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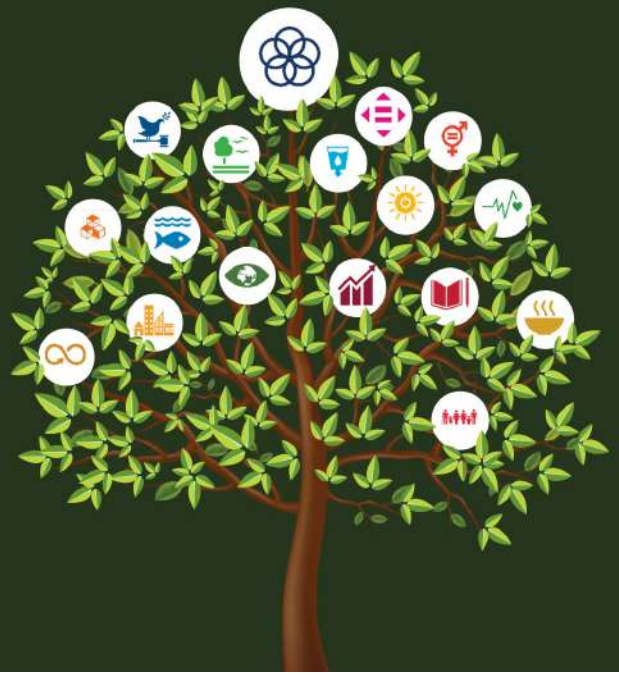

EnviStats India 2021 (Vol. II – Environment Accounts)

Azadi Ka Amrit Mahotsav

सत्यमेव जयते

Government of India
Ministry of Statistics and Programme Implementation

EnviStats India 2021
Vol. II : Environment Accounts

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Acronyms and Abbreviations

A	**AGB**	Above Ground Biomass
	APY	Area, Production and Yield
B	**BCM**	Billion Cubic Meters
	BGB	Below Ground Biomass
	bgl	Below Ground Level
C	**CACP**	Commission for Agricultural Costs and Prices
	CCA	Culturable Command Area
	CCS	Cost of Cultivation Studies
	CFS	Cubic Feet per Second
	CGWB	Central Ground Water Board
	CIFOR	Center for International Forestry Research
	CMR	Coal Mines Regulation
	COMAPS	Coastal Ocean Monitoring and Prediction System
	CPCB	Central Pollution Control Board
	Cu. m	Cubic Meter
	cumecs	Cubic Meter per Second
	CWC	Central Water Commission
D	**DES**	Directorate of Economics and Statistics
	DIN	Dissolved Inorganic Nitrogen
	DIP	Dissolved Inorganic Phosphorus
	DOD	Department of Ocean Development
	DOS	Department of Space
E	**EARAS**	Establishment of an Agency for Reporting of Agricultural Statistics
	EEA	Experimental Ecosystem Accounts
F	**FAO**	Food and Agriculture Organization
	FSI	Forest Survey of India
G	**GOI**	Government of India
	GPG	Good Practice Guidance
H	**Ha**	Hectare
I	**IMG**	Inter-Ministerial Group
	IPC	Irrigation Potential Created
	IPCC	Intergovernmental Panel on Climate Change
	IPU	Irrigation Potential Utilized
	IUSS	International Union of Soil Science
K	**km**	Kilometre
L	**LC**	Land Cover
	LU	Land Use
	LULC	Land Use and Land Cover
	LULCF	Land Use, Land-Use Change, and Forestry
M	**M. ha.**	Million Hectare

	MI	Micro Irrigation
	mm	Millimetre
	MoEF&CC	Ministry of Environment, Forest and Climate Change
	MoES	Ministry of Earth Sciences
	MSPs	Minimum Support Prices
N	**N.I**	Nutrient index
	NBS	Nutrient-based Subsidy
	NCCR	National Centre for Coastal Research
	NCIWRD	National Commission on Integrated Water Resources Development
	NPV	Net Present Value
	NRC	Natural Resources Census
	NRR	Natural Resources Repository
	NRSA	National Remote Sensing Agency
	NRSC	National Remote Sensing Centre
	NSO	National Statistical Office
	NSS	National Sample Surveys
O	**OW**	Observation Well
P	**PACS**	Primary Agricultural Credit Society
	PM-AASHA	Pradhan Mantri Annadata Aay Sanrakshan Abhiyan
R	**RR**	Resource Rent
S	**SHCs**	Soil Health Cards
	SRU	Standard River Units
	STL	Soil Testing Labs
U	**UNWTO**	UN World Tourism Organization
	UNWWAP	United Nations World Water Assessment Programme
	UPR	Usual Place of Residence

GLOSSARY

A

Abstraction

Amount (of water) that is removed (from any source), either permanently or temporarily, in a given period of time.

Annual Replenishable Ground Water Resource

Quantity of ground water recharged during monsoon and non-monsoon seasons.

B

Biochemical Oxygen Demand (BOD)

Biochemical oxygen demand (BOD, also called biological oxygen demand) is the amount of dissolved oxygen needed (i.e. demanded) by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period. The BOD value is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C and is often used as a surrogate of the degree of organic pollution of water.

Biodiversity

Variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems. It is also a measure of ecosystem health.

Boron

Boron, a chemical element, may occur in natural waters through weathering of rocks, soil leaching, or find its way into a watercourse through industrial waste effluents. Many cleaning compounds contain boron. Concentrations in unpolluted waters do not exceed 0.1 mg/L

C

Coliform

Group of bacteria (most common being the Escherichia coli or E. coli which can grow at elevated temperatures) found in the intestinal tract (therefore in the faeces) of humans and other animals. These rod-shaped microorganisms aid in digestion and are largely harmless. If ingested through contaminated food or water, however, they may cause bacterial or viral gastroenteritis, Hepatitis A, typhoid fever and associated

problems. Total coliform includes Faecal Coliform bacteria as well as other types of Coliform bacteria that are naturally found in the soil.

Cost accounting method

A method of noting and analysing all the costs involved in performing any process, project or in the production of a specific product.

Crop-Cutting Experiments

Crop Cutting Experiments or CCE, refer to an assessment method employed by governments and agricultural bodies to accurately estimate the yield of a crop or region during a given cultivation cycle.

Cropping intensity

It is the ratio of Net Area Sown to the Total Cropped Area or Gross Area Sown.

Crops

Plants or agricultural produce grown for food or other economic purposes, such as for textiles or livestock fodder.

D

Discharge

Quantity of water flowing across a section of a channel in a unit time is called the discharge. Common units are cubic feet per second (cfs), second-day feet (sdf), and cubic meter per second (cumecs). Two types of discharges are often measured and recorded: (i) instantaneous discharge - the discharge at a particular instant of time; and (ii) mean discharge- the arithmetic mean of individual discharges during a period of time.

DO or Dissolved Oxygen

Amount of oxygen dissolved (and hence available to sustain marine life) in a body of water such as a lake, river, or stream. DO is the most important indicator of the health of a water body and its capacity to support a balanced aquatic ecosystem of plants and animals. Wastewater containing organic (oxygen consuming) pollutants depletes the dissolved oxygen and may lead to the death of aquatic/marine organisms.

E

Ecosystem

A dynamic complex of plant, animal and microorganism communities and their non−living environment interacting as a functional unit.

Ecosystem accounting

Ecosystem accounting is a coherent framework for integrating measures of ecosystems and the flows of services from them with measures of economic and other human activity. Ecosystem accounting complements, and builds on, the accounting for environmental assets as described in the System of Environmental-Economic Accounting (SEEA) Central Framework (e.g. water resources, soil resources). In ecosystem accounting as described in the SEEA Ecosystem Accounting (SEEA EA), the accounting approach recognises that these individual resources function in combination within a broader system and within a given spatial area.

Ecosystem assets

Ecosystem assets are contiguous spaces of a specific ecosystem type characterized by a distinct set of biotic and abiotic components and their interactions. Examples of ecosystem assets include forests, wetlands, agricultural areas, rivers and coral reefs.

Ecosystem condition

Overall quality of an ecosystem asset in terms of its characteristics. Measures of ecosystem condition are generally combined with measures of ecosystem extent to provide an overall measure of the state of an ecosystem asset.

Ecosystem condition account

This account organizes biophysical information on the condition of different ecosystem types. The ecosystem condition account organizes data on selected ecosystem characteristics and the distance to a reference condition to provide insight into the ecological integrity of ecosystems.

Ecosystem extent

The size of an ecosystem asset, commonly in terms of spatial area.

Ecosystem extent account

This account serves as a common starting point for ecosystem accounting. It organizes information on the extent of different ecosystem types (e.g. forests, wetlands, agricultural areas, marine areas) within a country in terms of area.

Ecosystem services

Benefits supplied by the functions of ecosystems and received by humanity.

Ecosystem services flow account (physical and monetary terms)

This set of ecosystem accounts measures the supply of ecosystem services and the use of those services by economic units, including households, enterprises and government.

Electrical Conductance (Conductivity)

Electrical Conductance (Conductivity) of water is its ability to conduct an electric current. Salts or other chemicals that dissolve in water can break down into positively and negatively charged ions. These free ions in the water conduct electricity, so the water electrical conductivity depends on the concentration of ions. Salinity and total dissolved solids (TDS) are used to calculate the EC of water, which helps to indicate the water's purity. The purer the water the lower the conductivity.

Endangered species

Species in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic species

In ecology, an endemic species refers to a species that is native to where it is found.

Environmental-Economic Accounting

Environmental-economic accounts are integrated statistics that illuminate the relationship between the environment and the economy, both the impacts of the economy on the environment and the contribution of the environment to the economy. Environmental-economic accounts can provide information about the extraction of natural resources, their use within the economy, natural resource stock levels, the changes in those stocks during a specific period and economic activity related to the environment. Environmental-economic accounts present this information in physical and monetary terms, as appropriate.

Extinct species

Species that are no longer known to exist in the wild after repeated searches of the type in localities and other known or likely places.

F

Fauna

The animal life of a particular region or time.

Flora

The plant life of a particular region or time.

Fluorides

Fluorides appear in unpolluted natural water as the result of the interaction of the water with fluorine containing minerals. Natural surface water contains fluorides in amounts which usually do not exceed 1 mg/L. Fluorides may also be contributed to surface waters through industrial wastes, such as, from glass industry and some ore enriching plants.

G

Geographic Coordinate System (GCS)

A geographic coordinate system uses a three-dimensional spherical surface to define locations on earth. Any location on Earth can be referenced by a point with longitude and latitude coordinates.

Geographic Information System (GIS)

An integrating technology that helps to capture, manage, analyse, visualize and model a wide range of data with a spatial or locational component.

Gross area sown

This represents the total area sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowings in a year. This total area is also known as total cropped area or total area sown.

Groundwater

Water that collects in porous layers of underground formations is known as aquifers. Groundwater is the water within the earth that supplies wells and springs.

Groundwater recharge

The amount of water added from outside to the zone of saturation of an aquifer during a given period of time. Recharge of an aquifer is the sum of natural and artificial recharge.

I

Irrigated area

Area irrigated for cultivation through such sources as canals, tanks, tube-wells, other wells and other sources.

Irrigation

Process of purposely providing land with water other than rain water by artificial means.

Irrigation water

Water artificially applied to land for agricultural purposes.

IUCN Red List (of Threatened Species)

The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world.

L

Land cover

Land cover refers to the observed physical and biological cover of the Earth's surface and includes natural vegetation and abiotic (non-living) surfaces.

Land-use

Land-use reflects both (a) the activities undertaken and (b) the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions

M

Mangrove

The mangrove swamp is an association of halophytic trees, shrubs, and other plants growing in brackish to saline tidal waters of tropical and sub-tropical coastlines.

Minimum Support Price (MSP)

Minimum support price (MSP) is a "minimum price" for any crop that the government considers as remunerative for farmers and hence deserving of "support". It is also the price that government agencies pay whenever they procure the particular crop.

N

Natural capital

Natural capital is another term for the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people.

Net Annual Groundwater Availability (Resources)

Net annual ground water availability is the available resource after deducting the natural discharges from the Annual Replenishable Ground Water Resource.

Net area sown

This represents the total area sown with crops and orchards. Area sown more than once in the same year is counted only once.

O

Observation well

A well, constructed in a specific location, for the purpose of observing(measuring) changes in water level. An existing well perhaps drilled for a different purpose may also be used to observe water level changes. Observation wells are typically used for short duration data collection such as before, during and after an aquifer test. Wells that are used to collect data on a long-term basis are usually referred to as monitoring wells.

P

Percentile

A measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall.

pH

A quantitative measure of the acidity or basicity of aqueous or other liquid solutions, it is derived as the logarithm to the base 10 of the reciprocal of Hydrogen ion concentration. Ordinarily ranges between 0 and 14. In pure water, which is neutral (neither acidic nor alkaline), the pH value will be 7. A solution with a pH less than 7 is considered acidic; a solution with a pH greater than 7 is considered basic, or alkaline.

Precipitation

The total volume of atmospheric wet precipitation, such as rain, snow and hail, on a territory in a given period of time.

Protected areas

Geographical spaces, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

Q

Quintile

A quintile is one of five values that divide a range of data into five equal parts, each being 1/5th (20 %) of the range.

R

Recharge

The downward movement (percolation) of rain, snowmelt or surface water through the soil, weathered material and rock layers to replenish the ground water/aquifer stores. Concentrated zones of ground water recharge may occur through stream beds.

River

Rivers are natural course of water flowing on the land surface along a definite channel/slope regularly or intermittently towards a sea in most cases or in to a lake or an inland basin in desert areas or a marsh or another river.

River basin

The drainage area of a river and its tributaries and also the basic hydrological unit for water resources planning and management.

S

Sodium Adsorption Ratio (SAR)

SAR is a measure of the amount of Sodium (Na+) relative to Calcium (Ca2+) and Magnesium (Mg2+) in the water extracted from a saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soil carbon

A major component of the terrestrial biosphere pool in the carbon cycle. The amount of carbon in the soil is a function of the historical vegetative cover and productivity, which, in turn, is dependent in part upon climatic variables.

Soil erosion

Displacement of the upper layer of soil, caused by the dynamic activity of erosive agents, that is, water, ice (glaciers), snow, air (wind), plants, animals, and humans.

Species

Group of individual specimens having close resemblance but differing from others and belonging to the same genus.

Surface water

Comprises all water that flows over or is stored on the ground's surface, regardless of its salinity levels. Surface water includes water in artificial reservoirs, lakes, rivers and streams, snow, ice and glaciers.

System of Environmental-Economic Accounting (SEEA)

The System of Environmental Economic Accounting (SEEA) is the accepted international standard for environmental-economic accounting, providing a framework for organizing and presenting statistics on the environment and its relationship with the economy. It brings together economic and environmental information in an internationally agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics. The SEEA is produced and released under the auspices of the United Nations, the European Commission, the Food and Agriculture Organization of the United Nations, the Organisation for Economic Co-operation and Development, International Monetary Fund and the World Bank Group.

T

Thematic accounts

These accounts organise data on themes of specific policy relevance. Examples of relevant themes include biodiversity, climate change, oceans and urban areas.

Threatened species

Any species which is vulnerable, endangered or critically endangered.

Total Coliform

Total coliform counts give a general indication of the sanitary condition of a water supply. Total coliforms include bacteria that are found in the soil, in water that has been influenced by surface water, and in human or animal waste.

Total Dissolved Solids

Total dissolved solids (TDS) is the term used to describe the inorganic salts and small amounts of organic matter present in solution in water. The principal constituents are usually calcium, magnesium, sodium, and potassium cations and carbonate, hydrocarbon, chloride, sulphate, and nitrate anions.

Total Hardness (as $CaCO_3$)

Hardness is most commonly expressed as milligrams of calcium carbonate ($CaCO_3$) equivalent per litre. Water containing calcium carbonate at concentrations below 60 mg/l is generally considered as soft; 60–120 mg/l, moderately hard; 120–180 mg/l, hard; and more than 180 mg/l, very hard

V

Vulnerable

Species believed likely to move into the endangered category in the near future if the causal factors continue operating. Included are species of which most or all the populations are decreasing because of overexploitation, extensive destruction of habitat or other environmental disturbance; species with populations that have been seriously depleted and whose ultimate security is not yet assured; and species with populations that are still abundant but are under threat from serious adverse factors throughout their range.

W

Water abstraction

The amount of water that is removed from any source, either permanently or temporarily, in a given period of time by economic activities and households.

Water body

A mass of water distinct from other masses of water. This category comprises areas with surface water in the form of ponds, lakes, tanks and reservoirs.

Water resources

Consist of freshwater and brackish water, regardless of their quality, in inland water bodies, including surface water, groundwater and soil water.

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Chapter 1

Introduction

1. The services rendered by nature, despite having an immense value in the lives of humanity, often go unnoticed in the economy. However, it is now well-recognized that environmental assets must be maintained and managed for sustaining growth and development, with their contribution in the form of environmental goods and services duly measured and considered in decision making. The 'System of Environmental-Economic Accounting (SEEA[1])' provides a common framework for organising and presenting statistics on the environment and its relationship with the economy. The SEEA helps place statistics on environmental assets, goods and services into an accounting framework, thereby increasing their usefulness for policy, enabling international comparability, replication over time and coherence with existing national accounts.

2. The National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI) is mandated with "Development of Environment Statistics; and Development of methodology, concepts and preparation of National Resource Accounts for India"[2]. The Ministry constituted an Expert Group in 2011 under the chairmanship of Prof. Sir Partha Dasgupta, Frank Ramsey Professor Emeritus of Economics, University of Cambridge, U.K for advising on an implementation plan for compiling "Green National Accounts in India[3]". Several deliberations with numerous data sources followed the acceptance of the recommendations of the Expert Group by the Government of India. The Expert Group had recommended compilation of the accounts following the SEEA Framework in a phased manner, i.e. starting with the asset accounts followed by the physical and the monetary flows. The first layers of these accounts were released in the year 2018, in the publication, EnviStats India 2018 – Supplement on Environment Accounts, detailing the physical asset accounts of land cover, minerals, water and forests, at the state and national levels.

3. Since then, the Ministry has continuously strived to enhance the scope of coverage of environmental accounts, including those of ecosystem extent and condition accounts. Further, to translate the physical values using an economic yardstick, the Ministry evaluated some ecosystem services – such as Crop Provisioning Services, Timber and Non-Timber Forest Products Provisioning Services,

[1] https://seea.un.org/
[2] https://cabsec.gov.in/allocationofbusinessrules/completeaobrules/
[3] https://seea.un.org/content/green-national-accounts-india-framework

Carbon Retention Services provided by Forests and Nature-Based Tourism services. These accounts, along with the Extent and the Condition accounts, present a systematic glimpse of the State of Environment in India in respect of various environmental assets and ecosystems. The following accounts have been released by NSO, India, in the last three publications:

Type of account	Topics covered
Ecosystem extent	Change matrix of Land Use – Land Cover (LULC) from 2005-06 to 2011-12 and 2011-12 to 2015-16; and the corresponding Asset Accounts. Land Degradation Account, 2005-06 and 2015-16 Wetland Extent Account, 2006-07 Asset accounts for Minerals and Forests
Ecosystem condition	Soil nutrient indices; Water quality accounts Forest condition account; Cropland condition account
Ecosystem services	Crop provisioning services (monetary) Timber and Non-Timber Forest Products (NTFP) provisioning services (monetary) Carbon retention services provided by forests (physical and monetary) Nature-based tourism (monetary) Soil erosion prevention services provided by croplands (physical)
Thematic Accounts	Biodiversity - Extent of protected areas; State-wise floral and faunal species accounts; Species Richness of IUCN Red List species
Individual environmental asset accounts (SEEA CF)	Forests – Growing Stocks of Timber and Carbon Water Mineral

4. The current publication, which is fourth in the series, covers Crop Provisioning Services, Water Quality Accounts, Soil Nutrient Indices and Species Richness of IUCN Red List species.

5. 'Crop Provisioning Services' refer to the contribution of the cropland ecosystem to crop production and provide an assessment of the total and combined result of processes taking place in cropland that support crop production. In the NSO 2019 publication on environment accounts[4], district-wise estimates of 'crop provisioning services' had been compiled for three years 2005-06, 2011-12 and 2014-15. In Chapter 2 on 'Crop Provisioning Services' of the current publication, annual estimates have been presented for the districts of India for the years 2005-06 to 2017-18.

[4] EnviStats India 2019, Vol. II Environment Accounts

6. Condition accounts are used to synthesize information about changes over time in the state of environmental assets and ecosystems. In the current publication, two types of descriptions of the condition have been presented. While for water, condition of surface and groundwater resources of selected regions of the country have been assessed using 'Water Quality Accounts', 'Soil Nutrient Indices' have been used to provide an analysis of the soil fertility across the country.

7. In Chapter 3, soil nutrient indices, as compiled using the information collected for preparing Soil Health Cards, have been presented for three periods – 2015-17, 2017-19 and 2019-20. Earlier in 2019[4], the analysis of soil nutrient indices for the periods 2015-17 and 2017-19 had been presented.

8. Another topic covered in the 2019 publication was water quality. Accounts were presented for river water quality for the Godavari River Basin for 2015-16 and groundwater quality for 2015 for the States of Punjab and Haryana. Extending the coverage, in Chapter 4 of the current publication, the river water quality accounts for four Divisions – Godavari, Tapi, Mahi, and Krishna have been presented for the years 2015-16 to 2018-19, and groundwater accounts have been presented for the States of Maharashtra, Rajasthan and Kerala – for the years 2016-17 to 2018-19. Groundwater accounts have also been presented for the State of Odisha for the year 2018-19.

9. The recently released Dasgupta report titled 'The Economics of Biodiversity[5]' highlights that our economies are embedded within nature and are not external to it. Biodiversity enables nature to be more productive, resilient and adaptable. The fifth chapter of this publication presents Species Richness of Red List species, by taxonomic groups, as compiled using Spatial Datasets sourced from the International Union for Conservation of Nature (IUCN). The publication, EnviStats India 2020, Vol. II Environment Accounts included the analysis of the IUCN Spatial Datasets of Red List species for three categories – Mammals, Amphibians and Reptiles. The IUCN Spatial Dataset is generally updated thrice a year. In the 2020 publication, results of state-wise assessment using 2020 Version 2 were presented. The current publication presents the analysis of the Spatial Dataset for the two subsequent versions - 2020 Version 3 and 2021 Version 1 – and for three more categories – Plants, Mangroves and Freshwater group (consisting of both flora and fauna present in freshwater).

10. NSO India has been making several efforts to improve the coverage of environmental accounts in terms of time, domains and geographic coverage. However, it is expected that the understanding of the data sources and methods used to compile accounts will evolve over time as a result of engagement with the data sources and the users, especially the policymakers. Consequently, as with all statistical

[5]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf

products, the accounts presented so far may need to be revised and refined to depict better the connection between environment and economic and human activity.

11. The publication "EnviStats-India" intends to nudge the users in the direction of mainstreaming environmental information in decision making for a "better environment, better tomorrow".

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Chapter 2

Crop Provisioning Services

Introduction

1. Agriculture and allied sectors play a vital role in India, contributing 17.8% of the country's Gross Value Added[6] for the year 2019-20 (at current prices) and engaging 54.6 % of the total workforce. The Agriculture Sector occupies the centre stage in the Indian economy embodying three thrust areas as (i) to promote inclusive growth, (ii) to enhance rural income, and (3) to sustain food security.

2. India is a global agricultural powerhouse. It is the world's largest producer of milk, pulses, and spices and the second-largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep & goat meat, fruits, vegetables and tea.

3. To meet the nutritional requirements of the 1.3 billion Indian population, India has 139.4 million hectares of net area sown and 200.2 million hectares of gross area sown with a cropping intensity of 143.6%. The net area sown works out to be 42.4% of the total geographical area. The net irrigated area is 68.6 million hectares.

4. Realizing the pivotal role of agriculture in India, the Government of India has prioritised strengthening agriculture by promoting irrigation practices, crop insurance, and adoption of improved varieties of crops. The Rashtriya Krishi Vikas Yojana, the National Mission for Sustainable Agriculture, National Watershed Development Project for rainfed agriculture and many other national schemes[7] on horticulture, agricultural technology and livestock are leading the way in improving India's agriculture.

