1. Ocean Services, Modelling, Applications, Resources and Technology (OSMART) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
460	1. Establishment of ocean observing network in the Indian Ocean.	1.1. Deployment of ocean observing platforms. (in numbers)	60	1. Effective monitoring and understanding of the Indian Ocean.	1.1. New ocean data records generated. (in numbers)	10000
					1.2. Scientific/ technical publications.	8
	2. Generation and dissemination of ocean information, and early warning services.	2.1 No of potential fishing zone advisories issued (in days).	300	2. Enhanced livelihoods and safety of coastal and maritime communities.	2.1 Reduction in search time of fishermen (in %)	30
		2.2 Number of oceanogenic multi hazard early warnings issued (in % of events)	100		2.2 No of users enabled with maritime safety information.	300000
	3. Commissioning of two desalination plants (Chetlat and Kadamath) funded by MHA and being implemented by NIOT.	3.1 Percentage of work completed (Procurement-30%, setting up marine structures 30%, laying of cold water pipe 20%, Final commissioning 20%)	100	3. Benefit to islanders of Lakshadweep	3.1. Amount of freshwater generated per day per plant (in litres)	150000

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
	4. Commissioning of OTEC powered Desalination plant	4.1 Percentage of work completed for the establishment of the plant (%) (Process Components 20%, Civil structures and sump 10%, HDPE pipe procurement and welding 20%)	50	4. Green energy powered clean water	4.1 Self powered desalination system (Yes/ No)	No
	5. Harnessing of marine resources.	5.1 Number of marine microbes identified with potential biotechnological application.	2	5. Development of technology for food products and industrial biochemical from marine microbes, algae, seaweeds and open sea cage culture.	5.1 Number of technologies developed for production industrial biochemical from marine microbes, algae, seaweed and number of cages developed	1
		5.2 Number of algal/seaweed species identified and cultured.	2			
		5.3 Number of open sea cage deployed/tested.	1			
	6. Exploration of Marine resources: Underwater Non-living resources – eg. minerals	6.1 Area covered under bathymetric data acquisition in exclusive economic zone of India (in sq. km.)	9600	6. Enhancement of Knowledge and new information about surf zone and near shore area along East Coast of India	6.1 Number of research Papers in peer reviewed journals	3
		6.2 Number of cruises undertaken	3		6.2 Bathymetry charts (Yes/ No)	Yes

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
				7. Exploration of polymetallic nodules and sulfides	7.1 Continuation of work as per the contract with International Seabed Authority (Yes/ No)	Yes
	7. Exploration of Marine resources: Marine living resources -	7.1 Assessment of ocean acidification, and fish eggs & larval abundance/ diversity (No. of cruises)	4	8. Identifying the hot spots for marine biodiversity, spawning and breeding grounds of selected fishes, ocean acidification, and augmentation of Indian Ocean Biogeographic Information System (IndOBIS)	8.1 Area covered within the Indian coastal seas (%)	20
		7.2 Generation of barcodes of deep sea organisms	100		8.2 Development of genetic data base of marine organisms (No. of groups)	2
					8.3 Augmentation of number of voucher specimens	100
	8. Coastal monitoring and services	8.1 Number of locations for monitoring coastal pollution	50	9. Status of marine pollution and erosion	9.1 No. of reports/ publications on status of pollution	2
		8.2 No of states where coastal erosion is being monitored	4		9.2 Shoreline change atlas/publication indicating erosion hotspots (in numbers)	2
		8.3 No of studies conducted on performance of coastal structures.	2			
					9.3 Maps/publications indicating status of coastal structures (in numbers)	2

2. Polar Sciences Cryosphere (PACER) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
146	1. Expeditions to the Antarctic, Arctic and Himalayas	1.1. No of atmospheric observatories in polar regions	3	1. Improved understanding of polar and ocean regions and its global and regional impact	1.1. No of publications on better understanding of Antarctica, Arctic, Southern Ocean and Himalayas	50
		1.2. No of glaciers for continuous monitoring in the Himalayas	6		1.2. Generation of new geological/ cryospheric/ atmospheric/ biological/ environmental/ climate/ oceanographic data records in the Antarctic, Arctic and Himalayas (in numbers)	10
		1.3. No of hydro-meteorological stations in Himalaya glacier basins	5			
		1.4. Expedition days at two stations each in Antarctica	365			
		1.5. Expedition days in Arctic	150			
		1.6. Expedition days of in Himalaya	120			
	2. Indian contribution to international polar science and policy domains	2.1 No. of new collaborative scientific projects launched in polar regions	20	2. Increased activities in scientific, strategic and policy domains in polar regions	2.1 No. of scientific research publications from the collaborative projects in polar regions	20
					2.2 No of international scientific committees/ bodies where India has representation in polar domain	15

