

1. Ocean Services Technology Observation Resources Modelling & Sciences (O-STORMS) (CS) re-designated as Ocean Services, Modelling, Applications, Resources and Technology (OSMART)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20		
2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
483	1. Improved Safety at sea and in coastal areas	1.1.No. of buoys to be commissioned for Marine Observation along Indian Coast - Coastal buoys	4 buoys	1.a Coverage expansion and improvement of costal water monitoring 1.b Augmentation of data would help in better predication of ocean disasters 1.c Increased lead time for enabling timely response on emergency advisories	1.1.No of hotspots under coastal water quality monitoring system	4 locations
		1.2. Augmentation in the no. of observation systems as a part of the multi-hazard warning system- Moored Buoys	19 buoys		1.2. Improve the lead time of prediction of cyclones	72 hours
		1.3.No. of tsunami buoys -Operational	7 buoys		1.3. Improve issue of early warning of tsunamis & Time taken (Average/Highest/Lowest) to issue tsunami advisories	10 minutes
	2. Coastal states monitoring	2.1. Increase in the resolution of the real-time inundation model	2.50 km	2.a. Improve in coastal inundations 2.b. Issuance of weather and fishery advisories to support fishing	2.1. Increase in resolution of inundation models	2.5 km
		2.2. Number of locations for monitoring of coastal pollution	20		2.2. Assessment of health of the coastal waters of India	8 coastal states
		2.3.No of states where Coastal Erosion is	6 coastal		2.3. Assess the shoreline changes of the Indian Coast	7 coastal

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20			
	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
			being monitored	states	industry		states
		2.4. New system setup for species specific advisory services as well as potential fishing zone assessment services		2		2.4. No. Of registered mobile user of fisherman community	5 lakhs
		2.5. No. of fisheries advisories issued		300		2.5. Economic benefits generated from ocean advisory services	Rs.35,000 crore
	3. Exploration of Marine resources (a) Underwater living resources - Marine Species (b) Underwater Non-living resources - e.g minerals	3.1. Area covered under bathymetric data acquisition in exclusive economic zone of India (sq. km.)		1.00 lakh sq.km.	3.a. Assess the impacts of anthropogenic effects 3.b. Exploration of polymetallic nodules and sulfides	3.1. % of total west coast of India covered	90%
		3.2. Conducting biogeochemistry studies on the west coast of India		3			
		3.3. % of 2.2 million Sq. km. of Exclusive Economic Zone explored		68%			3.2. Continuation of contract with International Seabed Authority (Yes/No)
	4. Replacement of Ocean Research Vessels	4.1. % ocean research vessels outlived their designed life/needs replacement (2/5)		40%	4. Research on ocean science and technology	4.1. No. of publications in peer reviewed journals	20
	5. Commissioning of OTEC powered Desalination plants	5.1. Selection of site of the OTEC powered Desalination plants (Yes/No)		Yes	5. Setting up of OTEC plant in Lakshadweep	5.1. No. of OTEC plants set up	*

*Targets for this indicator are not amenable

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

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20			
	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
413	1.	Setting up of District Agro meteorological Field Units	1.1.Number of District Agro meteorological Field Units (DAMU) established.	390	1. Issuance of Weather, Climate and Agro meteorological advisories.	1.1.Number of farmers who receive the Agro-meteorological advisories	5 crore farmers
	2.	Augmentation of the Observation System Network	2.1 Installation and commissioning of Radars and Aviation Weather Observing System(AWOS)and Automatic Weather Stations (AWS) at DAMU and in 400 cities	Radars (X-Band) - 10 Radars(C-Band)-11 AWOS - 10 HAWOS - 5 Agro AWS-200 AWS-400	2. State-of-the Art support system for Aviation safety with the AWOS and advanced Forecasting tools at the civil airports in the country. Better forecasting capability for NW Himalayan region by commissioning of X-Band DWRs and Increase in Nowcasting Capabilities by Installation of C Band Radars	2.1.Frequency of issuance of weather advisories	Every 3hrs
						2.2. Increase in Number of Nowcast Stations	600
3.	Climate Services	3.1.Establishment of state-of-the-art climate data centre with integrated advanced climate data services portal for rendering national and regional climate	Yes	3. Improved Climate Services	3.1. Development State-of-art systems for all data management and Climate services on sectoral applications (Disaster, Water, Health, etc.,)(Yes/No)	Yes	

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	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
			services(Yes/No)				
	4. Enhancement of Global Ensemble Weather Forecasting System	4.1. Increase in the resolution of Global Ensemble Prediction System for the generation of Probabilistic Forecasts	12km	4. Global Ensemble Prediction System with an increased horizontal resolution	4.1. Generation of Probabilistic forecasts at an improved resolution of Ensemble Prediction System (EPS) with a better representation of the atmosphere and topography Generation of new forecast products for the renewable energy sector.(Yes/No)	Yes	
		4.2. Development of new applications	1				
	5. Development of Earth System model	5.1. No. of Coordinated Climate model experiments under Coupled Model Intercomparison Project (CMIP) of the World Climate Research Programme (WCRP)	1500	5. CMIP model simulations are assessed as part of the IPCC Climate Assessment Reports and various national assessments	5.1. Completion of the CMIP (Coupled Model Intercomparison Project) -DECK (Diagnosis, Evaluation, and Characterization of Klima) simulations Nearly 1500 years of climate model integration (IITM ESM and high-	Yes	