Cropland Ecosystem Services

5. The Cropland Ecosystem Services represent a range of services contributed by the cropland ecosystems to the benefits that are used in the economy and other human activity. The benefits provided by the Cropland Ecosystem are multiple and can be segregated into three broad categories as per the System of Environment Economic Accounting (SEEA-EA[8]) framework.

Provisioning Services: Those services which represent the material contribution to benefits supplied by ecosystems. These include food, fibre and pharmaceuticals.

[6] https://agricoop.nic.in/sites/default/files/Web%20copy%20of%20AR%20%28Eng%29.pdf
[7] https://agricoop.nic.in/en/programmes-schemes-listing
[8] https://unstats.un.org/unsd/statcom/52nd-session/documents/BG-3f-SEEA-EA_Final_draft-E.pdf

Regulating and maintenance Services: Those services which result from the ecosystems' ability to regulate and maintain climate, hydrological and biochemical cycles, and various biological processes in ranges that benefit individuals and society. These benefits include soil quality regulation services and pollination services.

Cultural Services: Those non-material services related to perceived or realized qualities of ecosystem assets whose existence and functioning contributes to a range of cultural benefits derived by individuals. These include education, scientific and research services, as well as spiritual symbolic and artistic services.

6. The actual tangible outputs fall within the boundaries of the System of National Accounts (SNA) and include food, forage, fibres, bioenergy and pharmaceuticals. On the other hand, the System of Environmental-Economic Accounting (SEEA) also includes the measurement of environmental assets and ecosystems, thus aiming to extend the production boundary and consequently the measurement of output.

Crop Provisioning Services

7. Crop Provisioning Services are the services provided by the croplands for generation of the food and non-food crops. SEEA emphasizes the monetary measurement of the ecosystem services to reflect the contributions of the ecosystem assets to the benefits used in the economic and other human activity. The valuation also attracts the attention of policymakers to shape effective policies and incentives for better management of ecosystems and natural resources. In SEEA, the 'Resource Rent Method' or 'Rental Price Method' have been prescribed for the valuation of the crop provisioning services.

8. The 'Resource Rent Method' prescribes estimating a value for an ecosystem service by taking the gross value of the final marketed good to which the ecosystem service provides input and then deducting the cost of all other inputs, including labour, produced assets and intermediate inputs. Another method is the 'Rental Price Method', where the value of the ecosystem service is equated to the payment made on account of the use of land for the production of the crops. The beneficiary is the owner of the land, and the actual payments made to owners of land are used to estimate the entire rent in terms of the rental value of owned land or rent paid for leased-in land.

Data Sources for the Compilation of Crop Provisioning Services

9. The estimates of crop provisioning services provided by the croplands in India have been compiled using the following datasets of the Ministry of Agriculture and Farmers Welfare (MoAFW), Government of India, which collects and collates various types of data on different facets of agriculture:

Cost of Cultivation Studies

10. The Cost of Cultivation Studies are primarily intended for use by the Commission for Agricultural Costs and Prices (CACP) to decide on the Minimum Support Price (MSPs) for different crops. In addition, these data are used by different Ministries and research agencies. The Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India is being implemented since 1970-71, with the following objectives:

i. collection and compilation of field data on the cost of cultivation and cost of production in respect of principal crops; and
ii. generation of state-wise estimates of the cost of cultivation and production of various crops covered under the scheme.

11. The Directorate of Economics and Statistics (DES) of MoAFW gets this study conducted in 19 States through agricultural universities. Under the scheme, the field data on the cost of cultivation/production are collected, compiled and analysed. The study covers both cash and non-cash costs. The cash costs include the costs for which farmers spend money to acquire material inputs like seeds, fertilizer, chemicals or labour inputs like hired labour. On the other hand, non-cash costs are attributable to items of cost which do not require spending money. These may be items of cost like family labour, payments made in kind, homegrown seeds and manure, exchange labour, depreciation and interest on operating capital. The field data under the scheme are collected on the Cost Accounting Method. Daily debit/credit entries for the expenditure/income are made to assess the total cost incurred/benefit accrued by/ to each farmer covered under the scheme. The detailed questionnaire is filled up/updated on a monthly/annual basis after making enquiries from farm holdings distributed equally across different size classes. The data is available in the public domain at https://eands.dacnet.nic.in/Cost_of_Cultivation.htm.

Information on Area, Production and Yield

12. DES, MoAFW also deals with the implementation of a scheme for "Improvement of Agricultural Statistics". The Scheme has four components, namely (i) Timely Reporting Scheme, (ii) Improvement of Crop Statistics, (iii) Establishment of an Agency for Reporting of Agricultural Statistics (EARAS) and (iv) Crop

Estimation Survey on Fruits & Vegetables.

13. The primary objective of the Scheme is to collect and improve agricultural statistics of Principal Agricultural Crops and selected Horticultural Crops. These include the season-wise estimates of area and production of principal crops, with the break-up of the area under irrigated/unirrigated and traditional /high yielding varieties of crops. The scheme also has provision for supervision and monitoring to improve the quality of statistics through a sample check of area enumeration and crop-cutting experiments.

14. District-wise data on crop production statistics giving crop-wise Area, Production and Yield (hereafter referred to as APY statistics) is available at https://aps.dac.gov.in/APY/Public_Report1.aspx. The estimates of Area can be aggregated to compile the Gross Area Sown in the district.

Land Use Statistics

15. The DES, MoAFW, has been compiling data on the nine-fold classification of land-use, irrigated land (source-wise and crop-wise) and total area and production under crops at the State and district level. Referred to as Land Use Statistics (LUS), these are a comprehensive and systematic account of the natural endowment of land spanning over 328.7 million hectares of geographic space of the country. Crop area statistics is the major segment of LUS, giving the crop acreage of numerous crops, net area sown and cropping intensity. The data at the district level is available in the public domain at https://aps.dac.gov.in/LUS/Public/Reports.aspx.

Compilation of Values of Crop Provisioning Service

16. The steps for compilation of the Crop Provisioning Services are briefly described below.

Step-1

For all CCS Crops and States: Rent per hectare calculated as the sum of the Rental Value of Owned Land and the Rent Paid for Leased-in-Land.

For CCS Crops not covered in a CCS state: Rent is imputed from the rent of the crop in the nearest CCS neighbour. In case of non-availability, minimum rent prevailing in the State is considered.

For non-CCS crop in CCS-States: Minimum rent prevailing in the State as per CCS is considered.

For Non-CCS State: Rent for a crop is imputed from the nearest CCS neighbour.

Step- 2

Rent (in Rs.) in the State for a crop = Rent per hectare for the crop * {Area under the crop in the State from APY Statistics * Area_Adjustment_Factor(State)}

where Area_Adjustment_Factor=Net Area Sown/Gross Area Sown from the

LUS Statistics.

Step- 3

Rent (per tonne) in the State for a crop= Rent (in Rs.) in the State for a crop as derived in Step-2 above/ Production from APY Statistics of the crop in State.

Step-4

Rent (in Rs.) in the District for a crop=Rent (per tonne) in the State for a crop as derived in Step-3 above * Production from APY Statistics of the crop in the district.

Step-5

Value of Crop Provisioning Service for a district = Sum of Rent (in Rs.) in the District of all crops.

Step-6

Value of Crop Provisioning Service (per hectare) in the District = Sum of Rent (in Rs.) in the District of all crops/ {(Area from APY Statistics of the district) * (Area_Adjustment_Factor(District))}.

Here, in case of non-availability of {Area_Adjustment_Factor(District)} in LUS at the district level, the {Area_Adjustment_Factor(State)} has been considered.

17. The 'Sum of Rent (in Rs.) in the District of all crops' as derived in Step 5 represents the value of the Crop Provisioning Service for the district. In some newly formed districts, the production values were found to be 'Null', while the area under cultivation had been reported. In such cases, the area under cultivation, as reported for the newly formed district, has been included in the parent district for that particular year.

18. States/UTs with only limited cropland areas like Andaman & Nicobar Islands, Chandigarh, Delhi, Daman & Diu and Dadra & Nagar Haveli have not been included in the analysis.

Results

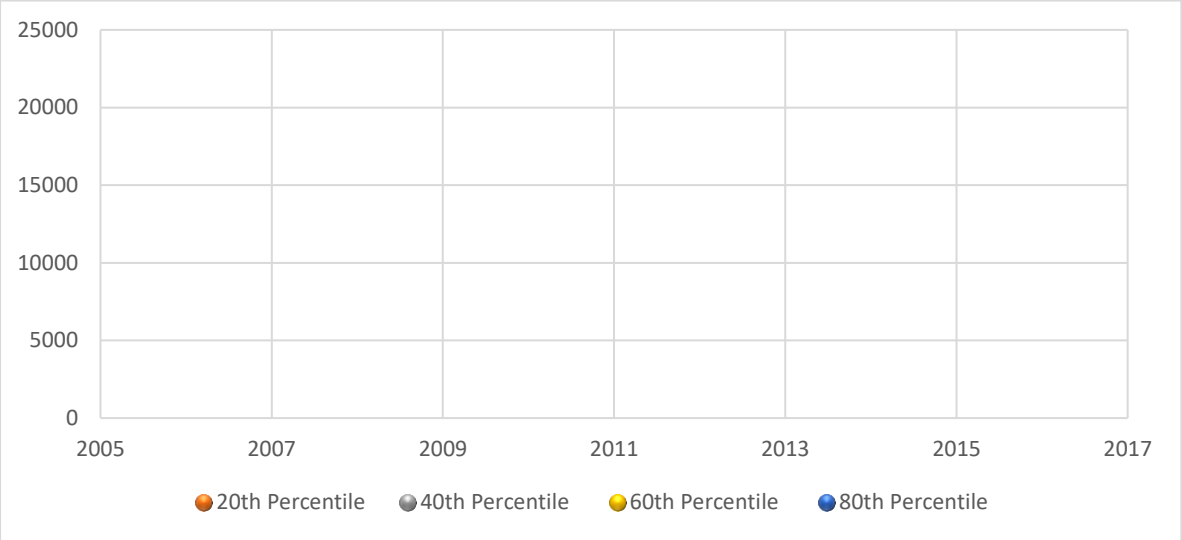
19. District-wise values of crop provisioning services have been computed for the years from 2005-06 to 2017-18 for districts covered in the APY across 29 States and one Union Territory, Puducherry. To assess the distribution of rental values across the different areas of the country and changes over time therein, quintile distributions of the Crop Provisioning Service per hectare of Net Area Sown across all districts of the selected States have been compiled. The cut-off points for the distribution of the Districts in respect of the Crop Provisioning Service have been provided in Table-2.1. These provide an indication of the variation in crop provisioning services over the years (Figure 2.1).

TABLE 2.1: Cut-off Points for Distribution of Districts in respect of Crop Provisioning Service

	(In Rs. Per Hectare of Net Area Sown)												
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
20th Percentile	2817	2924	3475	4219	4375	5321	5475	6416	6994	7606	7390	8598	8853
40th Percentile	3606	3848	4573	5537	5766	6652	7101	8383	9093	9722	9780	11108	11227
60th Percentile	4802	5176	6061	7196	7980	8755	9456	11276	11676	12140	12828	14259	14766
80th Percentile	6681	7384	7984	10438	10770	12206	13453	15075	16231	16452	18063	20558	20375
No of Districts	586	586	600	612	615	619	631	636	641	652	655	680	680

Source: Calculated using data received from Ministry of Agriculture & Farmers Welfare

FIGURE 2.1: Cut-off Points for Distribution of Districts in respect of the Crop Provisioning Service



20. An illustration of the quintile distribution of districts in 'Crop Provisioning Services' for the year 2017-18 is shown in Figure 2.2 at the end of this chapter. The variation across States in terms of the value of 'Crop Provisioning Services' is shown in Figure 2.3, where the proportion of districts in the State lying in the top two quintiles has been presented. Statements 2(a) to 2(m), given after Figures 2.2 and 2.3, provide

the distribution of districts for the years 2005-06 to 2017-18, in terms of the levels of Crop Provisioning Service. The district-wise estimates of Crop Provisioning Service per hectare of net area sown for the years 2005-06 to 2017-18 are given in Annexure 2.1.

Way forward

21. Croplands provide a plethora of services, and crop provisioning services is just a fragment of these services. To provide a holistic view, it is essential to include assessments of regulatory and maintenance services provided by the croplands, such as pollination services, pest control services and regulation of soil fertility. The valuation of these services will open avenues for a more granular policy framing to ensure improvement in the health of cropland ecosystems which in turn will help attain progress towards the achievement of the related SDGs.

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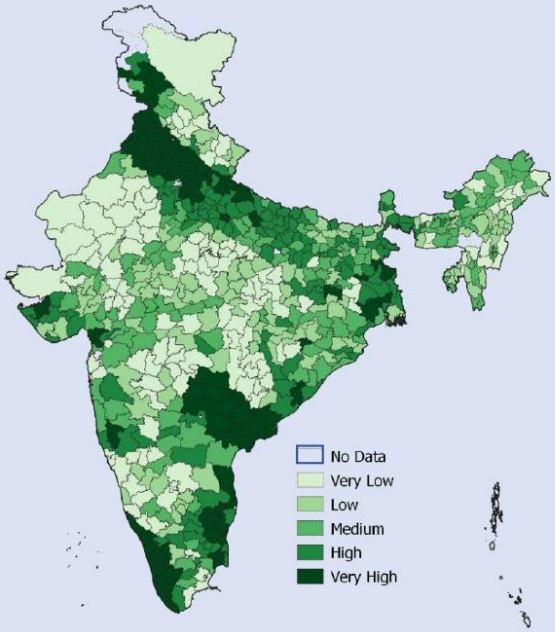
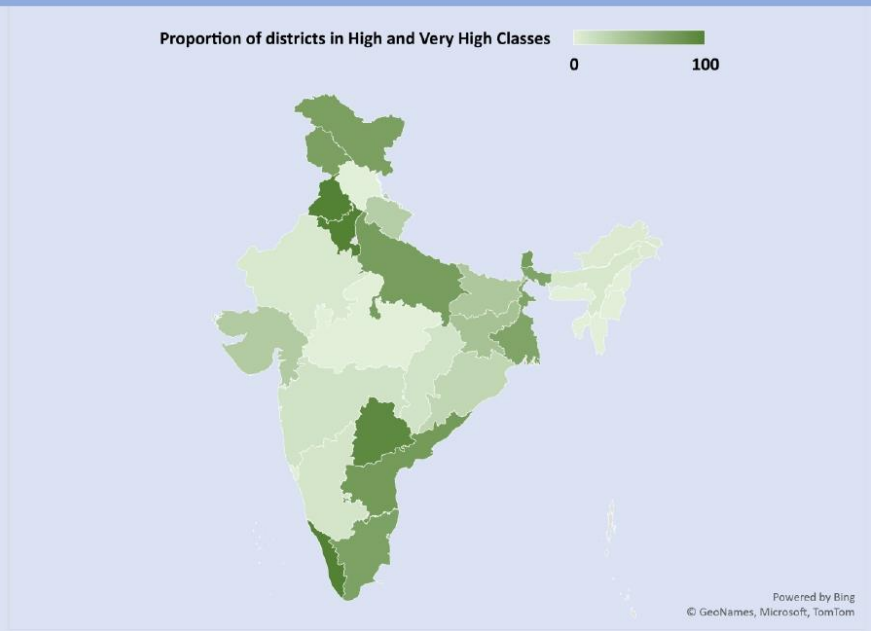
Crop Provisioning Service for the year 2017-18

FIGURE 2.2: District-wise variation in Crop Provisioning Service



Crop Provisioning Service for the year 2017-18

FIGURE 2.3: State-wise proportion of High-Valued Districts



Note: Data for the map can be seen in Statement 2(m).

Statement 2(a): Levels of Crop Provisioning Services across Districts of India 2005-06

States/UTs (2005-06)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1	1	2	8	10	22
Arunachal Pradesh	7	5	3	1		16
Assam	3	13	11			27
Bihar	7	11	10	9	1	38
Chhattisgarh	5	4	4	3	1	17
Goa	2					2
Gujarat	5	6	7	3	4	25
Haryana			2	6	12	20
Himachal Pradesh	3	2	5	1	1	12
Jammu and Kashmir	2	2		3	6	13
Jharkhand	17	4	1			22
Karnataka	3	10	7	6	1	27
Kerala				2	12	14
Madhya Pradesh	11	10	15	11	1	48
Maharashtra	15	13	4	2		34
Manipur	3	2	4			9
Meghalaya	3	1	1	1	1	7
Mizoram	1	5	2			8
Nagaland	5	2	1			8
Odisha	2	7	12	9		30
Puducherry	1			1	2	4
Punjab					17	17
Rajasthan	11	8	7	6		32
Sikkim	3		1			4
Tamil Nadu		1	5	11	12	29
Tripura	1	3				4
Uttar Pradesh	3	3	8	25	31	70
Uttarakhand	2	4	3	2	2	13
West Bengal	1		2	7	4	14

Statement 2(b): Levels of Crop Provisioning Services across Districts of India 2006-07

States/UTs (2006-07)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1		2	6	13	22
Arunachal Pradesh	9	4	2	1		16
Assam	9	14	4			27
Bihar	4	14	13	6		37
Chhattisgarh	3	2	8	2	1	16
Goa	2					2
Gujarat	4	10	5	4	2	25
Haryana				7	13	20
Himachal Pradesh	1	1	6	3	1	12
Jammu and Kashmir	2	2	2	2	6	14
Jharkhand	14	6	1	1		22
Karnataka	4	5	10	7	1	27
Kerala				1	13	14
Madhya Pradesh	13	9	12	11	3	48
Maharashtra	6	19	6	2		33
Manipur	4	5				9
Meghalaya	4	1		1	1	7
Mizoram	5	1	1	1		8
Nagaland	6	2				8
Odisha	1	9	17	3		30
Puducherry	1				3	4
Punjab					19	19
Rajasthan	12	3	7	10		32
Sikkim	3	1				4
Tamil Nadu	1	3	3	11	11	29
Tripura	3	1				4
Uttar Pradesh	5	1	11	29	24	70
Uttarakhand		3	6	2	2	13
West Bengal		1	1	7	5	14

Statement 2(c): Levels of Crop Provisioning Services across Districts of India 2007-08

States/UTs (2007-08)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh				6	16	22
Arunachal Pradesh	10	3	1	1	1	16
Assam	8	13	6			27
Bihar	7	12	12	7		38
Chhattisgarh	1	9	5	2	1	18
Goa	2					2
Gujarat	4	5	8	6	2	25
Haryana				6	14	20
Himachal Pradesh	1	3	3	5		12
Jammu and Kashmir	2	4		6	10	22
Jharkhand	13	8	1			22
Karnataka	3	12	11	3		29
Kerala				5	9	14
Madhya Pradesh	13	8	14	7	6	48
Maharashtra	2	16	13	2		33
Manipur	6	3				9
Meghalaya	4	2	1			7
Mizoram	4	1	3			8
Nagaland	6	1	1			8
Odisha	1	3	13	11	2	30
Puducherry	1			1	2	4
Punjab					20	20
Rajasthan	11	9	4	8		32
Sikkim	4					4
Tamil Nadu	3	2	4	12	8	29
Tripura	2	2				4
Uttar Pradesh	8	2	14	25	21	70
Uttarakhand	3	1	5	1	3	13
West Bengal	1	1	1	6	5	14

Statement 2(d): Levels of Crop Provisioning Services across Districts of India 2008-09

States/UTs (2008-09)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1			5	16	22
Arunachal Pradesh	8	3	3	1	1	16
Assam	7	15	4	1		27
Bihar	11	14	12	1		38
Chhattisgarh	6	8	2	2		18
Goa			2			2
Gujarat	2	5	8	5	6	26
Haryana				8	13	21
Himachal Pradesh	9	2			1	12
Jammu and Kashmir	1	4	2	3	11	21
Jharkhand	13	8	1	2		24
Karnataka	5	6	11	7		29
Kerala				3	11	14
Madhya Pradesh	10	15	16	8	1	50
Maharashtra	13	12	6	1	1	33
Manipur	4	1	4			9
Meghalaya	3	1	2	1		7
Mizoram	5	1		2		8
Nagaland		11				11
Odisha		2	17	9	2	30
Puducherry	1			1	2	4
Punjab					20	20
Rajasthan	16	5	8	4		33
Sikkim	2	1	1			4
Tamil Nadu	1	1	8	8	11	29
Tripura		4				4
Uttar Pradesh	5	2	6	35	22	70
Uttarakhand			4	6	3	13
West Bengal		1	5	9	2	17

Statement 2(e): Levels of Crop Provisioning Services across Districts of India 2009-10

States/UTs (2009-10)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh		1		7	14	22
Arunachal Pradesh	10	2	3	1		16
Assam	4	14	8	1		27
Bihar	7	18	13			38
Chhattisgarh	6	9	1	2		18
Goa			1	1		2
Gujarat	3	4	11	6	2	26
Haryana				7	14	21
Himachal Pradesh	7	4			1	12
Jammu and Kashmir	1	1	5	4	11	22
Jharkhand	20	4				24
Karnataka	5	9	8	5	2	29
Kerala				5	9	14
Madhya Pradesh	14	7	15	11	3	50
Maharashtra	4	11	13	4	1	33
Manipur	3	3	3			9
Meghalaya	3	1	2		1	7
Mizoram	3	3	2			8
Nagaland	4	6	1			11
Odisha	2	7	10	9	2	30
Puducherry	1			1	2	4
Punjab					20	20
Rajasthan	15	4	8	4	2	33
Sikkim	3	1				4
Tamil Nadu	2	7	6	15	1	31
Tripura	1	3				4
Uttar Pradesh	5	3	8	28	27	71
Uttarakhand			2	6	5	13
West Bengal		1	3	6	6	16

Statement 2(f): Levels of Crop Provisioning Services across Districts of India 2010-11

States/UTs (2010-11)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh			3	5	14	22
Arunachal Pradesh	8	2	5	1		16
Assam	2	14	10		1	27
Bihar	18	11	7	2		38
Chhattisgarh	8	3	5	2		18
Goa			1	1		2
Gujarat	4	3	8	6	5	26
Haryana				8	13	21
Himachal Pradesh	5	5	1		1	12
Jammu and Kashmir	3	2	2	5	10	22
Jharkhand	8	10	5	1		24
Karnataka	3	16	6	4	1	30
Kerala				2	12	14
Madhya Pradesh	13	10	13	11	3	50
Maharashtra	5	14	9	4	1	33
Manipur	4	1	2	2		9
Meghalaya	3	1	1	1	1	7
Mizoram	2	4	2			8
Nagaland	1	8	2			11
Odisha	8	5	12	5		30
Puducherry	1			1	2	4
Punjab					20	20
Rajasthan	17	7	9			33
Sikkim	3			1		4
Tamil Nadu		4	7	15	5	31
Tripura	2	2				4
Uttar Pradesh	5	2	7	35	23	72
Uttarakhand			3	6	4	13
West Bengal	1		3	6	8	18

Statement 2(g): Levels of Crop Provisioning Services across Districts of India 2011-12

States/UTs (2011-12)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh			1	3	18	22
Arunachal Pradesh	8	6	1	1		16
Assam	13	11	2	1		27
Bihar	9	21	6	2		38
Chhattisgarh	5	13	5	3	1	27
Goa			2			2
Gujarat	3	6	10	5	2	26
Haryana				4	17	21
Himachal Pradesh	6	5			1	12
Jammu and Kashmir	4	1	3	4	10	22
Jharkhand	13	6	2	2	1	24
Karnataka		11	11	6	2	30
Kerala				1	13	14
Madhya Pradesh	6	6	18	16	4	50
Maharashtra	1	6	19	7	1	34
Manipur	4	3	2			9
Meghalaya	4	1		1	1	7
Mizoram	6	1	1			8
Nagaland	6	5				11
Odisha	13	3	8	6		30
Puducherry			1		3	4
Punjab					22	22
Rajasthan	12	8	10	3		33
Sikkim	4					4
Tamil Nadu	1	1	13	13	3	31
Tripura	4					4
Uttar Pradesh	2	3	8	34	25	72
Uttarakhand	2	7		3	1	13
West Bengal		2	3	11	2	18

Statement 2(h): Levels of Crop Provisioning Services across Districts of India 2012-13