3. Seismological & Geosciences (SAGE) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
120	1. Strengthening of seismological observations	1.1. No. of broadband seismographs (BBS) systems procured	10	1. Improvement in the earthquake detection capabilities with increased accuracy in earthquake parameters	1.1. Maintaining the minimum threshold magnitude of 3.0 earthquake in most part of the country (Yes/No)	Yes
		1.2. Installation of seismic systems (in numbers)	10			
	2. Geochronological and isotopic finger printing.	2.1 Setting up of a national facility for geochronology for generation of quality data i.e., creation of required infrastructure to set up the Lab and procure ancillary equipment in % terms	20	2. Quality data generation of specific sample	2.1 No. of papers/ publication/findings	10
	3. Setting up of borehole observatory in Koyna region	3.1. Laboratory experimentation on borehole core samples in % terms	20 (of the total samples)	3. Improved understanding of earthquake processes in Koyna region	3.1 No. of reports/ publications/findings	4
		3.2. Instrumentation of pilot borehole (nos.)	6			

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
	4. Dissemination of Geoscience & seismological data	4.1 Creation of National Geoscience & seismological Data repository (Yes/No)	Yes	4. Data availability to Scientific community	4.1 Populating the National Geoscience data repository (in Tera Bytes)	50
	5. Seismic Hazard Microzonation of selected seismically vulnerable cities	5.1 Generation of large scale multi-thematic maps to help in planning risk resilient infrastructure.	4 cities	5. Generation of final risk index for 4 cities	5.1 Estimation of ground motion at specific sites	4225

4. Research Education & Training Outreach (REACHOUT) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
65	1. Extramural funding	1.1. Number of ongoing projects supported for carrying out R&D activities in various academic and research institutes of the country	100	1. Promoting R&D in Earth Sciences through various academic and research institutes	1.1. Number of publications based on research conducted through extramural funding	50
	2. Outreach and awareness	2.1 Number of schools where the outreach and awareness events are held.	30	2. Spreading awareness and scientific temperament in Earth	2.1 Number of students participating in the outreach and awareness events.	500
					2.2 Number of students	2000

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
		2.2 International Earth Science Olympiad (IESO) conducted annually.	1	Sciences among students.	appearing for the all India Test for IESO.	
	3. Training and capacity building in Earth Sciences.	3.1 Courses conducted in various disciplines of Earth Sciences in 3 training centres of MoES.	12	3. Develop skilled and trained manpower in Earth Sciences	3.1 Number of people who attended the training programmes	450
		3.2 Create learning resources by internal and external faculty (in numbers)	10			

1. Atmosphere & Climate Research - Modelling Observing Systems & Services (ACROSS) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
680	1. Generation and dissemination of weather based Agro-meteorological advisories	1.1. Number of District Agro meteorological Field Units (DAMU) and agromet observatories established	25	1. Increase in resilience of farmers to extreme weather events	1.1. Number of farmers who receive the Agro-meteorological advisories (in lakhs)	10
	2. Augmentation of the atmospheric observation	2.1 Installation & commissioning of various atmosphere observation	250	2. Improved weather services for aviation safety &	2.1 Aviation Weather services - current weather & horizontal visibility	70

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
	network in India	systems including Doppler Weather Radars (DWR), Automatic Weather Stations (AWS), New Digital Current Weather Instrument System (DCWIS) and New visibility sensors		protection of life and property from extreme weather events	information - provided to airports and heliports.	
					2.2 Increase in no. of cities/towns covered for rainfall monitoring & local forecasting services	200
					2.3 Increase in nowcast stations due to Radar coverage	40
	3. Climate services	3.1 Increase in number of stations generating climate data (AWS, Agro AWS, Aviation stations, DRMS)	400	3. Climate diagnostics for sectoral applications	3.1 Dissemination of climate data through climate data portal (no. of users)	2500
		3.2 Generation of climate data records (number of records)	6,00,000		3.2 Number of users of data/ data records/ documentation (visitors for climate data)	12,00,000
	4. Training/Capacity Building in operational Meteorology & Allied Sciences	4.1 No. of Trainings/ courses/ capacity building programs conducted as a Regional Training Centre of WMO	8	4. Skill development in meteorology & allied sciences	4.1 Number of people trained	500
	5. Improvemets in Short and Medium Range Forecasts	5.1 Increase the resolution of short-range prediction model (6 kms from 12 kms) (in %)	100	5. Generating weather forecasts at a higher spatial resolution (~from 6 kms)for applications at block level	5.1 Additional No: of blocks where, block-level short-range weather forecast will be initiated	500

