forestry

Theme III: *Natural resources and carbon flow dynamics vis-à-vis soil quality, water use trends, and integrated water management including ground water and farm machinery developments*

- Session I: Natural resources: assessment and degradation, management
- Session II: River flow dynamics, bank erosion, surface & underground water flow modelling vis-à-vis climate change
- Session III: Jute geo-textiles and its applications in coastal ecosystems
- Session IV: Carbon dynamics and C sequestration in coastal ecosystems vis-à-vis soil quality
- Session V: Coastal water use trends - sources and availabilities, integrated strategies for irrigation & drainage, and other location-specific irrigation practices including poor quality water use
- Session VI: Farm machinery development compatible with small land holdings and for women-friendly use

Theme IV: *Forestry & biodiversity and spatio-temporal changes, integrated forest management policy for ecological sustenance and eco-tourism for livelihood*

- Session I: Coastal forestry: mangrove dynamics and temporal changes, and biodiversity including algal species
- Session II: Eco-tourism for livelihood security

Theme V: *Climate change and disaster occurrence, its impact, IT & remote sensing for rapid dissemination and early warning protocols, mainstreaming climate change policies for regional integration*

- Session I: Climate change trends a dynamic phenomenon and its impact on agriculture, fisheries, forestry & animal husbandry
- Session II: Meteorological, hydrological & geological disasters: characteristics and likely impact on population dynamics
- Session III: Disaster management: IT and remote sensing -scope for preparedness, early warning models to combat adverse impact, researchers' code as per UN guidelines

Theme VI: *Technology impact on the socio-economic, gender issues, ICT application to assess and monitor, strengthening market linkage and business models on post-harvest and value chain for livelihood security and employment generation*

- Session I: Technology impact on socio-economy: food & income security and market linkages
- Session II: Innovative ICT applications and effectiveness of on-going government schemes and their contributions
- Session III: Business models on value chain and post-harvest use: FPOs, Impact on income & livelihood security, employment opportunities in rural sectors

ISCAR has been organizing a lecture in memory of Padma Shri Late Dr. J.S.P. Yadav, the founder President of the society, a doyen in soil science research & management and recognised in the soil science fraternity as an eminent soil scientist, since the last two symposiums. During this symposium on 16th March, 2021, the 3rd Dr. J.S.P. Yadav Memorial lecture was delivered by Dr. A.K. Singh, Former VC, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, India, and Former DDG (NRM), ICAR, New Delhi, India on “Impact of Climate Change on Coastal and Island Ecosystems”.

During the International Symposium, eleven plenum lectures were delivered by eminent researchers as follows.

<i>Speakers</i>	<i>Topic</i>
Professor Timothy John Flowers, School of Life Sciences, University of Sussex, Brighton, United Kingdom	How can eHALOPH, a database of salt-tolerant plants; help your research?
Dr. Michael Phillips, Director, Aquaculture & Fishery Sciences, WorldFish Center, Malaysia	The future of fish agri-food systems
Dr. M. Vijay Gupta, Former Assistant Director General, International Relations and Partnerships, WorldFish, Malaysia	Improving food and income security of coastal communities through fisheries and aquaculture management
Dr. Abdelbagi M. Ismail, Principal Scientist and IRRI Representative, Nairobi, Kenya, Africa	Agricultural systems transformation for food and income security in coastal zones
Professor Rattan Lal, Laureate World Food Prize 2020 and Director, Carbon Management and Sequestration Center, Ohio State University, Columbus, Ohio, USA	Impact of soil carbon dynamics on the environment and management of improved soil health in the coastal ecosystems
Dr. N.H. Ravindranath, Professor (Retd.), Centre for Sustainable Technologies, Indian Institute of Science, Bangalore, India	Natural ecosystems, biodiversity and climate change
Dr. Anupma Sharma, Scientist-F, Groundwater Hydrology Division, National Institute of Hydrology, Roorkee, India	Water management strategies to mitigate saltwater intrusion with special reference to coastal Saurashtra
Professor T.G. Sitharam, Director, Indian Institute of Technology, Guwahati, Assam, India	Water resource potential & uses along the coastal zone: Role of coastal reservoirs
Dr. M.M. Qader Mirza, Adjunct Professor, Department of Physical and Environmental Sciences, University of Toronto, Scarborough, Toronto, Ontario, Canada	Coastal agriculture under future climate change: Can developing countries adapt?
Dr. Sanjay K Srivastava, Chief of Disaster Risk Reduction at UN Economic and Social Commission for Asia and Pacific, Bangkok, Thailand	Building the coastal resilience in Asia and the Pacific: Opportunities and challenges
Dr. Pramod Kumar Joshi, Former Director, South Asia, IFPRI, New Delhi, India	Coastal ecosystems – explore value chains, processing and exports for poverty alleviation