States/UTs (2012-13)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh			1	6	15	22
Arunachal Pradesh	7	6	2	1		16
Assam	10	12	5			27
Bihar	18	13	6		1	38
Chhattisgarh	1	12	10	2	2	27
Goa		1	1			2
Gujarat	7	7	5	5	2	26
Haryana			1	7	13	21
Himachal Pradesh	6	4	2			12
Jammu and Kashmir	4	4	2	3	9	22
Jharkhand	14	8	2			24
Karnataka	4	9	9	6	2	30
Kerala				2	12	14
Madhya Pradesh	4	5	17	18	6	50
Maharashtra	3	4	15	9	2	33
Manipur	3	3	3			9
Meghalaya	3	2	1		1	7
Mizoram	6	1	1			8
Nagaland	6	5				11
Odisha		10	11	6	3	30
Puducherry				1	2	3
Punjab					22	22
Rajasthan	12	6	10	5		33
Sikkim	4					4
Tamil Nadu	3	3	7	10	8	31
Tripura	5	3				8
Uttar Pradesh	2	3	11	34	25	75
Uttarakhand	5	4	1	2	1	13
West Bengal		2	4	10	2	18

Statement 2(i): Levels of Crop Provisioning Services across Districts of India 2013-14

States/UTs (2013-14)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh		1		6	6	13
Arunachal Pradesh	8	5	4			17
Assam	8	4	12	3		27
Bihar	18	11	8		1	38
Chhattisgarh	3	13	8	3		27
Goa	2					2
Gujarat	1	9	7	7	2	26
Haryana				6	15	21
Himachal Pradesh	5	5	1		1	12
Jammu and Kashmir		2	3	6	10	21
Jharkhand	18	3	2		1	24
Karnataka		4	12	12	2	30
Kerala				1	13	14
Madhya Pradesh	5	15	16	14	1	51
Maharashtra	2	11	11	8	1	33
Manipur	3	2	2	2		9
Meghalaya	5	3	1		2	11
Mizoram	1	5	2			8
Nagaland	5	5	1			11
Odisha	12	6	6	5	1	30
Puducherry				1	2	3
Punjab					22	22
Rajasthan	12	10	10	1		33
Sikkim	4					4
Tamil Nadu	4	1	6	14	6	31
Telangana				3	6	9
Tripura	1	5	2			8
Uttar Pradesh	4	4	10	26	31	75
Uttarakhand	7	2	1	2	1	13
West Bengal		2	3	8	5	18

Statement 2(j): Levels of Crop Provisioning Services across Districts of India 2014-15

States/UTs (2014-15)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh		1		4	8	13
Arunachal Pradesh	11	5	1		1	18
Assam	6	10	10	1		27
Bihar	1	8	11	15	3	38
Chhattisgarh	4	13	6	3	1	27
Goa	1	1				2
Gujarat	3	10	10	6	4	33
Haryana			1	5	15	21
Himachal Pradesh	5	6			1	12
Jammu and Kashmir	3	1	3	4	11	22
Jharkhand	2	8	5	8	1	24
Karnataka	3	9	11	5	2	30
Kerala					14	14
Madhya Pradesh	9	15	18	7	2	51
Maharashtra	16	8	4	5	1	34
Manipur	5	1	3			9
Meghalaya	7	1	2	1		11
Mizoram	1	6	1			8
Nagaland	9	2				11
Odisha	5	4	12	8	1	30
Puducherry				1	2	3
Punjab					22	22
Rajasthan	16	9	8			33
Sikkim	4					4
Tamil Nadu	1	3	8	13	6	31
Telangana				4	5	9
Tripura	1	6	1			8
Uttar Pradesh	6	3	11	28	27	75
Uttarakhand	10		1	2		13
West Bengal	2		3	10	4	19

Statement 2(k): Levels of Crop Provisioning Services across Districts of India 2015-16

States/UTs (2015-16)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1		1	3	8	13
Arunachal Pradesh	8	9	1	2		20
Assam	7	7	12	1		27
Bihar	3	7	14	13	1	38
Chhattisgarh	9	8	7	2	1	27
Goa		1	1			2
Gujarat	5	7	11	8	2	33
Haryana			1	5	15	21
Himachal Pradesh	6	5		1		12
Jammu and Kashmir	3	1	3	3	12	22
Jharkhand	7	9	2	5	1	24
Karnataka	5	2	13	9	1	30
Kerala				1	13	14
Madhya Pradesh	8	23	14	6		51
Maharashtra	11	4	9	9	1	34
Manipur	5		4			9
Meghalaya	5	4	2			11
Mizoram		6	2			8
Nagaland	6	5				11
Odisha	11	7	3	7	2	30
Puducherry			2	1	1	4
Punjab					22	22
Rajasthan	18	5	9	1		33
Sikkim	1	3				4
Tamil Nadu		2	7	16	6	31
Telangana		1		4	4	9
Tripura	2	4	2			8
Uttar Pradesh	5	3	10	25	32	75
Uttarakhand	4	5		2	2	13
West Bengal	1	3	1	7	7	19

Statement 2(l): Levels of Crop Provisioning Services across Districts of India 2016-17

States/UTs (2016-17)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1	1	2	4	5	13
Arunachal Pradesh	9	10	1			20
Assam	8	10	8	1		27
Bihar	1	10	14	12	1	38
Chhattisgarh	11	6	6	4		27
Goa	1	1				2
Gujarat	5	3	14	7	4	33
Haryana				7	14	21
Himachal Pradesh	5	5	1		1	12
Jammu and Kashmir	2		2	7	11	22
Jharkhand	11	6	2	3	2	24
Karnataka	8	7	6	8	1	30
Kerala				4	10	14
Madhya Pradesh	12	21	11	7		51
Maharashtra	7	6	18	3	1	35
Manipur	5	1	3			9
Meghalaya	5	4	2			11
Mizoram	1	5	2			8
Nagaland	8	3				11
Odisha	6	9	13	1	1	30
Puducherry	2				2	4
Punjab					22	22
Rajasthan	12	10	8	3		33
Sikkim	1	3				4
Tamil Nadu	3	1	6	9	12	31
Telangana		1	3	6	20	30
Tripura	2	5	1			8
Uttar Pradesh	1	3	9	38	24	75
Uttarakhand	6	3		2	2	13
West Bengal	3	2	4	10	3	22

Statement 2(m): Levels of Crop Provisioning Services across Districts of India 2017-18

States/UTs (2017-18)	Very Low	Low	Medium	High	Very High	Total
Andhra Pradesh	1	1	1	4	6	13
Arunachal Pradesh	4	3	12	1		20
Assam	8	9	8	2		27
Bihar		10	14	14		38
Chhattisgarh	12	10	2	3		27
Goa	2					2
Gujarat	6	9	7	8	3	33
Haryana				7	15	22
Himachal Pradesh	6	4	2			12
Jammu and Kashmir	2	1	3	2	14	22
Jharkhand	2	7	5	7	3	24
Karnataka	11	9	7	3		30
Kerala					14	14
Madhya Pradesh	21	22	8			51
Maharashtra	15	6	9	3	1	34
Manipur	4	1	4			9
Meghalaya	5	2	4			11
Mizoram		3	5			8
Nagaland	1	9	1			11
Odisha	2	9	12	6	1	30
Puducherry			1	1	2	4
Punjab					22	22
Rajasthan	18	5	8	2		33
Sikkim			1	3		4
Tamil Nadu	4	1	4	12	10	31
Telangana			2	6	22	30
Tripura	1	5	2			8
Uttar Pradesh	6	2	11	38	18	75
Uttarakhand	4	4	1	2	2	13
West Bengal	1	4	2	12	3	22

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Chapter 3

Soil Nutrient Indices

Introduction

1. The term 'Soil', derived from the Latin word 'Solum', is commonly defined as the top layer of the earth's crust, formed by mineral particles, organic matter, water, air and living organisms. Soil is the foundation of all terrestrial ecosystems, agricultural and forestry provisioning services and the structural medium for supporting the terrestrial biosphere and human infrastructure[9]. Healthy soils increase the capacity of crops to withstand weather variability, including short term extreme precipitation events and intra-seasonal drought.

2. Soil fertility, or the soil's reserve of crop nutrients, is broadly equated with soil quality and soil health. Soil health is the capacity of soil to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health. According to Food and Agriculture Organization (FAO)[10], 95% of our food comes directly or indirectly from the soil, and it can take up to 1000 years to form just 2-3 cm of soil. But over the last 50 years, advances in agricultural technology and increased demand due to a growing population have put our soils under increasing pressure. In all agricultural systems, a significant amount of nutrients is removed over time in harvested products. These losses of nutrients can also occur due to soil erosion, runoff, leaching and burning of crop residues. Therefore, it is necessary to monitor the changes in soil and study the soil dynamics regularly to enhance the efficiency of nutrients applied to increase agricultural productivity.

3. Most soils contain four basic components: mineral particles, water, air, and organic matter or carbon. Soils are a major carbon reservoir comprising more carbon than the atmosphere and terrestrial vegetation combined. Soil organic carbon is the engine of any soil and plays a vital role in maintaining fertility by holding nitrogen, phosphorous and a range of other nutrients. It helps in improving soil properties such as water-holding capacity and providing gaseous exchange and root growth.

4. The fertility of the soil is a delicate balance of physical, biological and chemical properties. Soil nutrients are divided into two categories viz. Macro-nutrients and Micro-nutrients. Elements used in large quantities by the plant are termed macronutrients, which can be further defined as primary or secondary. The primary

[9] Suzanne van der Meulen and Linda Maring (2018). Mapping and Assessment of Ecosystems and their Services: Soilecosystems.

[10] 'Healthy soils are the basis for healthy food production', FAO, 2015; http://www.fao.org/3/i4405e/i4405e.pdf

macronutrients include nitrogen (N), phosphorus (P), and potassium (K). These elements contribute to plant nutrient content, plant enzymes and biochemical processes, and the integrity of plant cells. Secondary nutrients are those usually needed in moderate amounts compared to the primary macronutrients. Sulphur is one of the secondary macro-nutrients. Micronutrients are required in tiny amounts compared to primary or secondary nutrients. Micronutrients include boron, chlorine, copper, iron, manganese, molybdenum, and zinc.

5. It is crucial to have a balance between the macro and micronutrients because too few macronutrients can lead to poor plant growth and potential for disease, and excess of micronutrients can lead to loss of colour in the plant and reduced growth. Similarly, deficiency of micronutrients will result in reduced flowering and yellow-green colouration. Nutrient deficiency occurs when an essential nutrient is not available in sufficient quantity to meet the requirements of a growing plant. Toxicity occurs when a nutrient is in excess of plant needs and decreases plant growth or quality.

6. Physical parameters of soil like pH and Electrical Conductivity also play a significant role in soil fertility. For instance, most plant nutrients are optimally available to plants within the 6.5 to 7.5 soil pH range, and this range of pH is generally very compatible to plant root growth. On the other hand, soil electrical conductivity (EC) is an indicator of nutrient availability and loss, soil texture and available water capacity.

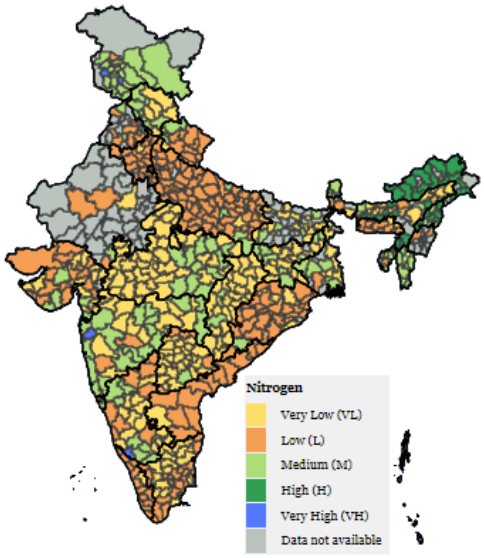
Government Programme on Soil Health – Soil Health Card

7. Soil health and quality remain a matter of great concern for the Government of India. Soil Health Card (SHC) scheme is a flagship programme launched in February 2015, under which uniform norms are followed across different States for soil analysis to diagnose fertility-related constraints and make site-specific fertilizer recommendations. Two Cycles of this flagship programme were conducted – Cycle I during 2015-17 and Cycle II during 2017-19. During the financial year 2019-20, the Model Villages Programme has been taken up under Soil Health Card (SHC) Scheme on a pilot basis. This programme includes adopting one village per block for landholding-based Soil Sampling, Testing & Distribution of Soil Health Cards and subsequently conducting SHC based demonstrations in each model village to scale awareness amongst the farmers across India. In Model Village Programme, soil samples collection has been taken up at individual farm holding with farmer's participation instead of sample collection at grids. The scheme is managed by Integrated Nutrient Management (INM) Division in the Ministry of Agriculture and Farmers Welfare, Government of India. Under the Soil Health Card Scheme, soil health condition is assessed with respect to twelve important soil parameters, namely

–

- Nitrogen (N), Phosphorus (P), Potassium (K) - primary macro-nutrients;
- Sulphur (S) – secondary macro-nutrient;
- Zinc (Zn), Iron (Fe), Copper (Cu), Manganese (Mn), Boron (B) - micro-nutrients;
- pH, Electrical Conductivity (EC), Organic Carbon (OC) - physical parameters.

8. Soil samples collected from different locations are analysed in the Soil Testing Labs as per the norms provided in the scheme's operational guidelines. The results are uploaded in the national Soil Health Card portal www.soilhealth.dac.gov.in which has been developed for registration of soil samples, recording soil test results, generation of Soil Health Cards (SHCs) and monitoring progress. The authorities provide a report to the farmers once in 3 years after observing the soil regularly. Examination of farmers' soil also helps decide the type of crops to be cultivated for more income and other remedial measures.



9. Soil Nutrient information is available on 25.127 million samples for Cycle I (2015-17), 23.268 million samples for Cycle II (2017-19) and 1.773 million samples for Model Village Programme (2019-20) as on 19.08.2021. Since the Model Village Programme is a newly reformatted scheme, a lower target was set for sample collection and testing in the programme as compared to Cycle I and Cycle II of the Soil Health Card Scheme.

Soil Nutrient Index

10. To enable the comparison of the levels of soil fertility of one area with those of another, it is desirable to have a single value for each nutrient. Nutrient index (N.I) value is one such measure of nutrient supplying capacity of soil to plants (Singh et al., 2016)[11].

11. The method for "Nutrient indexing" has been discussed in detail in the Manual on "Soil Testing in India" published by the Ministry of Agriculture, Government of India[12] in 2011. The Nutrient Index, as described in the said Manual, is compiled using

[11] Singh, G., Sharma, M., Manan, J., & Singh, G. (2016). Assessment of soil fertility status under different cropping sequences in District Kapurthala. *J Krishi vigyan, 5(1), 1-9*.
[12] Manual on "Soil Testing in India", 2011, Ministry of Agriculture & Farmers Welfare, Government of India. http://www.agriculture.uk.gov.in/files/Soil_Testing_Method_by_Govt_of_India.pdf

the assessment of soil fertility classified in three classes, i.e., low, medium and high. The nutrient index can then be calculated based on the information collected on the level of each nutrient using the following formula:

$$\textbf{Nutrient Index (N.I.)} = (N_L \times 1 + N_M \times 2 + N_H \times 3) / N_T$$

where N_L: Indicates the number of samples falling in the low class of nutrient status

N_M: Indicates number of samples falling in medium class of nutrient status

N_H: Indicates number of samples falling in the high class of nutrient status

N_T: Indicates the total number of samples analysed in a given area ($N_L + N_M + N_H$).

12. Interpretation of the different values of the Soil Nutrient Index is given in Table 3.1.

TABLE 3.1: Rating Chart of Nutrient Index

S.No.	Nutrient Index	Value	Interpretation
1	Low	<1.67	Low fertility Status of the area
2	Medium	1.67-2.33	Medium fertility Status of the area
3	High	>2.33	High fertility Status of the area

13. To enable an assessment of the current status of soil nutrients in different States/UTs and the trend in fertility status of Indian soils, the information on the soil samples collected under Soil Health Card Scheme for Cycle I (2015-17) & Cycle II (2017-19) and Model Village Programme (2019-20) as on 19.08.2021 have been analysed. Earlier, in the 2019 issue of this publication, the data generated under two Cycles (2015-17 and 2017-19) as on September 5, 2019, was analysed to compile soil nutrient indices for the various macro and micronutrients.

14. Status of Macronutrients has been categorized into five categories in the Soil Health Card database, i.e. **Very Low, Low, Medium, High, Very High**, while the status of Micronutrients has been categorized into two categories, i.e. **Sufficient & Deficient**. For the sake of calculation of the aggregate nutrient index, in case of Macronutrients and Organic Carbon, **"Very low"** and **"Low"** category samples have been classified under "**Low class of nutrient status**", and **"High"** and "**Very High"** category samples are taken under "**High class of nutrient status**". Similarly, in the case of Micronutrients and Sulphur, "**Deficient**" category samples are taken under "**Low class of nutrient status**", and "**Sufficient**" category samples are taken under "**Medium class of nutrient status**".

Soil Nutrient Indices in the States of India

15. The state-wise nutrient-wise Soil Nutrient Index, for Cycle I, Cycle II and Model Village Programme, is given in Annexure 3.1. A comparative statement of state-wise distribution of nutrient indices is given in Table 3.2 below. Figure 3.1 at the end of the

chapter gives the state-wise distribution of some of the main soil nutrients during 2017-19. It needs to be noted that since the design for collection of soil samples is different for the Model Village Programme as compared to the earlier Cycles of the Soil Health Card Scheme, the distribution is not strictly comparable across the three time periods. Information is not available under the Model Village Programme for the States of Arunachal Pradesh, Ladakh, Daman & Diu, Dadra & Nagar Haveli and West Bengal. Further, for certain nutrients, only a limited number of samples were available. Such States and nutrients have been kept out of the purview of the analysis due to the low sample size.

TABLE 3.2: State-wise Distribution of Soil Nutrient Indices

S. No.	State/UT	Cycle I (2015-17)			Cycle II (2017-19)			Model Village Programme 2019-20		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
1	Andaman & Nicobar Islands	N, P, K, OC, S	B, Cu, Fe, Mn, Zn		N, P, K, OC, S	B, Cu, Fe, Mn, Zn		N, P, K, OC, Cu, S, Zn	B, Fe, Mn	
2	Andhra Pradesh	N, B, Fe, Zn	K, OC, Cu, Mn, S	P	N, Zn	OC, B, Cu, Fe, Mn, S	P, K	N, OC, Zn	B, Cu, Fe, Mn, S	P, K
3	Arunachal Pradesh	P, B, Zn	K, Cu, Fe, Mn, S	N, OC	P, K, B, S, Zn	Cu, Fe, Mn	N, OC			
4	Assam	P, K, B	N, OC, Cu, Fe, Mn, S, Zn		P, K, B	N, OC, Cu, Fe, Mn, S, Zn		P, K, B	N, Cu, Fe, Mn, S, Zn	OC
5	Bihar	N, B, Cu, Fe, Mn, S, Zn	P, K, OC		N, B, Cu, Fe, Mn, S, Zn	P, K, OC		N	P, K, OC, B, Cu, Fe, Mn, S, Zn	

(Table continued on next page)

(Table continued from previous page)

S. No.	State/UT	Cycle I (2015-17)			Cycle II (2017-19)			Model Village Programme 2019-20		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
6	Chhattisgarh	N, B, Zn	P, K, OC, Cu, Fe, Mn, S		N, S, Zn	P, K, OC, B, Cu, Fe, Mn		N, P, OC, S	K, B, Cu, Fe, Mn, Zn	
7	Delhi	N, P, OC, Fe, Mn	K, B, Cu, S, Zn		P	N, K, OC, B, Cu, Fe, Mn, S, Zn				
8	Goa	P, B	N, K, Cu, Fe, Mn, S, Zn	OC	P, B, S	N, K, Cu, Fe, Mn, Zn	OC	P, B, S	N, K, Cu, Fe, Mn, Zn	OC
9	Gujarat	N, B, Fe, S, Zn	P, K, OC, Cu, Mn		N, B	P, OC, Cu, Fe, Mn, S, Zn	K	N, B, Fe, Zn	P, OC, Cu, Mn, S	K
10	Haryana	N, P, OC	K, B, Cu, Fe, Mn, S, Zn		N, P, OC, B, Fe, Mn	K, CU, S, Zn		N, P, OC, B	K, Cu, Fe, Mn, S, Zn	
11	Himachal Pradesh	N	P, K, B, Cu, Fe, Mn, S, Zn	OC	N	P, K, B, Cu, Fe, Mn, S, Zn	OC	N	P, K, B, Cu, Fe, Mn, S, Zn	OC
12	Jammu & Kashmir	P, B, Fe, Mn, S, Zn	N, K, OC		P, Mn, S, Zn	N, K, B, Cu, Fe	OC	P, B, Fe, Mn	N, K, Cu, S, Zn	OC
13	Jharkhand	N, P, B, S, Zn	K, OC, Cu, Fe, Mn		N, P,	K, OC, B, Cu, Fe, Mn, S, Zn		N	P, K, OC, B, Cu, Fe, Mn, S, Zn	
14	Karnataka	N, B, Fe, S, Zn	P, K, OC, Cu, Mn		N, B, Fe, S, Zn	P, K, OC, Cu, Mn		N, OC, B, Fe, S, Zn	P, K, Cu, Mn	
15	Kerala	N, B, S	P, K, Cu, Fe, Mn, Zn	OC	N, B, S	P, K, Cu, Fe, Mn, Zn	OC	N, B	P, K, Cu, Fe, Mn, S, Zn	OC

(Table continued on next page)

(Table continued from previous page)

S. No.	State/UT	Cycle I (2015-17)			Cycle II (2017-19)			Model Village Programme 2019-20		
		Low	**Medium**	**High**	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
16	Ladakh	Mn, S	N, P, K, B, Cu, Fe, Zn	OC	B, S	N, P, Cu, Fe, Mn, Zn	K, OC			
17	Madhya Pradesh	N, P, Zn	K, OC, B, Cu, Fe, Mn, S		N, P, Zn	K, OC, B, Cu, Fe, Mn, S		N, P, Zn	K, OC, B, Cu, Fe, Mn, S	
18	Maharashtra	N, OC, B, Fe, S, Zn	P, Cu, Mn	K	N, B, Fe, S, Zn	P, OC, Cu, Mn	K	N, B, Fe, S, Zn	P, OC, Cu, Mn	K
19	Manipur	N, P, K, Fe, Mn	OC, B, Cu, S, Zn		N, B, S, Zn	P, K, Cu, Fe, Mn	OC	N, P, K,		OC
20	Meghalaya	N, P, K, B, Fe, S	Cu, Mn, Zn	OC	N, P, K, Mn, S, Zn	B, Cu, Fe	OC	P, Mn	K, Cu, Fe, S, Zn	OC
21	Mizoram	P, OC, B	N, K, Cu, Fe, S, Mn, Zn		P, OC, S	N, K, B, Cu, Fe, Mn, Zn		N, P	K, OC	
22	Nagaland	P, Cu, Zn	K, B, Fe, Mn, S	N, OC	P	K, B, Cu, Fe, Mn, S, Zn	N, OC			
23	Odisha	N, P, OC, B, Cu, Fe, Mn, S, Zn	K		N, P, OC, B, Cu, Fe, Mn, S, Zn	K		N, P, K, OC, B, S, Zn	Cu, Fe, Mn	
24	Puducherry	N, P, B	K, Cu, Fe, Mn, S, Zn		N, P, B	K, Cu, Fe, Mn, S, Zn		N, P, B, S	Cu, Fe, Mn, Zn	K
25	Punjab	N, P, OC, B, Mn	K, Cu, Fe, S, Zn		N, P, OC, B, Mn	K, Cu, Fe, S, Zn		N, P, B, Mn	K, OC, Cu, Fe, S, Zn	
26	Rajasthan	N, OC, B, Fe, S, Zn	P, K, Cu, Mn		N, OC, B, Fe, Zn	P, K, Cu, Mn, S				
27	Sikkim	B, Mn	N, P, K, Cu, Fe, S, Zn	OC	N, B	P, K, Cu, Fe, Mn, S, Zn	OC	N, B, Zn	P, K, Cu, Fe, Mn, S	OC

(Table continued on next page)

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S. No.	State/UT	Cycle I (2015-17)			Cycle II (2017-19)			Model Village Programme 2019-20		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
28	Tamil Nadu	N, OC, B, Fe, S	P, K, Cu, Mn, Zn		N, OC, B, Fe, S	P, K, Cu, Mn, Zn		N, OC, B, Zn	P, Cu, Fe, Mn, S	K
29	Telangana	N, OC, B, Cu, S, Fe, Zn, Mn	P, K		N, OC, Fe, Zn	P, K, B, Cu, Mn, S		N, OC, Fe, Zn	P, K, B, Cu, Mn, S	
30	Dadra And Nagar Haveli & Daman and Diu	P	OC, B, Cu, Fe, Mn, S, Zn	K	N, P	OC, B, Cu, Fe, Mn, S, Zn	K			
31	Tripura	P, K, S	N, OC, B, Cu, Fe, Mn, Zn		N, K	P, OC, B, Cu, Fe, Mn, S, Zn		N, K	P, OC, B, Cu, Fe, Mn, S, Zn	
32	Uttar Pradesh	N, P, OC, B, S	K, Cu, Fe, Mn, Zn		N, P, OC, B, S	K, Cu, Fe, Mn, Zn		N, P, OC	K, B, Cu, Fe, Mn, S, Zn	
33	Uttarakhand	N, B	P, K, OC, Cu, Fe, Mn, S, Zn		N, B	P, K, OC, Cu, Fe, Mn, S, Zn		N, B	P, K, OC, Cu, Fe, Mn, S, Zn	
34	West Bengal	N, B, S, Zn	K, OC, Cu, Fe, Mn	P	N, K, S	OC, B, Cu, Fe, Mn, Zn	P			

Nutrients - N: Nitrogen; P: Phosphorus; K: Potassium; S: Sulphur; Zn: Zinc; Fe: Iron; Cu: Copper; Mn: Manganese, B: Boron; OC: Organic Carbon.