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	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
						resolution atmospheric version of IITM-ESM) by the end of March 2020(Yes/No)	
	6. Procurement of High Performance Computing system – V3.0	6.1. Preparation of Strategic Document for HPC upgradation. (Yes/No)	Yes	6. Augmentation of the existing High Performance Computing system	6.1. Preparation of the Detailed Project Report. (Yes/No)	Yes	
		6.2. Installation and commissioning of the High Performance Computing System V3.0(Yes/No)	No		6.2. Increase in the capacity of the HPC system.(Yes/No)	No	
	7. Establishment of National Facility for Airborne Research (NFAR)	7.1. Publishing the RFP for the procurement of Instrumented Aircraft System (IAS) (Yes/No)	Yes	7. IAS RFP Evaluation and Hangar construction	7.1. Completion of the technical and financial evaluation of the RFP and finalisation of the supplier of IAS (Yes/No)	Yes	
		7.2. Identification of hangar land at Aurangabad airport (Yes/No)	Yes		7.2. Acquisition of hangar land at Aurangabad airport from Airport Authority of India (AAI) (Yes/No)	No	

3. Polar Sciences Cryosphere (PACER) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20	OUTCOME 2019-20

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	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators
120	1. Scientific Expeditions	1.1. 13th Scientific expedition to the Arctic launched	1	1. Improved contribution of India to international polar research arena	1.1. No. of scientific research publications, papers published, international conferences representations, etc. with the findings from the cryospheric, atmospheric and geosciences domain related projects	50
		1.2. 39th scientific expedition to the Antarctic launched	1		1.2. No of parameters recorded during 39th expedition	20
		1.3. No. of scientific expeditions to Himalayas	1		1.3 No of Publications related to Indian Monsoons	1
	2. Initiation of scientific projects in cryospheric, atmospheric and geosciences domain	2.1. Multi-disciplinary inter-institutional scientific expedition to Southern Ocean including the Tropical Indian Ocean (TCO launched	1		2. Improved understanding of glacier dynamics	1.4 % of high impact scientific research publications to the total no. of publications
		2.2. No. of scientific projects launched in polar region	70	2.1. No of glaciers monitored in Himalayas		5
	3. Acquisition of Polar research vessels	3.1. Polar Research vessel - % of work in building PRV	10%	3. Enhance scientific capability to conduct polar research	3.1. No. of days where annual expeditions were interrupted	*

**Targets for this indicator are not amenable*

4. Seismological & Geosciences (SAGE) (CS)

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20		
	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators
115	1. Capacity augmentation for seismological observations	1.1.No. of seismological observatories commissioned in the country	115	1. Improvement in the earthquake detection capabilities with increased accuracy in earthquake parameters	1.1. Minimum detection threshold magnitude of earthquake within country	3.0
		1.2.No. of seismological observatories to be commissioned in the Garhwal-Kumaon Himalaya for delineation of deep crustal structures and seismic coupling maps	*			
		1.3.Setting up of a national facility for geochronology i.e creation of required infrastructure to set up the Lab and procure ancillary equipment in % terms	40 %	2. Increased research base in seismological studies"	2.1.No. of papers/ publication/findings	35
			2.2. % of High impact publications		10%	
	2. Setting up of borehole observatory in Koyna region	2.1.Processing, analysis and interpretation of geophysical data acquired from the pilot borehole drilled up to 3 km depth. Analysis and interpretation of geophysical datasets to identify active fault zone(s)	60%		2.3. Average Time lag in reporting earthquake occurring within country	5 min

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20			
	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20
			in % terms				
		2.2. Processing, analysis and interpretation of geophysical data acquired from the pilot borehole drilled up to 3 km depth: % of Geo-Chemistry data acquisition.	60%		2.4. No. of registered users of SMS services app	500	
		2.3. Processing, analysis and interpretation of geophysical data acquired from the pilot borehole drilled up to 3 km depth : % of Petrogra-phy Micro-structure of basement rock	70%		2.5. No. of registered users of mobile app services	5000	
		2.4. Seismological studies in Koyna region	80%		2.6. Minimum number of stations recording the minimum threshold magnitude event within country	5	
		2.5. Planning of main borehole (Yes/No) (Depending upon the site clearance)	Yes				

**Targets for this indicator are not amenable*

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

FINANCIAL OUTLAY (Rs in Cr)	OUTPUTS 2019-20			OUTCOME 2019-20			
	2019-20	Output	Indicators	Targets 2019-20	Outcome	Indicators	Targets 2019-20

90	1. Extramural funding	1.1. Number of proposals funded for undertaking R&D activities in various academic and research institutes of the country	50	1. Nurturing the R&D activities in Earth Sciences being undertaken in the various academic and research institutes of the country	1.1. No. of publications based on research conducted through extramural funding	50
	2. Outreach and awareness	2.1 Towards reaching out to the general public on the various services rendered by the ministry over 50 conferences/seminars/and symposium will be organized.	50	2. Providing support to seminars, conferences, workshops, field programmes training activities etc. in the area of Earth System Science to provide platform to scientists, engineers, technologists, experts, social scientists and user communities for exchanging information and knowledge; and participation/support in exhibitions for awareness of MoES achievements/ services of importance.	2.1. No. of people trained in short-term training programmes	30
	3. Establishment of BIMSTEC centre at Noida and UNESCO Category-2 centre of ITCOcean at Hyderabad	3.1. No. of courses launched in operational oceanography in collaboration with academic institutes/universities internationally	8		2.2. No. of people trained in long-term training programmes	10