A panel discussion on ‘Addressing coastal problems for improving economy and livelihood security’ was also held for coming out with an action plan to address the technology and socio-economic, policy and institutional issues for removing the bottlenecks for improving

the economy and livelihoods of the farmers in the coastal regions. The session was chaired by Dr. S.K. Chaudhari, DDG (NRM), ICAR and there were 26 intervention areas addressed by eminent scientists specialising in different key areas identified.

Awards in different sections

During the symposium various honours and awards were also conferred by the society to outstanding researchers working in the field of coastal agriculture. The ISCAR fellow award was conferred to Dr. Gouranga Kar, Director, ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore, West Bengal, Dr. Sukanta Kumar Sarangi, Principal Scientist, ICAR-Central Soil Salinity Research Institute, RRS, Canning Town, West Bengal and Dr. S.V. Sawardekar, Associate Professor, College of Agriculture, Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, Maharashtra. The Dr. J. S. P. Yadav Best Paper Award for the years 2018-2020 was conferred to Md. Tarikul Islam, Bushra Monowar Duti, Md. Rezaul Hasan, Md. Atiqur Rahman and S. M. Sahabuddin for their research paper entitled "Groundwater Salinity Modelling in the South West Region of Bangladesh Considering Climate Change" published in 2020 in the Journal of the Indian Society of Coastal Agricultural Research, Volume 38 No.2, page 76 to 84.

The Dr. H. S. Sen Best Poster Presentation Award was awarded to M.N. Islam, R.W. Bell, E. G. Barrett-Lennard and M. Maniruzzaman for their paper entitled "The Combination of Shallow Surface and Subsurface Drains Alleviates Waterlogging and Salinity in a Clay-Textured Soil and Improves Sunflower (*Helianthus annuus* L.) yield in the Ganges Delta" adjudged as the Best Poster Presented during the Symposium. Besides four other best poster presentation awards were also given to the participants ("Genomic and Transcriptomic Approaches to Accelerate Salinity Stress Tolerance in Jute (*Corchorus spp.*)" by Subhojit Datta, D. Saha, P. Satya, A. Anil Kumar, J. Mitra and G. Kar; "Photo-Protective Effect of Cuttlefish Ink Melanin on Human Hair" by P. K. Binsi, P. Muhamed Ashraf, U. Parvathy and A. A. Zynudheen; "Assessment of Long Term Trends in Stream Flow of River Basins Flowing in the West Coast of India by Sujeet Desai, Bappa Das, G. B. Sreekanth and Gopal Mahajan; "Popularizing Drought-Tolerant Rice Variety Sahbhagi Dhan in Upland Areas of Goa State through Front Line Demonstrations - An Impact Assessment" by K. K. Manohara, N. P. Mandal and N. P. Singh).