Level of Nutrients: Low: <1.67; Medium: 1.67-2.33; High: >2.33

Source: Calculated using data received from Ministry of Agriculture & Farmers Welfare

Way Forward

16. Fertile soil can easily be cultivated, absorbs rainwater well and withstands siltation and erosion. Efficient soil nutrient management helps produce profitable crops sustainably. The fertile soil, through its filtration service, leads to clean groundwater. However, when nutrient input exceeds crop demands, the excess nutrient may harm the crop, and off-site nutrient movement may occur, consequently polluting groundwater and surface water. Therefore, proper management of soil resources is essential to ensure that productive arable land, an essential pillar of sustainable agriculture, is kept intact.

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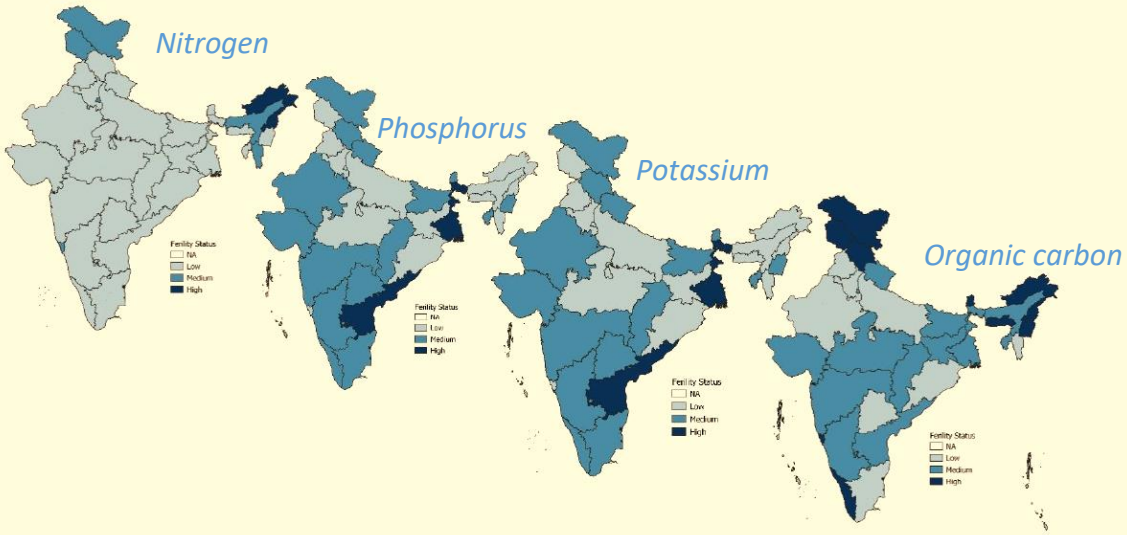
Soil Fertility Status

Figure 3.1: Soil Fertilty Status for 2017-19



Soil Fertility Status of Nitrogen (N), Phosphorus (P), Potassium (K), Organic Carbon (OC)

Chapter 4

Water Quality Accounts

Introduction

1. Water is a key driver of economic and social development. Water has cross-sectoral linkages with various sectors such as food, energy, agriculture, industries, and urban development. Factors such as demography and climate change further increase the stress on water resources. Thus, water cannot be considered in isolation, making it challenging for policymakers to apportion diminishing supplies between ever-increasing demands. In many regions, water availability, in terms of both quantity and quality, is severely affected by climate variability and climate change, with excessive or deficient precipitation in different regions and more extreme weather events.

2. A safe or clean water supply is the backbone of a healthy economy. It is critical to survival, and its absence can impact the health, food security, and livelihoods of families worldwide. The importance of water quality is illustrated through the fact that Sustainable Development Goal (SDG) 6 is dedicated to Clean Water and Sanitation. Target 6.3 of SDG-6 aims explicitly at improving ambient water quality by eliminating, minimizing and significantly reducing different streams of pollution into water bodies. Also, the associated indicator 6.3.2 reflects the proportion of bodies of water with good ambient water quality, where "Good" indicates an ambient water quality that can sustain the extant ecosystem functions and human health.

3. In general, water quality can be assessed based on actual or desired water uses/ functions or against general standards using physical, chemical and biological parameters. In many cases, the interaction between human activities and natural phenomena makes it impossible to establish a clear relationship between the economy and water quality. For example, the change in the concentration of nitrates and phosphates in a water body can be associated with the use of fertilisers in nearby agricultural areas, but also with natural processes (like ecosystem functions and hydrological dynamics) and change in dilution levels due to variations in levels of abstraction or precipitation.

Compilation of Water Quality Accounts

4. The complexity exists in inferring the status of water quality from the data available from different monitoring sites, thus, highlighting the need to specify the

quality status using indicators that are easier to interpret. SEEA-Water[13] describes the methodology to assess the water quality through 'Water Quality Accounts', which describe the quality of the stocks of water resources and water quality is reported in the form of discrete classes. The quality of a body of water may be approached in terms of its uses/functions or its condition in the natural form, and different countries use different classifications. The fundamental issue when discussing quality is whether 'quality determines use' or 'use determines quality'. Even under the 'quality determines use' perspective, quality can be assessed against thresholds based on natural (or background concentrations) or legal requirements (i.e. prescriptive standards).

5. Considering the importance of water quality, the Inter-Ministerial Group on Environmental-Economic Accounting in India constituted a "Sub-Group on the compilation of indices relating to water quality" to work out the methodology for assessing water quality for surface/ground/marine water. The Sub-Group was constituted under the Chairpersonship of Additional Secretary, Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti with members from Central Water Commission (CWC), Central Ground Water Board (CGWB), Central Pollution Control Board (CPCB), National Centre for Coastal Research (NCCR), Ministry of Environment, Forests and Climate Change (MoEF&CC) and MoSPI. It was envisaged that these accounts/indices would help aggregate the detailed statistics on water quality released by the concerned agencies to reflect the direction of combined fluctuations in the different variables/monitoring stations.

6. Based on the discussions in the Sub-Group, methodology, as recommended by SEEA-Water, has been adapted to compile water quality accounts using designated best use quality classes for surface and groundwater. The limits for various water quality parameters for these designated best use quality classes for surface and groundwater, as finalised by the Sub-Group, are given in Appendix-I and Appendix-II, respectively, at the end of this chapter. In short, the quality classes have been categorized according to the uses for which the water is fit for. The "designated best use classes of water" used in the water accounts are mentioned in Table 4.1.

Table 4.1: Designated Best Use Classes of Water

Quality Classes for Surface Water	Quality Classes for Groundwater
***Class A:* Drinking Water Source without conventional treatment but after**	***Class A:* Drinking Water Source – Class I**

[13] United Nations Statistics Division (2012) System of Environmental-Economic Accounting for Water (SEEA-Water), ST/ESA/STAT/SER.F/100; http://unstats.un.org/unsd/env accounting /seeaw/seeawaterwebversion.pdf

disinfection	
Class B: **Outdoor bathing (Organised)**	***Class C:*** **Drinking Water Source – Class II**
Class C: **Drinking Water Source after conventional treatment and disinfection**	***Class E:*** **Irrigation**
Class D: **Propagation of Wildlife and Fisheries**	***Class U:*** **Unclassified-Not classified as 'A' to 'E' or inadequate information**
Class E: **Irrigation, Industrial Cooling, Controlled Waste Disposal**	
Class **U: Unclassified-Not classified as 'A' to 'E' or inadequate information**	

7. The classification given in Table 4.1 can be viewed as a hierarchy of 'designated use', in the sense that the water quality requirement becomes progressively lower from A to E. Besides, the water quality of any one of the specified categories also satisfies the requirements of categories lower than the chosen one. An area or stretch of a body may be subjected to several uses. The area or the stretch is designated by that particular use that demands the highest/purest quality. It is in this context, that the classes are referred to as 'designated best use' classes of water.

8. The major usage of groundwater is for irrigation, drinking and domestic uses. Hence, there is a slight variation across surface and groundwater in the way the quality classes are defined, as shown in the above table. Also, the category "Unclassified" refers to any measurement point where the parameters do not fulfil criteria for quality classes "A" to "E" or the information is insufficient to classify the data point under any of the specified quality classes.

9. The methods and formats for the quality accounts of surface and groundwater are briefly described in the following paragraphs.

Quality Accounts for Surface Water

10. The structure of Quality Accounts for surface water for a given geographic area is shown below in Tables 4.2. Each entry in the table represents the amount of water of specific quality, measured in terms of the volume of water.

Table 4.2: Quality Accounts (Physical units) for Surface Water

Year1	Quality Class					
	A	B	C	D	E	U
Monitoring Site 1						
Month1						
Month2						
…..						
Monitoring Site 2						
Month1						
Month2						
….						

11. For the purpose of this publication, only river water has been considered for quality accounts of surface water. In the case of rivers, monitoring station-wise data is available from Central Water Commission (CWC). The water of each monitoring station is allocated to a unique quality class as per the recorded values of the different quality parameters and the threshold values given in Appendix-I.

12. An essential utility of the water quality accounts is to help combine the numerous water quality indicators into a single value for a given time period. For this, the use of Standard River Units has been recommended for rivers by SEEA-Water. The Standard River Units (SRU), which indicate the volume of water, can be derived using the length and discharge values. Assuming that the stretch between two monitoring stations is uniform in quality and flow, the Standard River Units can be allocated to the corresponding quality class. Quality accounts for rivers can be compiled by assessing the quality class for each stretch, computing the SRU value for each stretch, and summing the corresponding SRU per quality class to populate the quality accounts. The different quality classes can then be aggregated without double counting. It may be noted that volume corresponding to stretches of river water where the river bed is dry and does not allow for the collection of samples will be 'zero'.

Quality Accounts for Groundwater

13. The structure of Quality Accounts for groundwater for a given geographic area is shown below in Tables 4.3. As in the case of surface water, each entry in the table represents the amount of water of specific quality, measured in terms of the volume of water. The volume of groundwater is depicted using Net Annual Groundwater Resources[14], which is available block-wise from Central Ground Water Board.

[14] http://cgwb.gov.in/Dynamic-GW-Resources.html

Table 4.3: Quality Accounts (Physical Units) for Groundwater

Year 1	Quality Class				
	A	C	E	U	Total
Stock at State					
District 1					
District 2					
and so on					
……					

14. In the case of groundwater, the data is given location-wise, which is classified into the corresponding "designated best use classes of water". The classification is based on the threshold values as mentioned in Appendix-II, as specified in Bureau of Indian Standards [IS 10500: 2012 (Second Revision) – for Class 'A' and 'C' and IS 11624 (1986, Reaffirmed 2009)] – for Class 'E' and some modifications suggested by the Central Ground Water Board (CGWB). Certain parameters of the BIS prescribed Standards could not be considered due to non-availability of information. The volume of groundwater at block level, Net Annual Groundwater Resources[15], is assumed to be equally distributed across locations within the block. The quality accounts for groundwater are thus compiled by assessing the quality class for each location and by aggregating the Net Annual Groundwater Resources for the different monitoring locations as per the corresponding quality classes.

15. The same methodology can also be applied for other water bodies, like lakes and canals, albeit with certain modifications. 'Water Quality Accounts' can help reduce the bulk of information to a simplified and logical format. They aid in highlighting the water quality issues for the policymakers, the general public and users of the water resources and also in assessing the suitability of water resources for various uses such as agriculture, aquaculture and domestic use. Further, 'Water Quality Accounts', if combined with information on economic activities, may also provide insights on the role of the different sectors in determining water quality.

16. It would be unfeasible to monitor every contaminant/compound that is discharged into water supplies. As the 'Water Quality Accounts' are intended to be comparable throughout the country, only a limited number of criteria that were available across data sources and, over time, have been used in the compilation of Water Quality Accounts.

[15] http://cgwb.gov.in/Dynamic-GW-Resources.html

Quality Accounts for River Water in selected basins of India

17. The Quality Accounts **for river water** of following four Divisions for the years 2015-16 to 2018-19 have been presented in this publication:

- Godavari Division consisting of Upper Godavari, Lower Godavari & Wainganga Divisions
- Krishna Division consisting of Upper & Lower Krishna Divisions
- Mahi Division
- Tapi Division

18. The Mahi Division includes Basins of Mahi, Sabarmati & West flowing rivers of Kutchh and Saurashtra, including Luni. The Tapi Division includes Basins of Tapi, West flowing rivers from Tapi to Tadri and part of Narmada Basin. The number of quality monitoring sites in the Four Divisions, and the corresponding number of sites from which information has been used to compile the Water Quality Accounts, are given in the Table 4.4.

Table 4.4: Division-wise number of Water Quality Sites

Name of the Division	2015-16	2016-17	2017-18	2018-19
Godavari	31 (25)	31 (28)	31(29)	31(29)
Krishna	23 (18)	23 (21)	23 (21)	23 (21)
Mahi	11 (11)	11 (11)	11 (11)	11 (11)
Tapi	10 (10)	10 (10)	10 (10)	10 (10)
Total	**75 (64)**	**75 (70)**	**75 (71)**	**75 (71)**

Note: Number in parentheses indicates the number of monitoring sites for which requisite data was available on the quality parameters. Source for total number of Water Quality Sites: Hydrological Observation Sites in India, Central Water Commission.

19. The Water Quality Accounts have been compiled for river water in the four Divisions for the years 2015-16 to 2018-19 with 12 data points for each year, one for each month, using the data on quality parameters as furnished by Central Water Commission (CWC) for the monitoring stations across the Divisions (Annexure-4.1). Accounts were earlier presented for river water quality for the Godavari River Basin for 2015-16 in EnviStats India 2019, Vol.II Environment Accounts. The accounts presented in this publication vary from those published earlier due to receipt of updated data on water quality from the sites of the basin.

20. The percentage distribution of summary of Division-wise and month-wise quality accounts of Godavari, Krishna, Mahi and Tapi Divisions are given in Tables 4.5 and 4.6.

Table 4.5: Division-wise Distribution of River Water Quality, 2015-16 to 2018-19

2015-16 **(In %)**

Division	Designated Best use Class						Grand Total	Share in total Volume
	A	B	C	D	E	U		
Godavari	0	3	20	76	0	1	100	69.65
Krishna	0	3	22	57	18	1	100	6.55
Mahi	0	6	3	76	12	2	100	4.37
Tapi		1	97	1	1	0	100	19.44
Grand Total	0	3	34	60	2	1	100	100.00

2016-17 **(In %)**

Division	Designated Best use Class						Grand Total	Share in total Volume
	A	B	C	D	E	U		
Godavari	0	5	19	74	1	1	100	65.03
Krishna	0	4	19	56	15	5	100	8.91
Mahi		5	56	25	5	9	100	2.00
Tapi			95	3	2	0	100	24.07
Grand Total	**0**	**4**	**38**	**54**	**3**	**1**	**100**	**100.00**

2017-18 **(In %)**

Division	Designated Best use Class						Grand Total	Share in total Volume
	A	B	C	D	E	U		
Godavari	12	12	68	8	0	0	100	62.02
Krishna	0	11	57	16	13	3	100	24.06
Mahi	0	12	25	32	24	7	100	5.04
Tapi			82	17	1	0	100	8.88
Grand Total	**7**	**11**	**65**	**12**	**4**	**1**	**100**	**100.00**

2018-19 **(In %)**

Division	Designated Best use Class						Grand Total	Share in total Volume
	A	B	C	D	E	U		
Godavari	0	38	42	19	1	0	100	60.83
Krishna		45	25	23	7	0	100	32.79
Mahi		32	40	7	10	10	100	1.39
Tapi				84	10	5	100	5.00
Grand Total	**0**	**38**	**34**	**23**	**3**	**0**	**100**	**100.00**

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

Source: Calculated using data received from Central Water Commission

Table 4.6: Month Wise Distribution of River Water Quality 2015-16 to 2018-19

2015-16 **(in %)**

Month	Designated Best use Class						Grand Total
	A	B	C	D	E	U	
June		34	59	1	1	6	100
July		7	13	77	3	0	100
August		1	61	34	4		100
September		0	20	79	1	0	100
October		2	32	64	2	0	100
November	2	13	55	27	1	2	100
December	0	8	35	54	0	3	100
January		8	30	55	1	6	100
February	2	7	55	18	1	18	100
March		4	65	29	1	1	100
April		4	65	9	2	21	100
May		1	36	58	1	3	100
Grand Total	**0**	**3**	**34**	**60**	**2**	**1**	**100**

2016-17 **(in %)**

Division	Designated Best use Class						Grand Total
	A	B	C	D	E	U	
June		27	44	4		25	100
July			9	72	17	1	100
August		5	37	55	2	1	100
September		0	63	36	1	0	100
October		3	21	75	1	0	100
November	4	15	39	26	0	17	100
December	2	14	51	4	16	13	100
January		10	54	30	0	6	100
February		21	58	15		6	100
March	3	0	88	9	0	0	100
April	13	53	26		4	5	100
May	0	41	55	0	1	2	100
Grand Total	**0**	**4**	**38**	**54**	**3**	**1**	**100**

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

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2017-18 **(in %)**

Division	Designated Best use Class						Grand Total
	A	B	C	D	E	U	
June		1	26	53	1	18	100
July		2	82	9	5	2	100
August	10	23	42	14	11		100
September		8	86	4	1	1	100
October	18	2	64	14	3		100
November	0	15	66	2	16	1	100
December	11	18	31	38	1	1	100
January	13	46	29	10	2	1	100
February	27	39	31	1	1	2	100
March	32	5	6	55	1	2	100
April	16	68	6	9	0	1	100
May		2	3	93		3	100
Grand Total	**7**	**11**	**65**	**12**	**4**	**1**	**100**

2018-19 **(in %)**

Division	Designated Best use Class						Grand Total
	A	B	C	D	E	U	
June		86	5	1	2	6	100
July		84	12	3	1	0	100
August		28	52	14	4	2	100
September		29	34	33	4		100
October		32	54	12	1		100
November	3	30	23	32	11		100
December		46	11	41	1	1	100
January		41	27	30	1	1	100
February		41	23	34	1	0	100
March		2	16	81	1	1	100
April		8	2	89	0	1	100
May		26	2	67	2	4	100
Grand Total	**0**	**38**	**34**	**23**	**3**	**0**	**100**

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

Source: Calculated using data received from Central Water Commission

Quality Accounts for Groundwater of Selected States

21. The States of Kerala, Maharashtra, Odisha and Rajasthan have been selected to get a macro picture of the status of groundwater quality classes across the country over a period of 3 years. Block-wise Net Annual Groundwater Resources, as corresponding to the "Dynamic Ground Water Resources of India, 2017" have been utilized for the analysis. Site-wise information of groundwater quality for the years 2016, 2017 and 2018 was obtained from CGWB, which is also available on their website[16]. There were several blocks for which information on quality parameters was not available for a particular year. Resources of such blocks have been shown against the row on 'Missing Blocks'. The status of groundwater quality in each of the states has been discussed in the following paragraphs.

Kerala

22. The groundwater quality accounts for the state of Kerala for the years 2016-18 have been compiled based on the data on groundwater quality parameters provided by Central Ground Water Board for

331 sites across 131 blocks in 14 districts in 2016;
428 sites across 138 blocks in 14 districts in 2017; and
497 sites across 139 blocks in 14 districts in 2018.

Table 4.7: Distribution of groundwater quality in Kerala

District	2016						2017						2018					
	A	C	E	U	Total	% share	A	C	E	U	Total	% share	A	C	E	U	Total	% share
Alappuzha	49	13	35	3	100	6.21	74	26			100	7.76	88	3	7	2	100	7.76
Ernakulam	83	13	4		100	8.15	82	13	5		100	9.15	61	8	31		100	9.58
Idukki	56		44		100	3.57	37	6	57		100	3.57	29		68	3	100	3.57
Kannur	69	6	25		100	7.21	93	4	4		100	7.21	61	2	33	4	100	7.70
Kasargod	81		16	4	100	3.35	88		9	3	100	3.35	56		40	4	100	4.48
Kollam	63	6	23	8	100	5.89	63	4	15	17	100	6.39	57	2	41		100	3.75
Kottayam	84		13	2	100	6.65	25	3	70	2	100	6.65	31	3	62	4	100	6.65
Kozhikode	79		15	6	100	5.87	67	1	31	1	100	5.44	3	4	84	9	100	5.87
Malappuram	77	11	8	3	100	7.11	69	14	16	1	100	7.11	72	7	21		100	7.11
Palakkad	34	46	15	5	100	11.35	51	41	8		100	10.77	59	21	17	2	100	11.35
Pathanamthitta	57		38	5	100	4.50	87		13		100	4.50	40		60		100	4.50

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[16] http://cgwb.gov.in/wqreports.html and http://cgwb.gov.in/GW-Year-Book-State.html

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District	2016						2017						2018					
	A	C	E	U	Total	% share	A	C	E	U	Total	% share	A	C	E	U	Total	% share
Thiruvananthapuram	61	9	5	25	100	3.36	50	4	28	18	100	4.37	78	2	14	6	100	4.26
Thrissur	38	4	51	8	100	9.96	48	18	32	2	100	11.33	75	6	19	0	100	11.33
Wayanad	33	0	29	38	100	3.71	71	10	19	0	100	4.44	35	0	65	0	100	3.71
Total	60	11	23	6	100	86.88	64	13	20	3	100	92.04	57	6	35	2	100	91.63
Missing Blocks	0	0	0	100	100	13.12	0	0	0	100	100	7.96	0	0	0	100	100	8.37
Grand Total	52	9	20	18	100	100.0	59	12	19	10	100	100.0	52	5	32	10	100	100.0

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

Source: Calculated using data received from Central Ground Water Board

Maharashtra

23. The groundwater quality accounts for the state of Maharashtra for the years 2016-18 have been compiled based on the data on groundwater quality parameters provided by Central Ground Water Board for

969 sites across 268 blocks in 34 districts in 2016;

1126 sites across 316 blocks in 34 districts in 2017; and

1237 sites across 302 blocks in 34 districts in 2018.