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
	6. Improvements in the seasonal and extended range forecasts	6.1 Implementation of the next generation model with weakly coupled Data assimilation after thorough testing (in %)	100	6. Utilization of coupled model forecasts at Extended (up to 4 weeks) and Seasonal (next 3 months) time scales by IMD for various sectors	6.1 Number of homogenous regions for which Seasonal forecasts will be provided	4
					6.2 Issue the experimental extended range forecasts at district level (No. of districts)	700
	7. To improve the initial conditions of the operational NWP model	7.1 Assimilation of new/additional observations from Satellites/Doppler Weather Radars. (50% of total number of DWR data and 4 types of satellite sensors); (yes/no)	Yes	7. Improvement in the quality of initial condition in Global/Regional Models resulting in better weather prediction	7.1 Near Real-time use of regional meso-scale model outputs by IMD & other users for various applications (no. of users/sectors)	18
	8. Procurement of High Performance Computing system – V3.0	8.1 Install and Commission the HPC system at NCMRWF and IITM (in %)	100	8. Augmentation of the existing High Performance Computing system	8.1 Porting of the end-to-end Numerical Weather Prediction (NWP) system to the new HPC for enabling high resolution forecasts. (in %)	50
	9. Setting up of Atmospheric Research Data Center	9.1 Populating the Atmospheric Research Data center with atmospheric data sets (in Giga Bytes)	1000	9. Easier Accessibility of observed and modeling data to researchers on a single platform	9.1 Percentage of the data populated to be released to general public after extensive QC/QA (in %)	75

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
	10. Atmospheric Research Testbed (ART) in India	10.1 No: of instruments Commissioned in ART, Central India in the 1st phase of instrumentation to conduct monsoon observational campaign	10	10. Improving the understanding of Climate and Monsoon related processes over core monsoon zone and orographic regions	10.1 Data processing, quality control and preparation of first level of campaign data (in %)	60
					10.2 Number of publications in SCI journals	10
	11. Research and Development in weather modification	11.1 Establish a laboratory cloud chamber and convection setup infrastructure with measurement systems (in %)	30	11. Fundamental understanding of boundary layer dynamics, clouds, convection and rainfall processes in the tropical conditions	11.1 Number of Research collaborations	5
		11.2 Develop cloud and precipitation physics research collaboration with several universities.	5		11.2 Number of publications in SCI journals	15
	12. Expansion and strengthening Air Quality Early Warning System	12.1 Development of high resolution air quality forecasting system (2km) equipped with chemical data assimilation capabilities (in %)	100	12. Providing high resolution air quality forecasting services to non-attainment cities in India	12.1 Non-attainment cities to receive city-specific air quality forecasts which would help in effective management of local air quality. (no. of cities)	10

2. Deep Ocean Mission (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
600	1. Design and development of Manned submersible rated for 6000 metre water depth	1.1. Design and Procurement of components of manned submersible (in %)	100	1. Technology empowerment for Manned submersible system	1.1. Demonstration of Manned submersible (in %)	50
		1.2. Integration of personnel sphere, propulsion systems, sensor and controls (in %)	60			
		1.3. Completion of Harbour and Sea Trials (in %)	25			
	2. Development and testing of underwater Mining Machine for mining of the Deep sea minerals	2.1 Mining Machine (in %)	80	2. Experimental harnessing of Polymetallic nodules (in %)	2.1 Demonstration of Mining machine components in deep water (in %)	50
		2.2 Riser system with umbilical cable & hose (in %)	50			
		2.3 Sea trials of the integrated mining system (in %)	30			
	3. Development of ocean climate Advisory.	3.1 Development of climate advisories. (in %)	40	3. Improved understanding of the impact of ocean climate for the Indian coastal regions.	3.1. Climate change reports, publications for coastal region on impact of climate change (no. of reports/publications)	4
	4. Repository and DNA bank of deep-sea flora and fauna of Indian Sea Mounts	4.1 Number of Deep sea biodiversity surveys undertaken.	1	4. Conservation plan for deep sea Biodiversity within Indian EEZ	4.1 Taxonomic catalogues and reports	2

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2023-24			OUTCOMES 2023-24		
2023-24	**Output**	**Indicators**	**Targets 2023-24**	**Outcome**	**Indicators**	**Targets 2023-24**
		4.2 No. of deep-sea organisms collected	25	5. Online Reference facility for DNA based research	5.1 Access to the DNA resources by researchers (number of resources)	25
	5. Exploration of Hydrothermal Deposits	5.1 Exploration and Identification of plumes – Assessment and Survey (in %)	50	6. Understanding of hydrothermal distribution in the exploration area	6.1 Number of confirmed plumes (in %)	50
	6. Acquisition of new research vessel	6.1 Identification of shipyard, basic design, construction activities done/completed (in %)	50	7. Commissioning of ocean research Vessel	7.1 Construction of vessel (in %)	50
	7. Detailed design document for offshore OTEC powered desalination plant.	7.1 Design of closed & open cycle OTEC system plant components (in %).	50	8. Technology for offshore renewable energy	8.1 Design and experiments for energy and fresh water (in %)	50