The Society also confers best paper presentation award to early career researchers (below 40 years). During the International Symposium on Coastal Agriculture (ISCA Webinar - 2021), the ISCAR Best Paper Presentation Award for Early Career Researcher Award was conferred jointly to Ms. S. Remya, ICAR-Central Institute of Fisheries Technology, Cochin, Kerala for the paper entitled "Development of Chitosan Based Novel Antioxidant Film for Fish Packaging Application" co-authored with C.O. Mohan, J. Bindu & C.N. Ravishankar and to Ms. Amrutha S. Ajayan, Department of Soil Science and Agricultural Chemistry, College of Agriculture, University of Agricultural Sciences, Dharwad for the paper entitled "Green Synthesized Zinc Oxide Nanoparticles as Nutrient Source for Maize (*Zea mays* L.) Grown on Calcareous Vertisol" co-authored with N.S. Hebsur.

At the end, during the plenary session the summary of the deliberations and recommendations were presented by the rapporteurs for the different sessions.

The symposium was attended by more than 300 delegates comprising of researchers, academicians and students from Australia, UK, USA, Bangladesh, Canada, Kenya, Ghana, Thailand, Malaysia, Poland, Italy, Philippines, New Zealand and various parts of the coastal states of India. The Symposium was supported by the Indian Council of Agricultural Research, Australian Centre for International Agricultural Research (ACIAR), National Jute Board and NABARD

The recommendations that emerged out of the deliberations during the symposium are given below.

Recommendations Theme-wise

Theme I: *Systems approach for coastal zone development: agriculture, horticulture & plantation crops and their tolerance to biotic & abiotic stress*

- eHALOPH, database of salt tolerant halophytes can be used for screening of different salinity tolerance plant types and plant breeding.
- Salinity tolerance (CR405, BR47, BINA Dhan 8), submergence tolerance (Swarna-sub1, CR1009-sub1, BR11-sub1, Gosaba 5, Gosaba 6 etc.), and drought tolerance (Sahbhagi Dhan) rice variety has been developed for coastal South Asian region. Emphasis to be given multiple stress tolerant rice varieties that fits with the best management practices.
- Modern breeding tools to be employed to develop the sustainable resilient cropping system for aggravated climatic scenarios to ensure regular income to the farmers.
- A complete profile of salt tolerant mechanism at different stages of rice such as seed germination, seedling and at flowering (reproductive) to be developed at molecular, cellular and morphological level with the application of modern bio technologies.
- Emphasis to be given to the reproductive stage as it translates into yield through ascertaining mechanisms, developing exclusive molecular markers and to apply them in practical breeding.
- The mining of elite genes is needed from gene pools of different sources to facilitate gene pyramiding to confer resistance to salt tolerance.
- The DNA barcoding with efficient molecular markers to be extended to establish the claim right against bio piracy.
- Molecular assisted breeding, QTL mapping etc. to be explored to develop precision breeding.
- To cope with the situations of rainfall variability, waterlogging, fresh water scarcity in coastal areas, location specific land use, on-farm water harvesting, improved drainage, alternative water use (such as brackish water), multiple use of water, crop diversification, multiple crop cultivation besides developing tolerant crop varieties under different scenario is essential.
- The avenues to enhance vegetable production using floating gardens and embankment farming to be promoted.
- Large number of horticulture crops including fruits, vegetables, roots and tuber crops, plantation crops, medicinal and aromatic crops, spices and flower crops are grown commercially in the coastal ecosystem. Technological interventions to be carried out to address the challenges faced by the crops and to achieve sustainable productivity in the coastal ecosystem.
- In mango variety Alphonso, concentrated in Konkan Region of Maharashtra and having unique export quality, rootstock breeding work is to be explored with the wild species of *Mangifera* available in Western ghats.
- In cyclone prone areas, establishment of coconut based agro-forestry system in coastal lines could be effective in protecting the vulnerable coastal ecosystem and to reduce the damage on crops and property.

- In cashew, mass production of quality planting material of early bearing dwarfing genotype through soft wood planting technique and high density planting to enhance cashew production for meeting the growing domestic demand as well as to meet the requirement of the industry.
- While embark on import of advanced new varieties/clonal seeds from abroad, performance of such varieties under local conditions may be evaluated and package of good practices may also be disseminated for adoption to capture genetic potentials.