Table 4.8: Distribution of groundwater quality in Maharashtra

District	2016						2017						2018					
	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share
Ahmednagar	9	64	12	15	100	2.2	18	45	29	7	100	3.3	15	44	25	16	100	4.5
Akola		36	27	37	100	0.9		36	11	53	100	1.1	7	42	35	17	100	1.1
Amravati	2	73	18	7	100	2.5	3	34	45	18	100	2.9	3	72	16	8	100	2.7
Aurangabad		75	25		100	2.2		28	65	7	100	3.1		56	31	13	100	3.1
Beed	4	20	43	34	100	2.5	2	20	67	11	100	3.7	15	50	22	13	100	3.7
Bhandara	2	92	5	2	100	2.7	2	66	28	4	100	2.9		90	8	2	100	2.7
Buldhana		60	39	2	100	2.8		40	57	3	100	2.0		74	21	5	100	2.5
Chandrapur	2	69	23	6	100	3.2		58	34	9	100	3.6	9	42	42	7	100	3.1

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District	2016						2017						2018					
	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share
Dhule		62	23	15	100	2.3	5	49	28	19	100	2.3	10	6	51	33	100	2.3
Gadchiroli	10	79	11		100	2.6	2	38	59	1	100	3.1	15	70	15		100	2.6
Gondia	26	56	14	3	100	1.8	27	59	14		100	2.1	39	40	20		100	1.8
Hingoli	6	80	7	7	100	1.5	11	27	62		100	2.5	10	85	5		100	2.0
Jalgaon	11	72	16	1	100	3.5		29	60	12	100	3.8		72	26	2	100	3.2
Jalna		37	43	20	100	2.0		42	49	10	100	2.7		51	27	22	100	2.5
Kolhapur	48	48	4		100	3.7	44	46	11		100	4.1	43	53	4		100	3.7
Latur	5	63	32		100	1.7		17	80	3	100	2.2	2	63	20	15	100	2.1
Nagpur		92	8		100	3.0	3	56	38	4	100	2.8	11	68	17	4	100	3.0
Nanded		62	38		100	2.6		51	47	2	100	3.3	8	62	29		100	3.1
Nandurbar	7	89		4	100	1.6	2	83	11	4	100	1.6	11	85		4	100	1.6
Nashik	13	61	18	8	100	5.2	12	39	41	9	100	6.2	23	47	20	10	100	6.0
Osmanabad	9	60	30		100	2.0	9	37	51	3	100	2.5	2	75	20	3	100	2.5
Palghar	6	92	2		100	0.6	47	49	4		100	0.5	61	25		14	100	0.6
Parbhani	2	78	20		100	1.5		33	57	10	100	2.7	15	50	15	20	100	1.9
Pune	28	57	9	6	100	4.8	9	68	22	1	100	5.9	15	76	8		100	5.9
Raigad	58	40		2	100	1.1	41	49	6	4	100	1.1	63	33	4		100	1.2
Ratnagiri	86	7	3	3	100	1.4		71	29		100	1.4	58	6	34	2	100	1.4
Sangli		80	9	10	100	3.7	8	66	25	2	100	4.1		84	13	3	100	3.9
Satara	10	57	33		100	3.2	4	67	24	4	100	3.2	4	87	6	3	100	3.2
Sindhudurg	62	28	7	2	100	0.8		92	8		100	0.8	57	8	36		100	0.8
Solapur	5	64	14	16	100	2.9	1	44	51	3	100	4.6		51	40	9	100	4.6
Thane	18	78	4		100	0.6	43	51	6		100	0.6	38	59	4		100	0.6
Wardha	5	78	15	2	100	2.6		35	58	8	100	2.6	5	75	20		100	2.6
Washim		62	38		100	1.8	3	39	52	5	100	1.8		77	23		100	1.8
Yavatmal		75	25		100	3.1	3	53	40	4	100	3.3		77	22	1	100	3.6
Total	**11**	**64**	**19**	**6**	**100**	**80.6**	**7**	**46**	**40**	**6**	**100**	**94.1**	**12**	**61**	**21**	**6**	**100**	**91.8**
Missing Blocks				100	100	19.4				100	100	5.9				100	100	8.2
Grand Total	**9**	**52**	**15**	**24**	**100**	**100.0**	**7**	**44**	**38**	**12**	**100**	**100.0**	**11**	**57**	**19**	**14**	**100**	**100.0**

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

Source: Calculated using data received from Central Ground Water Board

Odisha

24. The data on groundwater quality parameters provided by Central Ground Water Board were analysed for

1193 sites across 251 blocks in 31districts in 2016;

1135 sites across 241 blocks in 34 districts in 2017; and

1141 sites across 264 blocks in 34 districts in 2018.

However, the groundwater quality accounts for the state of Odisha have been compiled only for the year 2018 since information on some of the critical quality parameters were missing for the years 2016 and 2017.

Table 4.9: Distribution of groundwater quality in Odisha

District	2018					
	A	C	E	U	Total	% Share
Anugul	56	24	17	3	100	3.51
Balangir	39	32	27	1	100	3.45
Baleshwar	24	36	40		100	5.24
Bargarh	39	54	6	1	100	3.30
Bhadrak	70	17	5	7	100	2.87
Boudh	30	42	28		100	1.42
Cuttack	44	52	1	2	100	3.60
Deogarh	55	14	17	14	100	1.85
Dhenkanal	43	47	7	4	100	2.76
Gajapati	60	33	7		100	0.83
Ganjam	21	69	6	3	100	4.74
Jagatsinghapur	78			22	100	1.84
Jajpur	39	58		3	100	2.32
Jharsuguda	79	21			100	1.28
Kalahandi	26	39	20	15	100	4.14
Kandhamal	77	23			100	1.65
Kendrapara	26	74			100	0.74
Kendujhar	63	36	1		100	5.39
Khordha	70	24		6	100	2.38
Koraput	92	8			100	2.97
Malkangiri	38	62			100	1.24
Mayurbhanj	71	26	3		100	9.09
Nabarangapur	44	56			100	2.78
Nayagarh	38	46	10	7	100	2.37
Nuapada	26	60	4	10	100	1.71

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District	2018					
	A	C	E	U	Total	% Share
Puri	52	48			100	3.40
Rayagada	64	36			100	1.39
Sambalpur	40	49	9	2	100	3.90
Sonepur	29	64	4	3	100	1.70
Sundargarh	61	38			100	4.18
Total	**50**	**39**	**8**	**3**	**100**	88.05
Missing Blocks				100	100	11.95
Grand Total	**44**	**34**	**7**	**15**	**100**	100.00

Note: Totals may not match due to rounding off.
Source: Calculated using data received from Central Ground Water Board

Rajasthan

25. The groundwater quality accounts for the state of Rajasthan for the years 2016-18 have been compiled based on the available data on groundwater quality parameters provided by Central Ground Water Board for

1193 sites across 199 blocks in 33 districts in 2016;
1135 sites across 207 blocks in 33 districts in 2017; and
1141 sites across 208 blocks in 33 districts in 2018.

Table 4.10: Distribution of groundwater quality in Rajasthan

Districts	2016						2017						2018					
	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share
Ajmer	25	6	14	55	100	2.57	16	13	10	61	100	2.57		38	13	49	100	2.57
Alwar		59	21	20	100	6.44		71	11	18	100	6.44	28	55	4	14	100	6.44
Banswara		55	45		100	0.94	8	19	73		100	1.16	12	52	23	13	100	1.30
Baran	9	42	42	7	100	3.60	3	66	15	16	100	4.07	4	13	72	11	100	3.60
Barmer		5	23	72	100	0.82	2	4	17	77	100	0.82		8	20	72	100	0.82
Bharatpur		18	22	60	100	3.13		15	33	52	100	3.47		15	24	60	100	3.13
Bhilwara		10	34	57	100	3.70		15	18	67	100	3.70		41	11	47	100	2.84
Bikaner	11	14	29	47	100	1.40		22	32	46	100	0.93	11	32	0	57	100	1.28
Bundi	20	40	12	27	100	3.42	17	26	32	25	100	3.95	17	32	26	25	100	3.95
Chittorgarh		50	20	30	100	2.50		44	48	9	100	2.74		82	18		100	2.11

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Districts	2016						2017						2018					
	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share	A	C	E	U	Total	% Share
Churu	15		9	76	100	0.75	20		2	78	100	0.75	21		3	76	100	0.75
Dausa	2	6	43	49	100	1.82		24		76	100	0.59		7	25	69	100	1.82
Dholpur		27	33	40	100	1.73		51		49	100	1.73		40	18	42	100	1.73
Dungarpur			100		100	0.24		26	74		100	0.66		47	45	7	100	0.66
Ganganagar	72	13	9	7	100	2.49	25	9	43	23	100	2.49	76	15	6	3	100	2.49
Hanumangarh	35	52	3	10	100	1.24	35	43	13	9	100	1.59	49	35	5	11	100	1.59
Jaipur	6	29	22	43	100	2.89	1	37	29	32	100	4.13	5	25	20	50	100	5.11
Jaisalmer		15	20	64	100	0.51		15	15	70	100	0.51		13	11	75	100	0.51
Jalore				100	100	1.80				100	100	1.24		3	39	58	100	3.47
Jhalawar	9	38	18	35	100	3.19	9	18	51	22	100	2.62	8	18	57	18	100	2.62
Jhunjhunu		52	36	12	100	0.59		74	20	5	100	1.31						
Jodhpur	4	13	12	71	100	2.23	15	20	16	50	100	1.70	12	33	2	53	100	1.91
Karauli		48	26	26	100	2.62		18	45	38	100	2.62		44	23	33	100	2.62
Kota	8	50	33	9	100	3.29	3	44	20	33	100	3.29		62	22	15	100	3.29
Nagaur			1	99	100	2.23	14	47		39	100	1.87		16	2	82	100	2.12
Pali		22	17	61	100	2.93		30	17	54	100	3.35		18	8	74	100	3.30
Pratapgarh		42	41	17	100	1.60	10	30	56	5	100	1.60	13	52	30	6	100	1.60
Rajsamand		34	33	33	100	0.74		29	42	29	100	0.74	4	60	28	8	100	0.74
Sawai Madhopur		54	16	29	100	3.37		22	44	34	100	3.37		28	36	36	100	3.37
Sikar		34	20	46	100	2.01		23	4	74	100	2.24	4	24	21	52	100	2.24
Sirohi		5	79	16	100	2.64	10	24	52	14	100	2.64		17	38	44	100	2.64
Tonk	3	37	21	39	100	3.48		31	18	52	100	3.48		15	36	48	100	3.04
Udaipur		49	31	20	100	2.24		32	46	22	100	2.33	3	46	29	22	100	2.41
Total	7	31	24	37	100	75.16	5	33	27	36	100	76.72	9	31	23	37	100	78.08
Missing Blocks				100	100	24.84				100	100	23.28				100	100	21.92
Grand Total	5	24	18	53	100	100.00	4	25	21	51	100	100.00	7	24	18	51	100	100.00

Note: Totals may not match due to rounding off. Data across years may not strictly be comparable, since the classification can be affected by the availability/non-availability of information on some of the quality parameters.

Source: Calculated using data received from Central Ground Water Board

26. A gist of the state-wise accounts of groundwater quality is presented in Figure 4.1 at the end of this Chapter. Quality Accounts of Groundwater, giving district-wise Net Annual Groundwater Resources under each of the quality classes, for the four States is given in Annexure-4.2.

Way Forward

27. The analysis presented in this chapter can be improved by pooling similar information on water quality collected by the other agencies at the Centre and State levels, like the State Pollution Control Boards and State Water Authorities, which will help present and analyse information even at micro-levels. These agencies have well-developed datasets to suit their needs and, therefore, have varying formats and structures. The need of the hour is to integrate these disparate datasets through standardized codes and methods, to get a 360-degree view of the state of water resources in the country.

28. Water Provisioning Services is an important ecosystem service that needs to be measured and managed for planning efficient distribution, harvesting and recharging the water resources. In accounting terms, for the valuation of 'water provisioning service', information would be required on the price(s) of water and costs of treatment and delivery, which, in turn, would be dependent on the quality of water in the water resources. Water quality accounts can help frame the bridges between water availability and use and enable an analysis of the net balance and flows of water provisioning services, for framing policies favouring a 'water sufficient' country.

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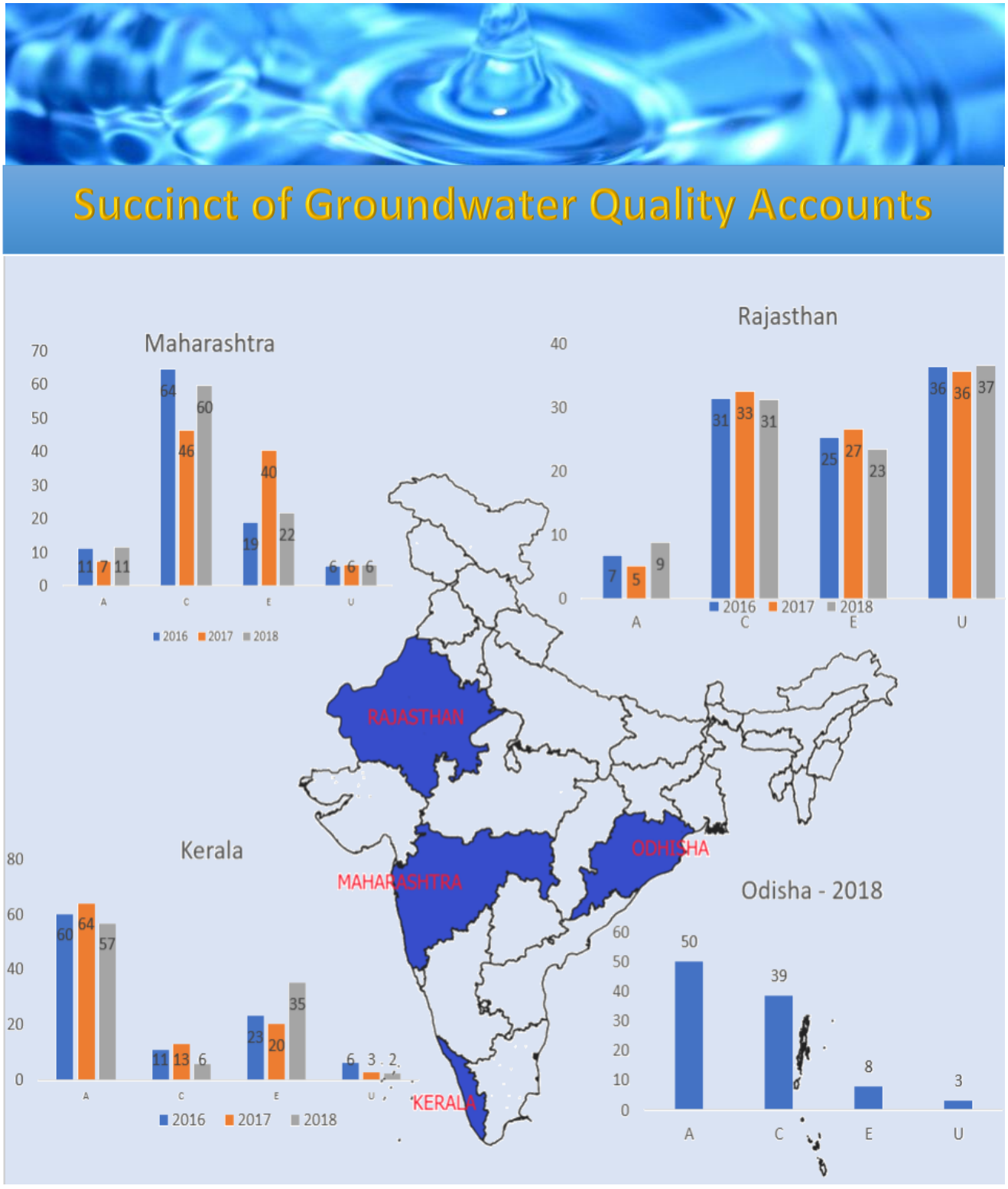
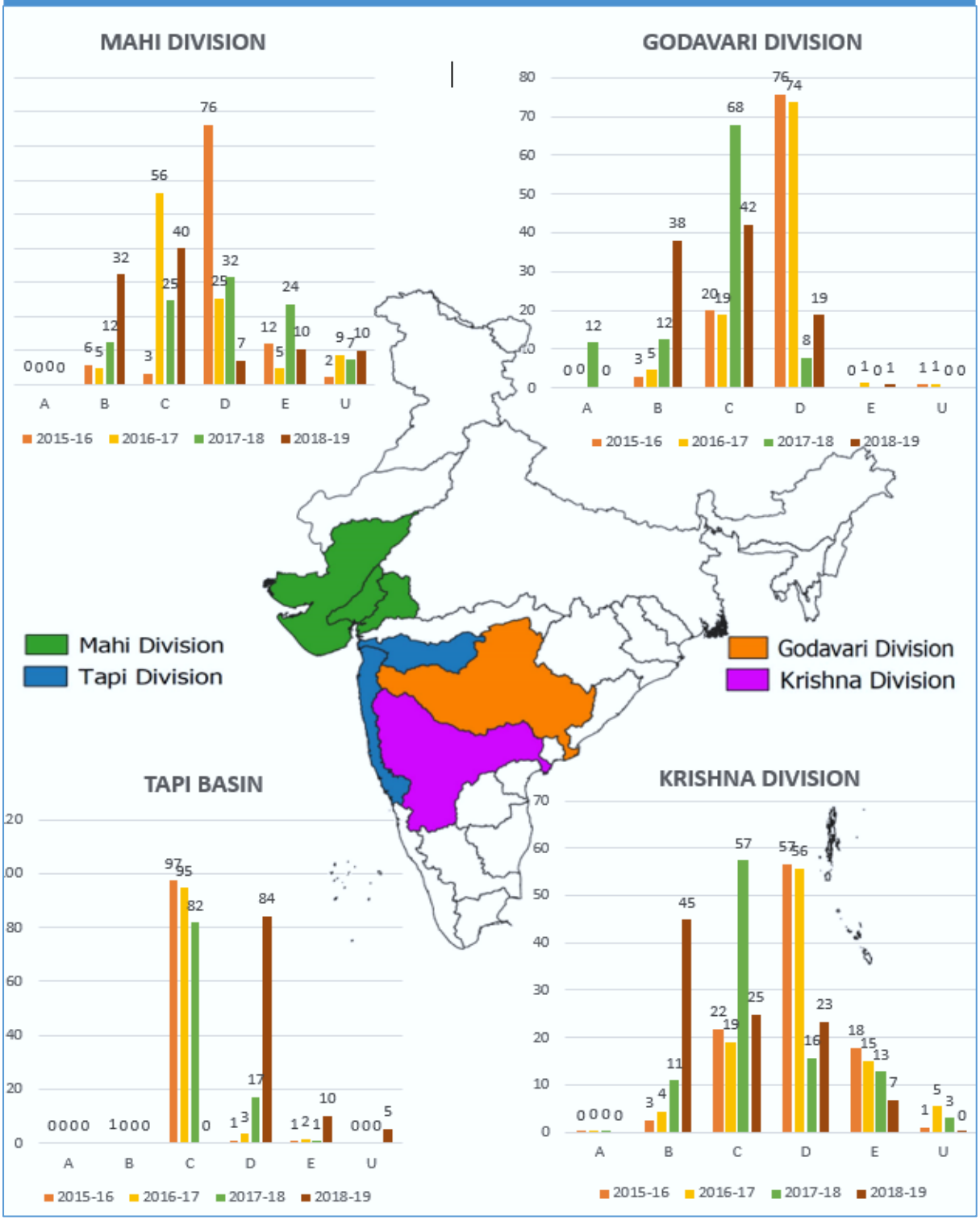
FIGURE 4.1: Assessment of Groundwater Quality in four States of India



Succinct of River Water Quality Accounts



Appendix I: Threshold Limits for various water quality parameters for designated best use quality classes for surface water[17]

Designated Best Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliform Organism MPN/100ml - 50 or less pH between 6.5 and 8.5 Dissolved Oxygen – 6 mg/l or more Biochemical Oxygen Demand 5 days 20^0C – Max 2 mg/l Arsenic (mg/l) [18] – Max 0.01 Fluoride (mg/l) [18] - Max 1.0 Nitrate, Nitrogen (mg/l) [18]- Max 45 (limit taken that for Nitrate)
Outdoor bathing (Organised)	B	Total Coliform Organism MPN/100ml - 500 or less pH between 6.5 and 8.5 Dissolved Oxygen - 5mg/l or more Biochemical Oxygen Demand 5 days 20^0C - Max 3 mg/l
Drinking Water Source after conventional treatment and disinfection	C	Total Coliform Organism MPN/100ml - 5000 or less pH between 6 to 9 Dissolved Oxygen 4 mg/l or more Biochemical Oxygen Demand 5 days 20^0C – Max 3 mg/l Arsenic (mg/l) [18] - Max 0.01 Fluoride (mg/l) [18] - Max 1.5 Nitrate, Nitrogen (mg/l) [18] - Max 45 (limit taken that for Nitrate)
Propagation of Wildlife and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen – 4 mg/l or more Free Ammonia (as N) - 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25^0C micro mhos/cm - Max.2250 Sodium Adsorption Ratio - Max. 26 Boron - Max. 2 mg/l
Unclassified	U	

[17]Status of Water Quality in India 2011, Central Pollution Control Board (CPCB), Ministry of Environment & Forests

[18]BIS, I. (2012). 10500: 2012 Indian Standard Drinking Water-Specification (Second revision). Bureau of Indian Standards (BIS), New Delhi.

Appendix II: Threshold Limits for various water quality parameters for designated best use quality classes for groundwater

Designated Best Use	Class of Water	Criteria
Drinking Water Source – Class I, as defined by the acceptable limits of IS 10500:2012[18]	A	pH between 6.5 to 8.5 Total Dissolved Solids, mg/l - Max 500 Total Hardness (as $CaCO_3$), mg/l - Max 200 Iron (as Fe), mg/l - Max 1.0 Chloride (as Cl), mg/l - Max 250 Sulphate (as SO_4), mg/l - Max 200 Fluoride (as F), mg/l - Max 1.0 Arsenic (as As), mg/l - Max 0.01 Nitrates (as NO_3), mg/l - Max 45 Calcium (as Ca), mg/l - Max 75 Magnesium (as Mg), mg/l - Max 30 Bicarbonate[19], mg/l - Max 244
Drinking Water Source – Class II, as defined by the permissible limits of IS 10500:2012[18]	C	pH between 6.5 to 8.5 Total Dissolved Solids, mg/l - Max 2000 Total Hardness (as $CaCO_3$), mg/l - Max 600 Iron (as Fe), mg/l - Max 1.0 Chloride (as Cl), mg/l - Max 1000 Sulphate (as SO_4), mg/l - Max 400 Fluoride (as F), mg/l - Max 1.5 Arsenic (as), mg/l - Max 0.01 Nitrates (as NO_3), mg/l - Max 45 Calcium (as Ca), mg/l - Max 200 Magnesium (as Mg), mg/l - Max 100 Bicarbonate[19], mg/l – Max 732
Irrigation Water, as defined by the IS 11624 (1986, Reaffirmed 2009)[20]	E	Electrical Conductance at 25° C, µS - Max- 3000 Sodium Adsorption Ratio - Max 18 Sodium Percentage [21] - Max 60 Residual Sodium Carbonate (RSC), milliequivalent per litre (mEq/l) - Max 3.0
Unclassified	U	

[19] As suggested by CGWB

[20] IS 11624: 1986 (Reaffirmed 2009), Guidelines for quality of irrigation water, Bureau of Indian Standards

[21] Water Quality Year Book, Yamuna Basin, 2016-17, CWC

Chapter 5

Biodiversity: IUCN Red List Species

1. The term biodiversity derived from "biological diversity" refers to the variety of life on Earth at all its levels, from genes to ecosystems. It includes diversity within species, between species and of ecosystems. The diversity of life on earth is essential for the healthy functioning of ecosystems, and it is biodiversity that boosts ecosystem productivity.

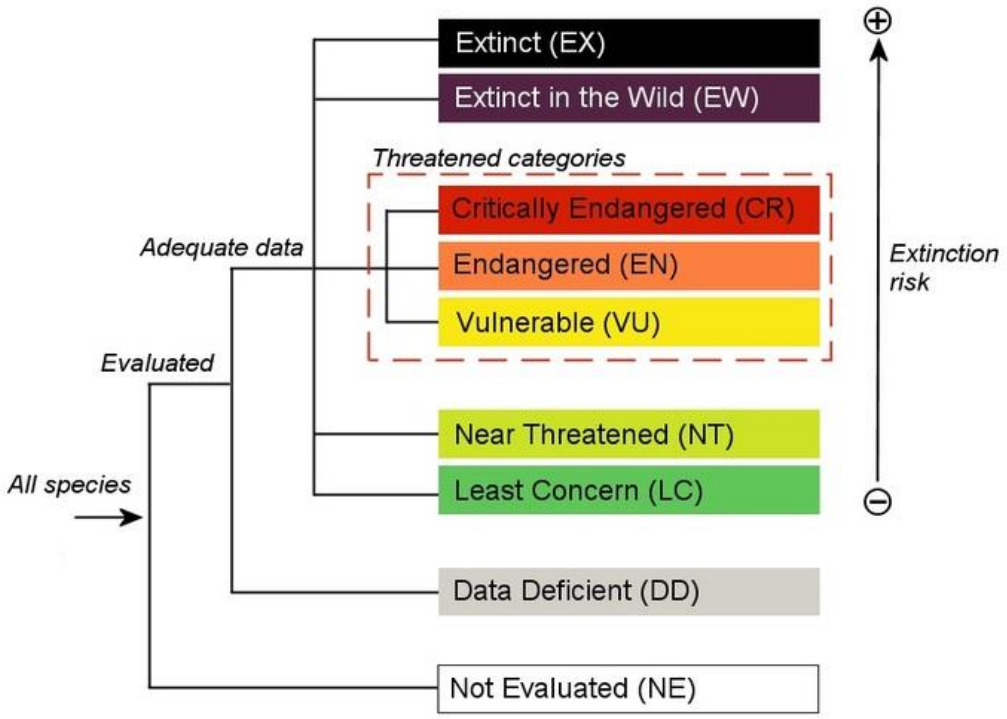
2. The biodiversity of any given region is not evenly distributed. It varies globally and within regions. The various factors that influence the biodiversity of a region include temperature, altitude, precipitation, soils and pressures from human activities. The biodiversity profile of a country at any point of time reflects the presence of diversity, the consequences of its utilisation, and how it has been conserved through legal or other measures. For instance, the faunal species of India has steadily climbed up, making India the world's 8th highest mega biodiverse country[22]. Different aspects of India's biodiversity have been discussed in the EnviStats India 2020, Vol. II Environment Accounts.

IUCN Red List of Threatened Species

3. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species is one of the most well-known objective assessment systems for classifying the status of plants, animals and other organisms threatened with extinction. It is a comprehensive information source on the global extinction risk status of animal, fungus and plant species[23]. It contains explicit criteria and categories to classify the conservation status of individual species based on their probability of extinction. The IUCN Red List Categories indicate how close a species is to extinction. The nine Red List Categories are shown in Figure 5.1.

[22] Animal Discoveries 2020, Zoological Survey of India
[23] IUCN Red List of Threatened Species; https://www.iucnredlist.org/about/background-history

FIGURE 5.1: IUCN Red List Categories[24]



4. Species are assessed against criteria based on geographic range, population size and population decline/increase, in addition to extinction probability analyses. These criteria determine which category is most appropriate for the species. A brief description of the categories, ***highlighting only the main criteria***, is given below:

i. Extinct (EX), a designation applied to species in which the last individual has died or where systematic and time-appropriate surveys have been unable to log even a single individual;

ii. Extinct in the Wild (EW), a category containing those species whose members survive only in captivity or as artificially supported populations far outside their historical geographic range;

iii. Critically Endangered (CR), a category containing those species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90 percent over the previous ten years (or three generations) or a current population size of fewer than 50 individuals;

iv. Endangered (EN), a designation applied to species that possess a very high risk of extinction as a result of rapid population declines of 50 to more than 70 percent over the previous ten years (or three generations) or a current population size of fewer than 250 individuals;

v. Vulnerable (VU), a category containing those species that possess a very high

[24] https://www.iucnredlist.org/resources/summary-sheet

risk of extinction as a result of rapid population declines of 30 to more than 50 percent over the previous ten years (or three generations), a current population size of fewer than 1,000 individuals;

vi. Near Threatened (NT), a designation applied to species that are close to becoming threatened or may meet the criteria for threatened status in the near future;

vii. Least Concern (LC), a category containing species that are pervasive and abundant after a careful assessment;

viii. Data Deficient (DD), a condition applied to species in which the amount of available data related to its risk of extinction is lacking in some way. Consequently, a complete assessment cannot be performed. Thus, unlike the other categories in this list, this category does not describe the conservation status of a species; and

ix. Not Evaluated (NE), a category used to include any of the nearly 1.9 million species described by science but not assessed by the IUCN.

5. Species in the Vulnerable, Endangered and Critically Endangered categories are collectively described as 'threatened'. The IUCN Red List does not include Not Evaluated species. The IUCN list also includes 'Least Concern' Species, which have a lower risk of extinction but are still important for global biodiversity. Some 'Least Concern' species are undergoing slow declines, and hence, it is important to monitor these species and to develop appropriate conservation actions to prevent them from becoming threatened in the future. The inclusion of the different categories of species helps track the changing status of biodiversity.

6. The IUCN Red List is a powerful tool to inform and catalyse biodiversity conservation and policy change, critical to protecting the natural resources required for survival. By providing information about range, population size, habitat and ecology, use and/or trade, threats and conservation actions, the IUCN Red List helps inform necessary conservation decisions and guide funding priorities.

7. The IUCN Red List relies on Assessors (trained individuals and species experts) to assess species based on available data and information. The information is gathered from various sources, including published scientific papers, books, reports, expert knowledge, indigenous knowledge and citizen science. The Red List Authorities review the assessments, and then the IUCN Red List Unit checks the assessments before publishing them on the IUCN Red List website.

IUCN Red List Spatial Data

8. The IUCN Red List of Threatened Species contains global assessments for over 138,300 species. The IUCN provides, in the public domain, intercontinental species

shapefiles with the Geographic Coordinate System as GCS_WGS_1984 and the Unit as Degree *(~100km*). The IUCN data repository has spatial datasets on mammals, amphibians, birds, reptiles, fishes, plants and other groups. More than 80% of the total Red List species (>111,000 species) have spatial data[25]. The data is freely accessible and includes taxonomic information, distribution status, IUCN Red List Category, sources and other relevant details. More information and resources can be found on the IUCN Red List Resources & Publications page[26].

9. The IUCN spatial datasets can be used to evaluate the species richness of the Red List species for any defined region/area. Species Richness represents a measure of the variety of species based simply on a count of the number of species in a particular sample. It is generally expressed as the number of species per unit area.

10. To facilitate its use, a GIS-based IUCN Red List Toolbox for ArcMap[27] is also available alongside the dataset, which intersects the Red List species polygon with a grid or shapefile of polygons, giving the number of species per cell or region polygon. The toolbox also enables the preparation of the Species Richness Map, which shows the number of IUCN Red List species found per pixel having an area of 0.07 square degree, or roughly 865 sq.km.

11. To understand the distribution of the Red Listed species in India, IUCN spatial datasets using the IUCN Red List of Threatened Species, Red List Version 2020-2 downloaded on August 31, 2020, were earlier analysed for Mammals, Amphibians and Reptiles. The results were published in EnviStats India 2020, Vol. II Environment Accounts. The analysis has now been extended to three more categories. Plants and Mangroves have been analysed using IUCN Red List spatial datasets Version 2020-3 downloaded in December 2020 and Version 2021-1 downloaded in May 2021. Freshwater group (consisting of both floral and faunal species) has been analysed using IUCN Red List spatial dataset Version 2021-1 downloaded in May 2021. The number of Red Listed species in India under these categories, as available in the IUCN spatial datasets, is given in Table 5.1. It needs to be noted that certain Red List species exist in India, for which information is not available in the IUCN Spatial Database. Information on some of such species, as obtained from the Botanical Survey of India and the Zoological Survey of India, has also been given in Table 5.1.

[25] https://www.iucnredlist.org/resources/spatial-data-download
[26] https://www.iucnredlist.org/resources
[27] https://www.iucnredlist.org/resources/spatialtoolsanddata

Table 5.1: Data availability for India in IUCN Spatial Database

Species		Category	Number of Species						
			Critically Endangered	Endangered	Vulnerable	Near Threatened	Least Concern	Data Deficient	Total
		Version	CR	EN	VU	NT	LC	DD	
Mammals		2020-2	9	60	87	58	338	40	592
		2020-3	9	64	87	60	337	36	593
		2021-1	9	64	86	60	336	35	590
Amphibians		2020-2	20	36	23	13	119	87	298
		2020-3	20	36	23	13	119	87	298
		2021-1	20	36	23	13	119	87	298
Reptiles (not comprehensive)		2020-2	10	13	23	11	199	66	322
		2020-3	10	13	23	11	199	66	322
		2021-1	15	19	25	13	202	66	340
Marine Groups	Mangroves	2020-2							
		2020-3	1	1		4	32	2	40
		2021-1	1	1		4	32	2	40
	Scleractinian corals*	2020-2		10	131	117	195	20	473
		2020-3		10	131	117	195	20	473
		2021-1		10	131	117	195	20	473
	Organ Pipe coral*	2020-2			1				1
		2020-3			1				1
		2021-1			1				1
	Hydrozoa*	2020-2					5		5
		2020-3					5		5
		2021-1					5		5
	Merostomata*	2020-2						2	2
		2020-3						2	2
		2021-1						2	2
	Echinodermata*	2020-2		2		4	12	21	39
		2020-3		2		4	12	21	39
		2021-1		2		4	12	21	39
	Cephalopoda*	2020-2					22	25	47
		2020-3					22	25	47
		2021-1					22	25	47
	Bivalvia*	2020-2				1	2	1	4
		2020-3				1	2	1	4
		2021-1				1	2	1	4
	Actinopterygii (Fishes)*	2020-2			9	15	395	89	508
		2020-3			9	15	395	89	508
		2021-1			9	15	395	89	508
	Chondrichthyes (Fishes)*	2020-2	18	28	24	34	14	13	131
		2020-3	18	28	24	34	14	13	131
		2021-1	18	28	24	34	14	13	131

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Species		Category	Number of Species						
			Critically Endangered	Endangered	Vulnerable	Near Threatened	Least Concern	Data Deficient	Total
		Version	CR	EN	VU	NT	LC	DD	
Marine Groups	Reptiles*	2020-2	1	1		4	21	4	31
		2020-3	1	1		4	21	4	31
		2021-1	1	1		4	21	4	31
	Mammals*	2020-2	1	3	2	3	13	11	33
		2020-3	1	3	2	3	13	11	33
		2021-1	1	3	2	3	13	11	33
Plants	Magnolias	2020-2							
		2020-3	1	2	1		1	3	8
		2021-1	1	2	1		1	3	8
	Orchids#		74	108	505	50	18	15	770
	Balsams#			5	3		1		9
	Musa#		1				3		4
Freshwater Groups	Crabs	2020-2							
		2020-3							
		2021-1			4	3	25	66	98
	Crayfishes	2020-2							
		2020-3							
		2021-1					3		3
	Fishes (not comprehensive)	2020-2							
		2020-3							
		2021-1	20	97	129	56	751	194	1247
	Molluscs (not comprehensive)	2020-2							
		2020-3							
		2021-1		5	6	2	506	155	674
	Odonata (not comprehensive)	2020-2							
		2020-3							
		2021-1		3	12	14	404	118	551
	Plants (not comprehensive)	2020-2							
		2020-3							
		2021-1	26	37	17	18	641	29	768
	Shrimps	2020-2							
		2020-3							
		2021-1		2	1		73	32	108
Total Number of Analysed Species for which IUCN Spatial Dataset is available		2020-2	39	109	82	133	656	193	1212
		2020-3	41	116	88	134	688	194	1261
		2021-1	92	266	183	304	3093	787	4725

Blank cell denotes that Spatial datasets have not been analyzed.

 # Source: Botanical Survey of India. Excluded from analysis of Spatial Distribution of Species.

**Source: Zoological Survey of India. Excluded from analysis of Spatial Distribution of Species.*

12. From Table 5.1, it can be seen that most of the Red List species in India are under

the 'Least Concern' category. The State-level Red List species counts, as compiled using the IUCN Red List Toolbox, are given in Table 5.2. The counts have been calculated using different versions of IUCN Red List data. The increase (decrease) in the species richness count does not necessarily reflect the true change in the number of species for a state/region. Change can also be attributed to the increased number of species assessed and improvement in the knowledge of species' distribution.

13. Figure 5.2 shows the species richness of different species groups across the country, with the protected areas of India marked on the map. The map denoting richness of 'All Species' in Figure 5.3 includes only those species described in Table 5.2.

Table 5.2: State-wise Count of IUCN Red List Species

State	Species Richness Count								
	Mammals			Amphibians			Reptiles		
	2020-2	2020-3	2021-1	2020-2	2020-3	2021-1	2020-2	2020-3	2021-1
Andhra Pradesh	126	124	123	23	23	23	79	79	83
Arunachal Pradesh	195	194	195	77	76	76	60	60	71
Assam	179	178	179	61	61	61	60	60	71
Bihar	126	123	124	25	25	25	43	43	52
Chhattisgarh	81	81	80	23	23	23	40	40	45
Goa	108	108	107	31	31	31	61	61	62
Gujarat	120	120	119	18	18	18	62	62	69
Haryana	92	91	91	11	11	11	19	19	26
Himachal Pradesh	123	123	124	17	17	17	19	19	26
Jharkhand	82	81	81	20	20	20	46	46	54
Karnataka	147	146	145	82	82	82	102	102	105
Kerala	144	141	140	103	103	103	140	140	143
Madhya Pradesh	93	92	91	16	16	16	44	44	52
Maharashtra	132	132	131	44	44	44	95	95	100
Manipur	146	145	145	42	42	42	54	54	64
Meghalaya	142	141	141	53	53	53	50	50	61
Mizoram	130	129	129	27	27	27	49	49	55
Nagaland	138	137	138	53	53	53	52	52	62
Odisha	112	111	111	24	24	24	72	72	78
Punjab	87	87	88	11	11	11	16	16	23
Rajasthan	90	89	88	10	10	10	25	25	33
Sikkim	157	157	158	27	25	25	32	32	39

(Table continued on next page)

State	Species Richness Count								
	Mammals			Amphibians			Reptiles		
	2020-2	2020-3	2021-1	2020-2	2020-3	2021-1	2020-2	2020-3	2021-1
Tamil Nadu	152	149	148	80	80	80	158	158	161
Telangana	83	82	81	21	21	21	44	44	47
Tripura	99	98	98	24	24	24	39	39	46
Uttar Pradesh	121	121	120	20	20	20	39	39	48
Uttarakhand	139	139	140	23	23	23	26	26	35
West Bengal	211	210	211	53	53	53	93	93	104
Andaman & Nicobar	55	54	54	14	14	14	40	40	40
Daman & Diu	94	97	96	11	15	15	45	52	54
Dadar & Nagar Haveli	69			19			31		
Delhi	49	48	48	10	10	10	12	12	17
Chandigarh	56	55	56	10	10	10	9	9	13
Jammu & Kashmir	152	120	120	16	14	14	22	14	21
Ladakh		103	102		14	14		17	18
Lakshadweep	27	25	25				5	5	5
Puducherry	104	103	103	19	19	19	64	64	67

Table 5.2 (contd): State-wise Count of IUCN Red List Species

State	Species Richness Count			
	Marine Mangroves		Plants Magnolias	
	2020-3	2021-1	2020-3	2021-1
Andhra Pradesh	22	22	0	0
Arunachal Pradesh	2	2	6	6
Assam	2	2	5	5
Bihar	2	2	1	1
Chhattisgarh	2	2	0	0
Goa	20	20	0	0
Gujarat	12	12	0	0
Haryana	2	2	0	0
Himachal Pradesh	2	2	0	0
Jharkhand	2	2	1	1
Karnataka	22	22	1	1
Kerala	23	23	1	1
Madhya Pradesh	2	2	0	0
Maharashtra	21	21	0	0

(Table continued on next page)

(Table continued from previous page)

State	Species Richness Count			
	Marine Mangroves		Plants Magnolias	
	2020-3	2021-1	2020-3	2021-1
Manipur	2	2	2	2
Meghalaya	2	2	2	2
Mizoram	2	2	1	1
Nagaland	2	2	5	5
Odisha	34	34	0	0
Punjab	2	2	0	0
Rajasthan	2	2	0	0
Sikkim	2	2	1	1
Tamil Nadu	26	26	1	1
Telangana	2	2	0	0
Tripura	2	2	0	0
Uttar Pradesh	2	2	0	0
Uttarakhand	2	2	0	0
West Bengal	35	35	2	2
Andaman & Nicobar	34	34	0	0
Daman & Diu	12	12	0	0
Dadar & Nagar Haveli				
Delhi	2	2	0	0
Chandigarh	2	2	0	0
Jammu & Kashmir	2	2	0	0
Ladakh	2	2	0	0
Lakshadweep	11	11	0	0
Puducherry	24	24	0	0

Table 5.2 (contd): State-wise Count of IUCN Red List Species

State	Species Richness Count						
	Fresh Water Group						
	Crabs	Crayfishes	Fresh Water Fishes	Molluscs	Odonata	FW Plants	Shrimps
	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1
Andhra Pradesh	11	0	182	73	61	255	18
Arunachal Pradesh	32	2	156	130	117	121	12
Assam	34	2	149	159	144	120	21
Bihar	15		119	125	111	108	15

(Table continued on next page)

(Table continued from previous page)

State	Species Richness Count						
	Fresh Water Group						
	Crabs	Crayfishes	Fresh Water Fishes	Molluscs	Odonata	FW Plants	Shrimps
	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1
Chhattisgarh	6		86	87	71	198	16
Goa	5		130	47	63	237	13
Gujarat	6		126	53	55	213	10
Haryana	9	1	58	64	65	80	9
Himachal Pradesh	9	2	69	74	67	89	9
Jharkhand	9	0	102	104	94	92	17
Karnataka	13	0	224	67	117	348	27
Kerala	29	0	247	50	119	333	38
Madhya Pradesh	6	0	76	69	65	218	14
Maharashtra	11	0	169	69	77	291	22
Manipur	21	0	149	130	107	117	11
Meghalaya	19	1	106	106	113	104	17
Mizoram	17	0	105	153	108	118	16
Nagaland	26	0	126	129	115	118	12
Odisha	10	0	170	106	87	203	12
Punjab	8	1	54	39	57	86	4
Rajasthan	6	0	67	62	62	89	9
Sikkim	12	2	105	125	120	109	10
Tamil Nadu	29	0	271	61	119	344	31
Telangana	5	0	104	59	61	231	13
Tripura	12	0	111	112	87	102	9
Uttar Pradesh	10	0	107	96	99	97	12
Uttarakhand	10	2	96	92	90	96	9
West Bengal	24	2	210	152	137	122	21
Andaman & Nicobar	2	0	87	38	49	70	9

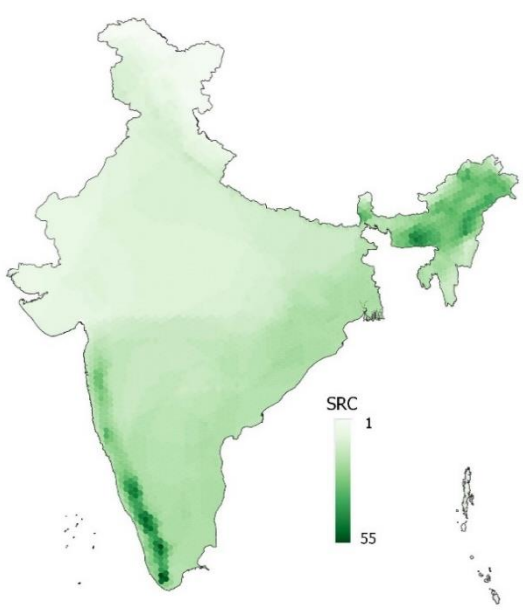
(Table continued on next page)

(Table continued from previous page)

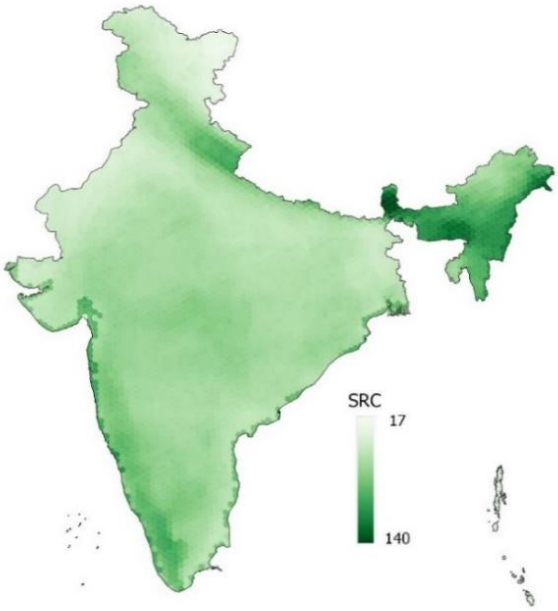
State	Species Richness Count						
	Fresh Water Group						
	Crabs	Crayfishes	Fresh Water Fishes	Molluscs	Odonata	FW Plants	Shrimps
	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1	2021-1
Daman & Diu	3	0	108	43	49	192	9
Dadar & Nagar Haveli							
Delhi	6	0	50	57	56	77	7
Chandigarh	5	0	41	32	49	69	4
Jammu And Kashmir	6	0	60	36	52	79	4
Ladakh	6	3	62	51	52	87	5
Lakshadweep	0	0	27	4	4	3	0
Puducherry	9	0	178	54	60	263	13

Source: Calculated using Spatial datasets on Red List Species downloaded from the website of IUCN

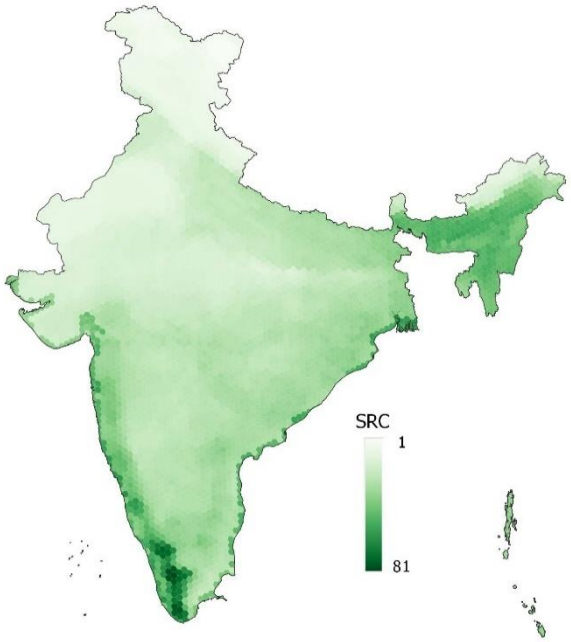
Figure 5.2: Species Richness Map of Red List Species