Theme II: Technological developments in fisheries, livestock and poultry management, water pollution trends, and ecological security for coral reefs, farming system modules

- The rich species diversity of Indian waters (more than 1100 taxa) is a common feature keeping Indian situation at better position with regard to the marine fishery resources. The increasing demand for fish for consumption keeps the challenges towards maintaining the sustainability in resource, production, supply and utilisation.
- Species and farming system diversification in aquaculture is the need of the hour to meet up the increasing demand of fish with the accelerating population, on a sustainable mode.
- Promotion of the native shrimp species such as Indian white shrimp, *Penaeus indicus* as a complimentary species to *P. vannamei* through stock improvement by selective breeding and large-scale seed production is required for the growth trajectory of Indian shrimp farming sector.
- Low input-based technologies should be popularized among resource-poor small and marginal coastal shell fish and finfish farmers.
- Development and popularization of location specific farming models with locally available fish species, using cost effective indigenous formulated feeds for improvement of livelihood of coastal farmers.
- The Eco-labelling and certification of marketed fish and fishery products to flag and extend the sustainability concept towards the consumers.
- Emphasis to be given in innovations in fish processing and value addition sectors like micro-encapsulated sardine oil, seaweed enriched products, nutritional mix from fish scale collagen peptide, encapsulated fish calcium, chitosan based hydro-alcoholic sanitizer, ready to serve fish products, fish curry in retort pouches, instant fish gravy powder, fish soup powder, extruded fish products, cured, smoked and dried products, fish pickle, canned fish products, fish by-products, and battered and breaded products etc.
- Advocatedeveloping cost effective newer and modern packaging methods like Modified Atmospheric Packaging (MAP), SMART packaging, Active packaging (AP), Sensor based film packaging to detect the spoilage and to improve shelf life of fishes.
- To overcome risks emanating out of disasters including pandemics like COVID-19, there is a need for policy support the fishers through immediate relief schemes, online fish marketing channels, special cash package for fishermen families, moratorium for credit payments, inclusion of fishing and allied activities under MGNREGS, priority based support for traditional fishers, fisherwomen, mechanised fishers and processors.

- Biosensors for water pollution monitoring using enzyme-mimic nano systems for continuous monitoring of different ecologically and economically important aquatic ecosystems for emerging toxic pollutants and micro-plastics on real time basis.
- Climate change *vis-a-vis* global warming, sea level rise, extreme events like tsunami, cyclone and sea-surges and anthropogenic activities leading to coastal erosion and consequent sedimentation has got an indelible impact on coral growth and sustenance which ultimately causes the destruction coral reef ecosystem. Thus, a comprehensive policy and planning is needed to protect this important natural resource.
- The Rice-fish-horticulture-livestock based integrated farming technologies /models and similar models on rice- fish/- duck farming need to be popularised in the suitable coastal areas in the country. Similarly, various homestead farming system models being practiced in Kerala and West Bengal in India needs dissemination in other coastal areas.
- The institutional support in terms of fund, quality inputs, capacity building and proper marketing are vital to boost large scale adoption of this farming system.
- Region specific livestock breeding to be encouraged to improve animal activity in island ecosystem.
- Region specific fodder cultivation to be encouraged to enhance feed security.
- Sero monitoring and surveillance is to be strengthened keeping in view to endemic and emerging diseases of livestock and poultry.
- Inclusion of alternate poultry species like Japanese Quails, ducks, turkey and guinea fowl in coastal region.

Theme III: *Natural resources and carbon flow dynamics vis-à-vis soil quality, water use trends and integrated water management including ground water and farm machinery developments*

- The interaction of climate change and intensifying land use in the coastal zone is driving rapid change in coastal rivers, estuaries, and the benefit they provide in the ecosystem services. Careful monitoring is essential to understand long term trends as the basis for current management and future planning of coastal water resources.
- Attention to be given to decline in groundwater quality due to sea-level rise as well as saline water intrusion. More focus is needed on research, monitoring and management of coastal salinity and sea water intrusion.
- Conjunctive use of surface and groundwater resources, techniques such as managed aquifer recharge and riverbank filtration in mitigating salinity and maintaining groundwater quality for human use.
- Integrated modelling of surface - groundwater interactions for planning and design of management interventions and to understand long term trends due to changing climate and water use.
- Land use planning for agriculture in the coastal zone must take account of both field and landscape scale impacts and profitability. Land suitability assessments across scales to increase productivity within environmental limits.
- Concepts of crop water profitability and nutritional water productivity, as well as economic profitability, to help in assessing the real benefits and costs of different land uses.

- The mechanism of long term soil organic matter stabilization in coastal region is thought to be through physical protection by micro-aggregate, chemical protection by binding with oxyhydrates and to molecular recalcitrance of hydrophobic particulate organic matter contributing to C sequestration in paddy soils.
- To reduce transport of sediments, plant nutrients and other pollutants, rehabilitation of upper riverine through introduction of agroforestry, conservation agriculture, regenerative agriculture etc. is needed.
- Coastal natural vegetation (mangrove, marsh, seagrass) captures and holds a significant amount of global carbon, known as blue carbon. Continuous human intervention (like conversion to croplands, pollution, oil-spill, erosion) has degraded these ecologies a lot in last few decades. Proper conservation measures are required for their preservation.
- Conversion of natural vegetation to cultivation always results soil more of a source of carbon than sink.
- The components of tree and shrubs in farming system and perennialization of coastal agriculture is essential to make the coastal ecosystem more resilient.
- Agriculture subsidies to shift towards support for more ecological production systems that enhance soil C, water quality, animal welfare and biodiversity protection.
- There is a need of women friendly improved farm implements for enhancing work efficiency and reduction in drudgery of farm women engaged in different agricultural operations starting from sowing to harvesting and post-harvest operations in coastal region.
- The fiber crop, jute is being pushed to the marginal low-productive lands in order to make more room for food crops the highly versatile and environmental friendly natural fiber has a great scope to adopt in coastal saline region.
- A feasible strategy for realising the potential of degraded coastal land appears to be intensification through integrated farming of agri-aquaculture systems by harvesting a portion of the huge available surplus run off by land shaping and using it for supplemental irrigation at the critical crop growth stages.

Theme IV: *Forestry & biodiversity and spatio- temporal changes, integrated forest management policy for ecological sustenance and ecotourism for livelihood*

- Using remote sensing in estimating mangroves which makes easier to convince policy makers for Government institutions contributions in conservation and sustainable management of mangroves
- Emphasise to be given on mangrove dynamics vis-a-vis sediment supply in relation to continental drift and sea level rise using palynological data of mangrove species namely *Nypa*, *Rhizophora*, *Avicennia*, etc.
- Community engagement for mangrove restoration and conservation based on case studies from Andhra Pradesh carried out by MSSRF in collaboration with Andhra Forest Department
- Promote agro ecotourism by developing 'Bio Villages' in coastal areas to conserve local biodiversity, tradition and culture and to help in livelihood sustainability by integrating agriculture and allied activities with tourism.
- The need for publishing in local language for effective awareness generation tool was essential

- Nature base solution with biosheilds with local communities be the nature's own solutions to natural hazards - help to protect people from the danger of floods, storms, and sea level rise, build resilience, also increase biodiversity, food, and provide other livelihood resources.