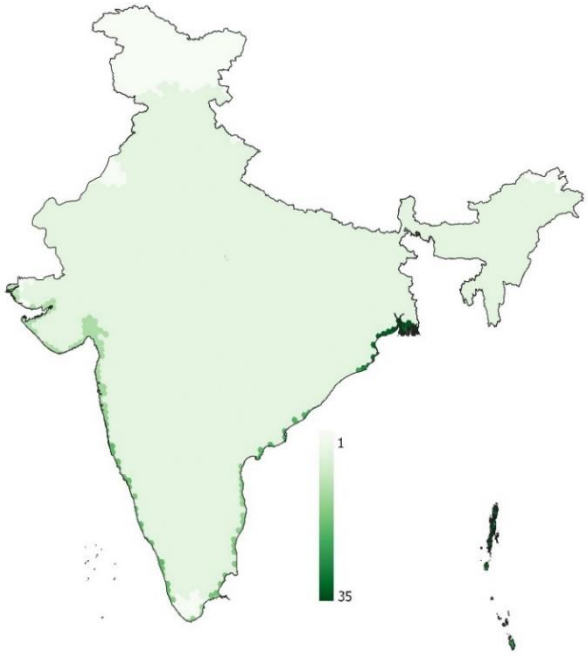
(a) Amphibians



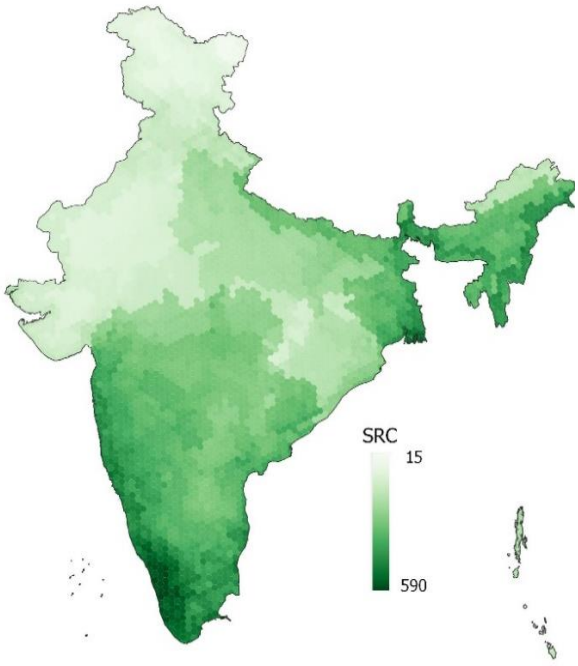
(b) Mammals



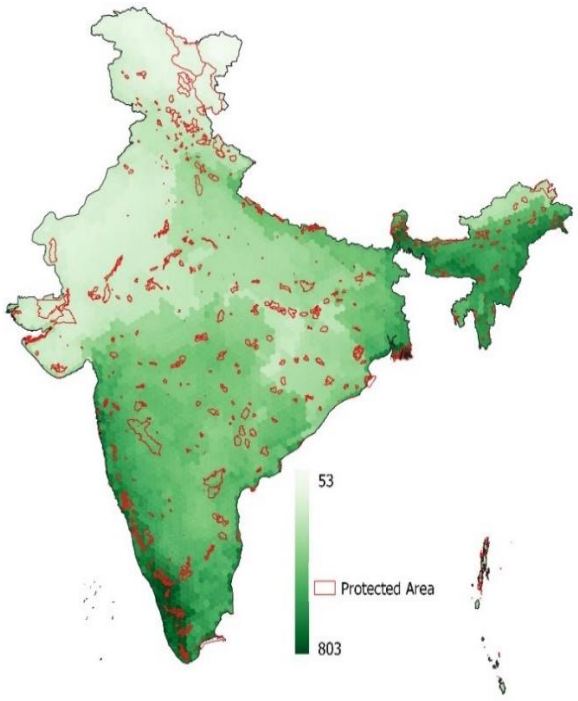
(c) Reptiles



(d) Mangroves



(e) Fresh Water Group Species



(g) All Analysed Species with Protected Areas marked in Red

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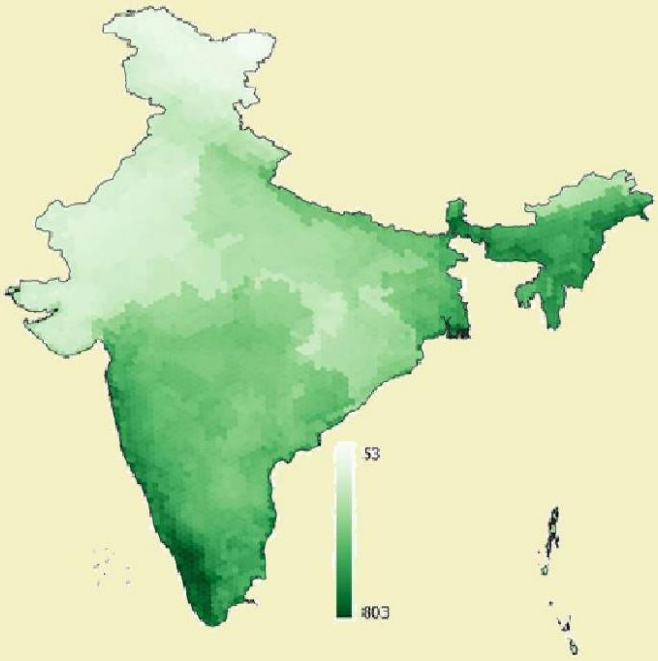
Species Richness of IUCN Red List Species

Figure 5.2: Species Richness Map for All Analysed Species



Data availability for India in IUCN Spatial Database Version 2021-1

DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	Total
DD	LC	NT	VU	EN	CR	
787	3093	183	304	266	92	4725

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Andhra Pradesh	ADILABAD	4189	6374	8345	9051	9553	11716	15762	13136					
	ANANTAPUR	2617	1377	6238	3796	4732	8230	8943	12237	8469	8164	6995	3490	7238
	CHITTOOR	6670	9972	10733	16753	14642	18800	26453	21852	20911	18380	18654	14244	18757
	EAST GODAVARI	10841	13559	17686	20400	20541	18369	16928	23782	26901	23081	34345	31436	38750
	GUNTUR	10501	12641	13517	19274	21002	16503	23229	25492	26019	26291	23448	25016	29648
	KADAPA	3358	4981	8379	8438	9370	10821	15136	9867	14434	12461	14436	10729	10379
	KARIMNAGAR	9454	11850	15982	19784	18244	21222	17131	23854					
	KHAMMAM	6738	8074	10625	12742	13158	16085	15166	19417					
	KRISHNA	12633	13530	16701	22248	27961	19624	21204	25143	28015	22738	33621	25286	29212
	KURNOOL	5568	5571	7500	12087	9304	10451	11554	13800	16029	16702	10666	15001	15569
	MAHBUBNAGAR	4387	4253	6138	10975	8890	12437	14626	17950					
	MEDAK	6319	7143	8957	10270	8882	14752	16254	22194					
	NALGONDA	7171	7970	9749	14047	16708	15979	14869	18493					
	NIZAMABAD	10431	11171	13170	18477	16483	20965	18213	31251					
	PRAKASAM	5526	7445	7500	11307	11772	9411	16117	14179	15593	16850	15125	12371	11555
	RANGAREDDI	5307	5892	6507	10040	8954	8433	12729	14414					
	SPSR NELLORE	9490	11979	12208	19965	21270	17597	24089	27435	26030	25505	25507	26860	28025
	SRIKAKULAM	6477	8296	10902	11076	13345	8021	13803	19210	15637	14111	18696	18183	19219
	VISAKHAPATANAM	5226	6872	7979	8641	9567	10991	10388	12021	14694	12554	18041	15765	16198
	VIZIANAGARAM	5102	7206	8354	12412	12448	12443	13634	16441	15981	14645	21805	19873	21376
	WARANGAL	8038	9527	10668	16854	15084	17982	21803	22973					
	WEST GODAVARI	12963	15449	19291	23970	24148	22977	19734	27474	31055	24484	35500	36216	36397
Arunachal Pradesh	ANJAW	2803	1990	2041	3370	2484	4501	3771	4091	4848	4351	4569	4891	8349
	CHANGLANG	3214	4422	8254	6789	6875	7781	6692	6819	8753	8611	8513	9041	9914
	DIBANG VALLEY	2076	1025	1680	2678	2612	4198	8733	11235	5930	4881	6792	7239	11946
	EAST KAMENG	1454	1676	2008	3397	2757	4121	3483	4773	6179	5666	7118	7446	11221

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Arunachal Pradesh	EAST SIANG	4135	3848	4149	6328	5597	7583	6459	6338	8971	8054	9118	10721	13018
	KRA DAADI											14155	7890	8034
	KURUNG KUMEY	2632	2262	1643	2656	2868	5288	6888	13149	6265	4685	14627	7976	7757
	LOHIT	3841	3836	2842	4354	7021	7638	6431	5880	7596	6451	7207	8886	12075
	LONGDING									6188	5238	7112	8527	12726
	LOWER DIBANG VALLEY	3077	2716	2762	4238	3177	5002	3944	4891	5995	5166	6965	8435	11843
	LOWER SUBANSIRI	3188	3102	2806	4165	4141	6557	2614	8039	10206	9987	9752	11169	12466
	NAMSAI										17378	7665	9689	12576
	PAPUM PARE	3408	3533	3757	6238	5648	7498	6279	7692	10454	9630	9144	9872	11610
	SIANG											7156	6758	8757
	TAWANG	6549	5689	6458	30012	8497	10886	9803	9645	10855	8448	8977	9325	13421
	TIRAP	1494	1351	1584	2594	1946	3017	2617	5434	6041	4768	8256	9500	14020
	UPPER SIANG	2738	2574	2709	3401	3104	4310	3606	6850	7297	6784	8421	9865	11454
	UPPER SUBANSIRI	2817	2311	5414	4894	3743	5603	4839	6479	9773	8828	10324	11007	13032
	WEST KAMENG	4249	3706	3915	8279	5785	7958	6842	7456	8476	6479	8810	9868	16300
	WEST SIANG	2259	1942	2335	3109	2521	3807	3144	4587	5966	5729	6520	7246	9776
Assam	BAKSA	3168	3173	3548	7554	6369	7353	6548	6939	8706	10403	10341	9629	11387
	BARPETA	2166	2305	2815	4582	5274	7147	6157	7547	9288	8850	8578	10012	11674
	BONGAIGAON	4198	3997	4794	4364	4635	6147	5633	6915	9840	9189	7790	10308	9830
	CACHAR	4098	3329	2440	5833	5891	6205	4524	5250	5459	7688	7054	8290	7924
	CHIRANG	3051	2918	2911	4368	5447	6490	5290	4665	5635	5810	5999	6157	8188
	DARRANG	3029	3278	3665	4792	5092	7120	6305	6654	9194	9105	9341	9817	10872
	DHEMAJI	3676	3675	4323	3642	4742	6124	4969	6337	8158	9239	9558	8061	8496
	DHUBRI	2638	3380	3574	4479	4352	6101	5748	11206	14767	14691	14981	16984	15249
	DIBRUGARH	2975	2871	3008	4239	4718	5192	3030	5298	6135	5829	6752	6689	7433
	DIMA HASAO	4184	3829	4708	5285	9403	12580	10813	6639	8274	9192	11271	11274	9103

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	GOALPARA	3259	3120	4228	5375	5486	8034	5352	7411	10833	10444	10921	11878	14485
	GOLAGHAT	4030	3506	4378	4927	6223	7236	6021	6994	9351	9203	9003	9046	9069
	HAILAKANDI	4168	4012	4996	6195	6637	6469	5671	7152	10121	11587	9806	10490	10280
	JORHAT	3257	2421	3258	4121	5215	5502	4634	5038	6619	5933	6585	7203	7603
	KAMRUP	3217	2880	4194	3926	4182	5330	3987	6926	10146	10303	11376	11235	11621
	KAMRUP METRO	3971	3763	4592	3659	4191	5672	4308	6283	9229	8583	10428	11053	10586
	KARBI ANGLONG	3730	4286	4771	5464	6921	7062	5347	6995	8736	9311	9252	11224	11004
	KARIMGANJ	3516	4408	4194	6314	6369	5752	5905	4831	6470	6354	5593	7319	7669
	KOKRAJHAR	3793	3793	4551	4449	6277	8304	7314	9349	12238	11564	10320	9589	9860
	LAKHIMPUR	3218	2480	3211	3026	5390	7733	8533	9761	10340	9892	10084	11515	12109
	MARIGAON	2503	2653	3192	4207	5014	5704	5502	8580	12493	11857	11692	12635	13636
	NAGAON	3550	3244	3893	4309	5345	5495	4752	7004	10210	9835	10641	13102	13378
	NALBARI	3715	3818	5001	5823	5790	7836	5943	8702	10274	11457	10559	12223	15089
	SIVASAGAR	3082	2593	3266	5513	5216	5255	3985	5467	6721	6589	6629	7290	8170
	SONITPUR	4111	3051	4284	5346	5681	7957	6400	7584	9798	10887	11138	11096	11292
	TINSUKIA	3228	3081	3623	3859	4011	5719	4789	4169	5508	6195	7051	5929	5881
	UDALGURI	2964	2673	3772	4380	4788	5500	4633	6369	6872	8916	9584	8877	9342
Bihar	ARARIA	3851	3772	4440	5411	6163	7581	6446	7685	10510	13644	16024	15213	14014
	ARWAL	4260		5322	4758	4786	5307	5081	4874	6010	12541	10593	15585	17097
	AURANGABAD	2809	5666	6501	3392	4417	4907	7918	7782	9573	14490	14104	13345	15279
	BANKA	3073	4295	5710	6087	6542	7574	8073	6045	8444	13418	14525	13287	14490
	BEGUSARAI	4466	4032	3632	4020	3918	7129	6106	8383	6535	9510	10521	14282	13406
	BHAGALPUR	3471	3698	3423	4075	4915	6650	5745	6544	8225	9332	13071	10606	13157
	BHOJPUR	4995	4962	6393	6746	6503	6679	6623	5822	6757	10286	12159	9823	13143
	BUXAR	5624	4436	7694	7130	5514	6225	7165	6700	8526	10705	14476	14710	17249
	DARBHANGA	2839	2491	3170	4214	4819	4067	4643	3663	4934	7855	9296	8847	9404

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Bihar	GAYA	1869	3623	5533	4678	5029	4454	5519	6696	5379	12384	10805	11521	13130
	GOPALGANJ	5026	4280	5150	5909	7871	9030	6253	9495	10538	11342	12515	14315	11708
	JAMUI	1478	3313	4382	3635	3217	3795	5882	3932	6161	9009	12011	16452	15526
	JEHANABAD	3069	4752	5299	6916	4982	4503	9911	11222	9460	20028	16538	15283	18759
	KAIMUR (BHABUA)	5485	5235	6441	5187	4722	5824	7003	6555	7936	13525	12279	11635	15374
	KATIHAR	4915	5176	4608	6258	7714	8137	7079	8551	10308	12883	13866	15726	18133
	KHAGARIA	6024	5353	6033	4425	6114	5334	6536	5199	5978	9235	10900	13206	14823
	KISHANGANJ	3723	3269	3190	3959	3943	5838	6343	4591	8271	11569	9553	10247	9314
	LAKHISARAI	3375	4851	6543	5260	5656	4326	5309	6111	8799	15205	14054	13794	14542
	MADHEPURA	5041	4379	6422	5364	6294	5540	6961	7882	7108	13116	11667	12266	13462
	MADHUBANI	1986	2555	2469	3908	6197	3611	4043	3195	3775	6568	6236	8599	9294
	MUNGER	3568	3820	4541	3871	4328	2788	4839	4722	5802	9177	8958	10189	11170
	MUZAFFARPUR	3553	3102	3040	4889	3261	4402	6236	6416	5460	10029	7032	8438	9367
	NALANDA	2548	4196	3683	3779	3763	4365	7620	6662	6088	10891	13087	14360	16309
	NAWADA	2182	4559	5940	5868	4439	4247	5827	5120	5355	10383	9403	11268	12693
	PASHCHIM CHAMPARAN	5513	3408	5489	8281	5455	10812	6916	15212	17636	22964	22753	22393	13153
	PATNA	4432	3267	3357	4457	4929	4892	6448	6501	7060	13757	11665	12271	13964
	PURBI CHAMPARAN	2959	2357	2629	4008	2777	4883	6188	6587	6663	7994	5254	11019	9381
	PURNIA	3582	3537	4355	4161	6276	6559	5808	5856	6159	8441	10940	10759	10124
	ROHTAS	6880	5562	6687	6729	7104	6486	8135	7859	10392	16637	15282	14721	18304
	SAHARSA	4635	4443	5210	5213	6380	7864	8172	6928	8321	14444	13127	13607	16119
	SAMASTIPUR	3437	3730	3671	6699	6343	6069	6470	6024	8270	13078	12369	16505	18810
	SARAN	3879	3307	4302	4735	4666	5230	4840	4762	6059	10159	7756	10813	11037
	SHEIKHPURA	4496	5910	5929	6279	5139	3580	6366	5814	5335	13608	14788	10417	11216
	SHEOHAR	3045	2487	3535	5472	7179	6082	10602	10719	10062	12500	12098	13841	16091
	SITAMARHI	2566	3041	3617	5262	5196	8248	5297	9206	10235	13204	17677	18833	15873

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Bihar	SIWAN	4353	4176	4432	4945	4408	4694	5163	6071	6487	10587	9181	11678	11215
	SUPAUL	4976	4886	5625	5874	5696	6569	5406	5728	7192	10634	11378	11558	11753
	VAISHALI	4224	3536	3986	6358	5611	5058	5796	5953	6952	11919	9158	12023	14036
Chhattisgarh	BALOD							9461	10802	9633	11248	8688	13220	10945
	BALODA BAZAR							5774	8519	8181	9279	11227	9327	8916
	BALRAMPUR							5662	8458	15674	9048	8499	8828	9409
	BASTAR	3215	3538	4342	4033	4621	5208	4598	7502	7476	8188	5680	8684	8618
	BEMETARA							8992	9761	8629	10375	12284	12131	10794
	BIJAPUR			4235	2565	4796	6824	6021	8091	7853	8627	6429	7349	8784
	BILASPUR	4802	4626	5283	5654	5252	6720	8935	10078	11465	11304	9388	11376	8265
	DANTEWADA	1935	3935	3809	3372	2565	5159	4773	8763	6955	7473	4439	6511	4331
	DHAMTARI	6852	7990	9588	8763	10062	10962	14818	17220	16177	21561	16567	20144	16976
	DURG	5546	5230	7092	5089	4676	7369	9423	11547	10588	10369	10705	14508	9877
	GARIYABAND							5561	7628	7982	9032	5973	11243	10044
	JANJGIR-CHAMPA	5109	6286	7363	7450	10076	9238	13201	15414	15412	15748	20719	14497	18694
	JASHPUR	2280	2789	3769	4126	4555	4663	6222	6798	7446	7472	6240	5439	7689
	KABIRDHAM	3932	4536	4588	4833	5158	6661	7590	8097	7014	8917	10508	12580	10057
	KANKER	4073	4604	5092	4580	5155	7027	5751	10708	11297	12200	8269	9989	8532
	KONDAGAON							4633	7219	8207	8888	7553	7925	7727
	KORBA	3032	2489	3539	3725	3925	4082	5965	7078	6816	7397	5536	7201	8675
	KOREA	2282	2639	2726	4235	3123	3667	6156	7356	7560	8610	5780	7922	7000
	MAHASAMUND	2766	3860	4600	4668	5201	6559	6769	9246	9446	9774	10849	8436	10758
	MUNGELI							10593	12979	11073	11616	18046	13127	13530
	NARAYANPUR	2390		4212	4983	4137	5185	4542	5941	7030	7598	4401	6637	5579
	RAIGARH	3150	3909	4453	5865	5331	5082	6524	7342	6944	8392	8292	10320	12304
	RAIPUR	4476	4661	5460	5320	6824	5490	6545	11190	10572	12561	12697	17193	15060

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Chhattisgarh	RAJNANDGAON	3902	4051	4030	3382	3788	5947	7506	8719	7950	8990	6951	10814	8267
	SUKMA							4990	8304	9967	9284	7959	6867	8821
	SURAJPUR							6170	6737	8547	9628	9301	8225	11008
	SURGUJA	2853	3236	4054	4534	3508	4070	6382	8133	8706	9195	10315	8171	10659
Goa	NORTH GOA	2409	2523	2784	6359	7443	8087	7919	7937	5204	6535	8259	7486	7051
	SOUTH GOA	2617	2584	2873	7166	8512	9105	8538	9282	6010	9310	12438	8782	7781
Gujarat	AHMADABAD	3449	3050	3307	4458	6603	8665	7293	7523	8620	8024	10260	11954	9071
	AMRELI	3945	3839	6270	7271	5259	12849	8191	3543	19254	7872	15354	13973	10129
	ANAND	5402	4805	6502	6505	7974	6495	6703	8657	10187	10330	11321	12057	10339
	ARAVALLI										8298	9536	11325	10688
	BANAS KANTHA	3348	2934	4950	4428	4850	5724	6246	8203	7177	8942	8460	12975	11368
	BHARUCH	3261	3088	3478	4942	7460	8395	7990	10849	10169	10903	11669	12679	12815
	BHAVNAGAR	6249	6719	8259	10553	8181	16509	11038	7834	13767	12763	14268	20949	16933
	BOTAD										10123	11458	5672	18979
	CHHOTAUDEPUR										13481	12892	16808	12694
	DANG	2115	2526	2813	5018	4861	4934	5122	5681	7442	7111	9384	11622	8236
	DEVBHUMI DWARKA										13269	3129	8503	16090
	DOHAD	2734	2558	4648	3665	3160	4044	3855	6342	4407	4688	4598	7089	6022
	GANDHINAGAR	3969	4190	5787	6920	7480	8336	8131	10695	10028	10874	11524	14113	11058
	GIR SOMNATH										16515	23132	25400	16674
	JAMNAGAR	4663	5675	6690	13386	10755	10217	11931	2168	15893	14422	13995	8970	22852
	JUNAGADH	7119	6504	8331	14214	7849	9679	10261	8094	16009	19790	8638	15113	9523
	KACHCHH	2443	2924	3368	6541	6716	6659	6433	11352	7776	8986	9533	11502	7725
	KHEDA	4313	4054	5507	6145	6665	7282	6900	8371	9107	9468	9861	11430	9825
	MAHESANA	3589	3368	5063	5542	6906	7403	7395	8992	8368	8818	9415	12224	10152
	MAHISAGAR										7802	7089	9269	6886

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Gujarat	MORBI										12978	15851	14403	16344
	NARMADA	3645	3285	3555	5983	7347	10018	8836	11891	8517	9360	11238	11364	10693
	NAVSARI	7042	8037	7498	11030	16113	13812	13987	15812	16211	17904	16968	17543	21481
	PANCH MAHALS	2110	1499	3783	3824	3601	4507	4377	7131	7323	7605	6348	8123	6681
	PATAN	2391	2198	3266	4293	4117	5713	5614	7197	7095	7607	7449	9953	6605
	PORBANDAR	5123	6126	5722	18318	9673	5260	8571	5478	12832	10092	3234	23229	16022
	RAJKOT	7018	4836	7793	10382	7367	13275	12426	4151	16218	11147	11425	3409	19658
	SABAR KANTHA	4250	3225	5074	6454	5720	6888	6872	11679	7214	11844	12786	13061	13482
	SURAT	8555	7526	6107	11480	20582	16958	18736	25945	26505	21715	20957	22543	28847
	SURENDRANAGAR	3483	3620	4826	5669	6499	11485	11380	6040	11086	11051	13574	14333	13474
	TAPI				7401	9682	7496	9403	14982	14319	13793	12248	14330	14853
	VADODARA	3233	3171	4171	7393	8060	9193	7953	11930	10735	11070	11689	14195	13772
	VALSAD	4411	4974	4458	7691	9648	9364	9364	11029	10974	11450	13565	14520	13771
Haryana	AMBALA	9937	9898	11947	13571	18630	19632	22887	23888	27229	26985	29597	31191	33597
	BHIWANI	3930	5923	6656	8478	8942	11216	13607	12793	15090	16936	16947	19021	15758
	CHARKI DADRI													15569
	FARIDABAD	8674	9236	12805	14338	15413	14625	19523	19988	22585	20030	22804	24992	24510
	FATEHABAD	10591	12049	14747	17996	18284	19433	21965	21244	27308	27404	26017	33620	32146
	GURGAON	4443	5665	6834	8051	10003	9530	11739	11139	12431	10671	12778	18768	20191
	HISAR	7867	9006	10338	13060	13609	14578	18951	16254	19788	18989	21552	24805	23514
	JHAJJAR	5154	5801	7163	7757	9538	9479	14276	12621	16231	15929	17933	17321	20074
	JIND	9783	10223	12315	14287	16372	16499	19493	18619	22194	21165	20680	24012	27242
	KAITHAL	11055	10812	14068	15813	18475	18129	19610	21339	25891	26372	27150	30788	32231
	KARNAL	12307	12676	16080	16929	20924	18947	22612	22923	28687	28631	30117	32237	33777
	KURUKSHETRA	12935	13007	15992	18510	23805	18775	21950	22533	28780	29030	30902	32910	35660
	MAHENDRAGARH	5401	6091	6540	8469	9206	10908	10112	13700	15786	14959	18152	20312	16334