Theme V: Climate change and disaster occurrence, its impact, IT & remote sensing for rapid dissemination and early warning protocols, mainstreaming climate change policies for regional integration

- Integrated assessments of climatic change in coastal areas are crucial to support the management policy development in order to achieve sustainability in coastal agriculture under climate change.
- Comprehensive agrometeorological adaptation policy guidelines, focusing on preparedness and adaptation measures to support sustainable agricultural development are needed to cope with the impacts of climate change.
- Upscaling of the proven resilient technologies to enable farmers to reduce the yield losses and enhance their adaptive capacity against climatic variability in coastal regions.
- To cope up the natural calamities several climate change adaptation measures at different time scales need to be evolved along with mitigation strategies including flood tolerant varieties, real time agroadvisories, preparedness, rehabilitation, sub-surface drainage etc.
- The impact of change in sea surface temperature and coral bleaching need to be studies in details along the coastal zones which has direct relevance with the fish catch.
- Tuber crops to be promoted to the poor people as an alternative crop in Konkan, the coastal belt of Maharashtra, India as climate smart, sustainable, economically viable and nutritionally rich food crop.
- Adopting several strategies like use of locally adapted breeds/varieties, improved housing and diet, better herd and grassland management, genetic improvement for heat tolerance in animals, smart villages with shelters for man and animals during climatic havocs in combating with the changing climate.
- Potential impacts of climate change on the corals, mangroves and associated marine fisheries of Islands ecosystems need to be studied for improving the fishery strategies ensuring sustainable fishing practices as well as preserving pristine environmental condition of this unique eco-region.

Theme VI: Technology impact on the socio-economics, gender issues, ICT applications to assess and monitor, strengthening market linkage, and business models on post-harvest and value chain for livelihood security and employment generation

- Seaweed cultivation is emerging as a sustainable livelihood opportunity for the farmers living in coastal areas.
- Investment on creating awareness among the households living in coastal areas, start-up grant to set up seaweed value chain are essential for scaling up seaweed business across the coastal region.
- Introduce disaster insurance to reduce the risk of investing in marine aquaculture industry.

- Coastal eco-tourism has potential to provide sustainable livelihood opportunity for the people living in coastal areas and this requires effective policy and institutional arrangements.
- Farm women mobilization through self-help groups and linking them to Value chain would help to increase the income from agriculture and to empower them.
- Identify and restore the cultivation of indigenous plant species to ensure nutrition security and social and cultural value of the tribal people living in coastal areas.
- Investment to strengthen coastal value chain can ensure higher return from the produce, enhance land productivity and quality of the produce and thereby ensure food and livelihood security of the households inhabited in coastal areas.
- Imparting of knowledge and skill on technologies to farmers and farm women regarding the cropping system along with capacity building on value addition and value chain management for the farmers is the need of the hour.
- An operational work plan involving scientists, computer analyst, service providers and panchayati functionaries for short as well as long term planning in unison.
- Emphasized on holding aqua clinics/ agri- clinics and entrepreneurship development programmes for creating employment for graduates.
- Fisheries and Aquaculture R&D stakeholders should adopt "Value Chain Extension Approach in Fisheries/ Aquaculture
- ICT based Smart Aquaculture models, aquapreneurs and Fisheries Startups need to be supported by the partnership, networking and policy support.
- Farmers groups, FPOs /Co-operatives/ SHGs in Fisheries/ Aquaculture needs to be mobilized and handholding support need to be enhanced.

The symposium ended with thanks to all participants including Chairman, Co-chairman, speakers, both invited and voluntary categories, for each session. The plenum and plenary session lectures deserved high appreciation. The Society also expresses its extreme gratitude to Dr. M.S. Swaminathan, Chairman, Advisory Committee, Dr. Trilochan Mohapatra, Chief Patron, Dr. S.B. Kadrekar, Patron and Dr. A.K. Bandyopadhyay, Patron and members of the International and National Advisory Boards for their guidance and support for successful organization of the International Symposium. The contribution of all members of the organizing committee in organization of the event is highly appreciated.

Dr. H.S. Sen, President of ISCAR offered thanks to all his colleagues, partners and stakeholders for all their painstaking & highly disciplined support to make the symposium a good success hoping the recommendations and research highlights drawn will suggest new horizons in coastal research and management world-wide. It was strongly envisaged that ISCAR would thus establish its role as a leading partner in the area.

Dated: 05.08.2021

Sd/-
Dr. Uttam Kumar Mandal
Secretary, ISCAR