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Haryana	MEWAT	5244	5489	8603	10420	10835	10225	12231	12174	15093	12472	15713	18938	19688
	PALWAL				11796	15316	15187	17093	17802	19487	18651	20487	23727	24307
	PANCHKULA	6072	7527	7833	9418	9858	9898	11897	14995	18060	19341	25409	22918	26349
	PANIPAT	11913	12134	13688	16087	20020	18260	21796	21703	25172	19740	26193	29180	31892
	REWARI	5947	6366	7708	8999	9565	10221	14131	13196	13973	13196	14733	18218	17171
	ROHTAK	6009	7186	8032	9362	10721	10913	14465	12980	15009	14978	16601	19242	22919
	SIRSA	8472	10286	11954	14300	14891	16603	18712	19099	24468	23749	23142	28021	23051
	SONIPAT	10482	10395	12631	14517	16665	17751	19131	18339	22225	20796	25932	27674	28491
	YAMUNANAGAR	11695	13119	12789	15661	16248	19561	21769	22552	24863	24918	28577	32207	36617
Himachal Pradesh	BILASPUR	2342	5179	6533	2501	3094	4478	5880	4851	6104	5997	6485	7107	8854
	CHAMBA	2366	3852	3405	4013	4606	6431	6738	8682	7101	9033	9597	10871	11311
	HAMIRPUR	3311	5048	4845	2292	2811	4037	5021	4741	6107	6031	6268	6963	8629
	KANGRA	4016	4415	5310	3846	4140	5420	5376	5984	7260	7780	8299	10089	11889
	KINNAUR	2494	2761	3813	3664	4009	5751	5013	6162	8696	9191	7182	8095	4148
	KULLU	5187	5023	6181	4235	4244	6248	5759	6985	6879	7114	6956	9559	8557
	LAHUL AND SPITI	8930	9380	7201	13454	14097	17534	16732	11162	18885	18602	15170	21719	10098
	MANDI	4228	5097	6156	3265	2295	3250	3821	3564	5154	4640	6041	4910	7989
	SHIMLA	3782	3015	4401	2577	2888	4418	4095	4116	5253	5415	6187	5559	6271
	SIRMAUR	4069	5578	5729	4481	5065	6972	6447	7613	7751	8380	7948	11231	10327
	SOLAN	4112	4595	4118	3749	4569	2555	4220	8148	9723	9358	7542	9512	8633
	UNA	3577	5694	6343	3887	4783	6116	5644	7728	8289	8812	7989	10606	10660
Jammu and Kashmir	ANANTNAG	9279	8628	11488	10782	14143	14090	14272	15328	14816	15678	31904	29327	37725
	BADGAM	6133	6221	7742	3794	13267	11781	12487	16925	11234	14428	20041	24844	29537
	BANDIPORA			7991	10565	13222	13876	11817	11694	15652	15629	20290	22903	29362
	BARAMULLA	5291	4850	6532	6715	9446	7825	7562	8194	26220	12638	16241	17329	17375
	DODA	2481	2996	3390	4340	5905	4013	6251	7435	11863	10140	10484	15369	14257

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Jammu and Kashmir	GANDERBAL			9969	34897	17971	11478	12964	11899	13320	17723	25238	24895	32381
	JAMMU	8277	12620	15984	21689	20495	20163	23929	23975	34123	48957	33325	33733	25738
	KARGIL		1676	3604	6962	6259	7428	3295	3579	7749	16771	4142	5445	6231
	KATHUA	8083	10991	14203	16047	14161	17942	21560	20071	27572	32600	26513	32844	40951
	KISHTWAR			3654	4812	6111	5601	4553	6063	11140	4268	6233	11254	11804
	KULGAM			10337	8456	17474	18489	14016	14695	12147	16970	17223	20793	25182
	KUPWARA	2959	3486	3468		4486	6514	4292	6239		10506	19775	16528	16751
	LEH LADAKH	622	2176	4331	5051	4038	3485	4030	3677	9100	7306	4780	5397	5270
	POONCH	5254	7167	7553	14057	12384	9258	9456	10321	19729	19304	14172	18163	28258
	PULWAMA	9840	9388	13650	12512	15919	15940	20841	21771	18598	10465	28907	34568	23141
	RAJAURI	6726	9434	12128	17463	14616	13840	15243	17965	29549	20225	18795	20542	27973
	RAMBAN			3923	4400	5803	4992	8807	7872	8346	6709	10852	12661	11186
	REASI			6119	8568	5970	8872	8537	10043	17028	9533	10242	17603	12808
	SAMBA			14664	30697	10229	18760	20727	18841	27719	27514	32014	28710	31488
	SHOPIAN			6712	9086	9612	13698	17031	16725	22266	19024	8385	17730	21235
	SRINAGAR	9455	9853	12948	28613	48915	17058	14372	6757	15538	46101	24238	28440	30409
	UDHAMPUR	3539	5087	7686	11101	8479	11883	14802	17055	26281	20889	23698	26521	28252
Jharkhand	BOKARO	1428	2362	3290	3796	2619	8661	10793	7356	7594	14464	9452	7401	11559
	CHATRA	2179	3449	4323	4385	2314	4199	6355	6819	22417	11612	15110	10025	12237
	DEOGHAR	762	3334	4273	4591	2775	6621	6200	2852	4481	9410	9802	8963	12360
	DHANBAD	2369	3429	4204	4576	3887	6389	10788	3576	5952	12990	9507	7983	7163
	DUMKA	3140	2922	3326	4082	4970	5300	5279	7990	7438	9237	9072	15201	17062
	EAST SINGHBUM	1670	2065	2641	5407	2479	3739	6196	7207	6477	15598	15077	5073	7360
	GARHWA	1634	1827	1900	2780	2573	6237	5219	4815	6397	8725	7000	9022	8976
	GIRIDIH	1464	2619	3682	3998	3566	6278	5033	3966	9226	11786	14782	22815	17447
	GODDA	3367	2746	3867	5858	4992	6473	4279	8878	7827	7698	6034	5802	11528

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Jharkhand	GUMLA	2507	1632	2528	3404	3439	5073	3985	2954	4095	7822	7270	14765	20323
	HAZARIBAGH	3109	3172	3815	4435	4157	8653	6224	4932	5845	13891	13309	9351	10999
	JAMTARA	947	3753	2914	4476	2516	6141	5443	4844	3567	9086	5860	10071	20430
	KHUNTI				3367	3334	6558	3581	6310	6774	12171	9705	8178	11078
	KODERMA	2094	3970	3901	4009	3875	6710	77259	2812	5851	7958	7392	6294	16260
	LATEHAR	2084	2125	2711	2641	4409	5428	4396	3541	3711	5759	6503	16194	18476
	LOHARDAGA	1958	7111	4743	8073	3658	5341	7800	9211	6828	11225	9525	13743	20167
	PAKUR	3693	2169	3242	2142	3073	6706	3960	6493	5537	12525	15656	11191	27183
	PALAMU	1305	2373	2309	9786	2735	5822	5987	7833	6489	6906	8467	7572	12779
	RAMGARH				5311	4648	9074	7299	7213	9469	20160	30754	73056	15297
	RANCHI	1609	2276	2675	4626	3937	7168	5809	7516	6653	12696	8256	10028	35159
	SAHEBGANJ	3345	1923	2390	3248	2885	5167	4956	3957	5002	8205	10308	6295	10008
	SARAIKELA KHARSAWAN	1579	3280	3482	3590	3571	4133	3865	5537	4844	13882	5149	6698	9399
	SIMDEGA	2198	1391	3444	2573	3193	4688	4890	5268	4363	10008	8418	6760	10958
	WEST SINGHBHUM	1269	1879	2511	1441	2509	4779	4023	3719	5877	10464	6765	5800	9061
Karnataka	BAGALKOT	4544	4236	5500	7571	9396	10095	11288	12178	14043	13782	13549	16754	14903
	BANGALORE RURAL	2879	3919	4838	6433	5608	6064	6980	8130	8600	8861	10386	12121	10040
	BELGAUM	5389	5433	5959	8475	11098	12166	13453	15154	16241	16456	11465	19170	19926
	BELLARY	3736	4220	5534	6731	6531	7808	10115	11809	13849	13222	15142	18035	13079
	BENGALURU URBAN	2898	3518	3993	6261	5315	5377	6502	8933	12061	10863	12268	7927	9254
	BIDAR	2780	2984	3812	4174	5294	6151	8040	10883	9814	7193	7032	10281	12300
	BIJAPUR	1943	2445	3022	3374	3625	5265	5755	6377	8637	7739	4591	10570	7797
	CHAMARAJANAGAR	3751	4098	4034	5884	5971	6183	7617	7869	10808	9203	12703	6002	9811
	CHIKBALLAPUR			3054	5992	3582	5686	6409	9704	8954	5648	10943	7723	10652
	CHIKMAGALUR	3372	3894	4020	5342	5676	5535	5900	6515	10072	8253	12441	9650	7854
	CHITRADURGA	3500	3909	3870	3850	4402	6355	6344	7457	11043	9202	13861	6145	9081

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Karnataka	DAKSHIN KANNAD	4986	5732	5855	6502	6260	7299	8323	11286	14543	11534	15262	11351	6558
	DAVANGERE	5728	5647	5591	7665	9175	9933	12273	12177	14900	13670	16014	12138	11032
	DHARWAD	3242	5463	4908	5424	6896	7812	7952	5719	11676	9350	5774	8936	7134
	GADAG	3081	3227	3752	3599	4146	5405	5615	4777	9765	9858	6419	6838	6703
	GULBARGA	2827	2794	3639	4173	4278	4479	7382	6221	10430	10028	7394	15811	13258
	HASSAN	3837	4761	4751	6475	6764	6553	7723	8066	9881	9945	12262	8630	11541
	HAVERI	3109	3798	4224	4633	4424	8576	11072	6924	11836	9939	11027	11557	9865
	KODAGU	3651	4171	5068	5590	6278	5726	7101	9306	10532	9678	11386	12094	6778
	KOLAR	2805	2865	2427	4402	3461	4742	6083	8299	7576	6102	6585	5479	12096
	KOPPAL	3247	2543	4309	4957	4444	6546	7398	8931	9984	10026	7513	7798	8773
	MANDYA	6209	6164	7758	10322	11462	14331	14312	18247	18380	16511	21469	23035	13442
	MYSORE	5291	6059	7856	9375	9058	9785	11022	9423	13519	10831	14984	10602	7739
	RAICHUR	2891	3467	4570	5918	6301	6276	7489	10195	11670	12024	11888	18854	11228
	RAMANAGARA			3780	5242	5082	5450	6582	8669	9899	9257	12114	8313	9131
	SHIMOGA	5116	5605	5972	7733	8183	8607	11103	13039	12686	11787	14044	12806	8606
	TUMKUR	3886	4441	4473	6076	5435	6490	6468	7467	11626	9472	15084	9484	6868
	UDUPI	6866	7421	7316	8246	8874	8009	9083	11226	14600	14843	16570	14763	10143
	UTTAR KANNAD	4573	4730	5359	5739	7199	6637	7640	11619	12677	11433	12158	15134	7907
	YADGIR						6409	6871	8275	12441	12759	9793	16171	15666
Kerala	ALAPPUZHA	8121	9125	7886	12184	10753	13174	14908	16780	17182	23384	18815	20175	26994
	ERNAKULAM	8200	7744	7092	9200	8236	10496	13138	12759	14192	19261	15122	15000	21273
	IDUKKI	7731	8830	10081	12357	13586	16882	16514	20279	20186	21409	21924	21161	25309
	KANNUR	8372	7982	7587	10415	9793	13156	17307	17497	18628	25917	22545	21718	28804
	KASARAGOD	7913	7865	9471	12994	10490	14300	18936	18424	22684	39385	29522	29557	41989
	KOLLAM	9407	9674	8577	13192	11230	13848	17925	17873	21568	29402	21453	21314	27638
	KOTTAYAM	6500	6954	7723	10654	8964	11869	15062	15035	16758	21368	18594	19154	26187

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Kerala	KOZHIKODE	9406	8862	9543	15250	12116	15066	18628	19556	22118	39974	30751	26420	40771
	MALAPPURAM	9476	9666	10271	16070	15563	19069	22349	26378	24085	40313	35939	29906	44513
	PALAKKAD	7484	8669	10066	14183	13573	16242	19813	20292	22427	28882	26078	22983	29453
	PATHANAMTHITTA	6988	7480	8226	11559	11481	14404	18807	17251	18011	23567	19990	20830	28593
	THIRUVANANTHAPURAM	9470	8429	8646	13951	11678	14313	18665	18958	20660	39200	30287	27007	40560
	THRISSUR	10533	9192	9407	13205	11513	14636	19157	19186	21785	27904	23260	23263	32683
	WAYANAD	6157	7445	7379	10296	11088	12230	14063	15467	17299	20135	21580	20112	20826
Madhya Pradesh	AGAR MALWA									7156	11268	8566	10354	9395
	ALIRAJPUR				3383	3300	5128	4202	6083	4887	8103	7729	6238	4305
	ANUPPUR	2339	2441	2089	5299	2914	2899	4670	5535	7892	7056	5295	5283	4414
	ASHOKNAGAR	3345	4073	4133	4974	5970	6857	10417	12500	9613	9238	11108	8476	8224
	BALAGHAT	3806	3576	4456	7466	8029	7533	7317	9259	9109	7412	6294	7162	5264
	BARWANI	2062	2585	3049	3755	3460	5456	7058	15955	10876	9619	9270	10086	10056
	BETUL	3481	3753	4836	5167	6262	6170	7393	11335	7101	11405	6492	8389	8187
	BHIND	4293	3787	5169	6442	6524	8410	8720	10907	10320	9842	11694	11495	10926
	BHOPAL	4991	5272	7198	7089	8713	8154	10894	12963	11737	9714	9174	10145	9268
	BURHANPUR	4916	3724	4254	4959	4724	6043	7627	9178	11721	7712	9193	10539	10822
	CHHATARPUR	3117	2756	2659	4091	4185	4326	7238	7932	6571	8388	8373	9606	7192
	CHHINDWARA	4671	5182	7015	6137	10521	13479	13683	13739	8843	9802	11855	9761	9865
	DAMOH	3482	3776	4533	6317	6404	7028	7974	8942	6050	8098	10254	11908	9187
	DATIA	4629	4855	5846	6246	7220	7321	9084	11193	12069	8494	9683	8230	7433
	DEWAS	5609	6678	7949	7456	9312	10495	12390	16081	10511	12277	11833	14956	11647
	DHAR	5342	6306	8488	7197	9106	9924	10201	13067	14312	10903	11273	11511	11337
	DINDORI	1816	1857	2472	3484	3107	2871	4042	6497	7405	6357	5574	5768	4932
	GUNA	3706	3929	4722	5012	5563	8122	9645	12093	9322	13138	9061	9874	8109
	GWALIOR	5707	5785	5731	9576	8398	10519	13062	12771	12872	10132	12615	11377	8253

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Madhya Pradesh	HARDA	8484	8578	13206	11795	14882	18134	18976	17289	11404	16854	13442	17120	11868
	HOSHANGABAD	6590	8456	12379	10022	13077	14384	16307	17377	12014	18707	17531	16521	13863
	INDORE	4571	7952	9565	9099	12563	11219	14696	18032	13732	13884	15451	17105	13963
	JABALPUR	4359	4760	4595	5963	5623	7846	9264	10312	8591	8745	10567	12240	10835
	JHABUA	2305	2529	3305	3474	3403	4174	4832	6866	9349	7847	8052	9191	7546
	KATNI	2625	1890	2189	5746	3262	3896	7537	8662	13406	7447	8683	10327	9037
	KHANDWA	3935	4113	5464	5347	4864	6098	7146	10540	10095	11675	7823	11065	8679
	KHARGONE	4576	4676	5945	5950	6760	9808	9589	8437	8778	12039	12074	13122	12206
	MANDLA	2141	2209	2938	3976	3231	4485	5539	4419	6261	5715	7832	7864	8860
	MANDSAUR	2555	4895	5133	5109	5665	8431	11028	15496	15017	10983	8088	11968	8998
	MORENA	6453	6974	8731	7646	7989	10666	13097	13306	12525	11470	16223	14769	12404
	NARSINGHPUR	5701	6809	8059	7911	9187	11545	10850	12410	9025	13625	15197	16267	11434
	NEEMUCH	4120	4484	5142	6079	5994	7575	8345	14902	13588	9886	9375	11053	8988
	PANNA	2492	2491	3485	4784	4784	5421	7154	8408	7780	6888	7436	10237	9613
	RAISEN	4066	4723	5196	5511	7120	6494	9713	11590	7234	12427	11962	11116	8881
	RAJGARH	3374	3788	4948	4588	6182	6557	8390	11783	8914	13299	8188	10888	8918
	RATLAM	5252	6141	7691	7110	7489	10122	9884	13342	12332	9760	8865	10774	11111
	REWA	2945	2713	2916	5297	4154	3756	7003	8196	8541	9293	6571	9337	9152
	SAGAR	3049	3542	3815	4726	5772	5540	8016	10319	6292	8634	9151	9005	8593
	SATNA	3163	2518	2385	3965	4289	4182	6959	8719	9111	10871	8894	10988	9449
	SEHORE	5336	5755	6642	6839	10371	9438	12186	11767	9995	16245	12688	14426	10024
	SEONI	3006	3373	4020	5024	5200	5889	6840	10157	10978	8380	7525	8875	7948
	SHAHDOL	2168	2183	2077	4771	4014	5257	7334	8443	11709	6821	7023	5987	3841
	SHAJAPUR	3649	4552	5458	5202	7124	8062	9134	10282	9897	10695	10570	12947	8585
	SHEOPUR	4888	5376	7128	7111	8197	8900	13360	14565	18595	12133	13690	13445	9157
	SHIVPURI	4085	3884	3659	6453	6510	8087	9571	12168	9738	10986	8366	9692	8241

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Madhya Pradesh	SIDHI	2192	2490	2727	4045	3732	3718	5676	7145	8376	6300	7457	8514	6294
	SINGRAULI				3238	4172	4181	4910	11407	9763	7905	9301	8224	6748
	TIKAMGARH	3536	3385	2543	7045	6351	5855	8798	9099	7214	9372	5790	10563	5682
	UJJAIN	3743	7174	7676	6981	10276	9982	10813	14242	12358	9970	10893	14229	11010
	UMARIA	2031	1887	2244	3569	3485	3494	5179	5672	7042	6312	6368	6735	6286
	VIDISHA	3926	4703	4627	5539	7058	7996	8771	9318	9617	10782	10682	9609	11123
Maharashtra	AHMEDNAGAR	2372	3327	4050	4379	5729	5861	8598	6661	9833	9653	6342	7845	11226
	AKOLA	2709	4906	5357	3907	7039	6994	7563	11701	9812	6333	12949	13939	8426
	AMRAVATI	2732	3111	4604	3470	6393	6027	7435	12988	11078	7086	13221	13384	9875
	AURANGABAD	3525	4472	4766	5444	6728	9511	10384	6362	13359	5857	6915	11210	7203
	BEED	2569	3266	3610	3983	5497	5824	7594	6980	8421	4936	3549	6746	5768
	BHANDARA	3466	3091	4019	2499	4203	5105	6474	8989	7729	7007	8541	9632	7031
	BULDHANA	2179	3386	5007	4327	6288	6495	7182	8735	10215	6885	8302	12837	7740
	CHANDRAPUR	2532	2849	3599	3414	3608	4712	5628	9613	6994	7417	10884	12173	9548
	DHULE	2553	3485	4651	2890	5993	9234	8325	9709	11277	10561	10490	10835	13826
	GADCHIROLI	3076	2921	3451	2533	3275	5083	4756	7138	7225	5807	5384	8433	6695
	GONDIA	3207	2404	3742	2106	4409	5892	6159	8456	7993	7992	8493	10655	7675
	HINGOLI	3197	3658	5395	4596	5758	5582	7569	11982	8197	8861	6270	9185	8398
	JALGAON	4148	4846	5286	6568	7116	9866	11686	10517	14976	16078	13778	15550	13207
	JALNA	3097	4245	4467	4860	6973	8226	8775	4561	11428	5314	6162	12527	6724
	KOLHAPUR	6084	6821	7846	10906	16490	15584	17587	25847	23347	22013	23940	22015	26080
	LATUR	3345	2779	4152	3905	6569	6975	8773	13978	13379	6873	6016	12244	9199
	MUMBAI SUBURBAN												4142	
	NAGPUR	2750	3338	4027	4294	5116	5040	5647	8211	5321	7542	10177	14025	11459
	NANDED	2080	2521	3460	3752	3584	6337	8401	9927	7416	4985	6206	7959	7959
	NANDURBAR	3337	3199	4970	6280	6611	7333	9626	10380	8608	9205	11353	10964	12830

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Maharashtra	NASHIK	3078	3416	4575	5441	5698	6296	7758	9314	9116	9009	10373	13126	13398
	OSMANABAD	2413	2723	3556	3589	5145	4831	7484	4779	9363	4629	3769	6539	7228
	PALGHAR	926						6780			9605	11119	11372	7976
	PARBHANI	2566	3227	4379	4977	5189	5422	7822	9512	9025	6192	3944	12112	9531
	PUNE	3054	3473	4276	5306	7767	6525	12576	16576	15473	12311	15376	11813	16996
	RAIGAD	4559	4525	5294	6672	9037	7560	8027	10516	13411	10846	14097	11205	11517
	RATNAGIRI	4591	4653	4937	6083	8784	8302	8937	11299	12605	12010	12326	13527	13053
	SANGLI	3130	3630	4486	6137	7366	7194	8670	11284	11099	12569	13143	12650	13548
	SATARA	3372	3737	5031	7090	8092	7789	10556	13067	12096	12121	13404	11575	14424
	SINDHUDURG	5163	5815	6077	7572	9850	9092	9581	12817	15832	12722	15268	14688	14978
	SOLAPUR	2658	3612	3918	4576	6832	5918	10419	8969	9150	12232	7234	6912	10036
	THANE	4218	3498	4479	5258	7304	6150	7832	10237	10643	9399	11533	11740	8544
	WARDHA	2889	3254	4249	3871	4468	6560	8363	10930	7235	8142	14106	15018	15632
	WASHIM	2434	3436	4645	2780	4566	5680	6191	9502	5881	5489	8622	9786	5042
	YAVATMAL	2626	3214	4561	4707	4572	7094	8646	13108	7904	6344	12553	11960	8026
Manipur	BISHNUPUR	4037	3613	4488	6683	6433	8760	7949	9682	11717	10542	10707	11789	12947
	CHANDEL	2530	2627	3219	4263	4535	5692	6107	7334	7389	6996	6876	6984	8735
	CHURACHANDPUR	2286	2156	2622	3143	4149	4208	4166	5679	5645	6542	6026	7030	7853
	IMPHAL EAST	3633	3649	4046	6242	5669	7754	6275	8382	10846	9078	11580	10150	12913
	IMPHAL WEST	4588	3579	4543	6629	6292	8470	6624	8561	10851	10241	10454	12115	12833
	SENAPATI	3854	3055	3436	4165	4453	5004	5318	6648	7091	6510	6595	7408	9304
	TAMENGLONG	1530	1539	2544	2939	3481	4176	4244	6219	5956	6593	6267	6753	6750
	THOUBAL	3590	2858	3231	6846	7138	9851	7820	9603	11742	10503	11056	12336	13298
	UKHRUL	3207	2975	3346	3796	3743	4591	5226	6113	6773	6385	6283	6908	8094
Meghalaya	EAST GARO HILLS	2273	1733	2125	3320	3730	4389	3362	4816	5619	5548	5608	6185	6786
	EAST JAINTIA HILLS	2336	2062	2797	3614	3998	4715	3631	4499	6087	5072	5337	5828	6980

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Meghalaya	EAST KHASI HILLS	11169	7671	3603	10098	11648	16184	15741	15795	19319	12238	11676	13170	14757
	NORTH GARO HILLS									4932	5415	5898	6310	6815
	RI BHOI	3698	3260	4700	5761	6265	7261	5399	6931	8301	8381	9165	9958	12523
	SOUTH GARO HILLS	2016	1828	2173	3143	3494	3675	3010	4179	5108	4905	5837	6107	6991
	SOUTH WEST GARO HILLS									8888	11057	9223	9821	10979
	SOUTH WEST KHASI HILLS									19678	10863	10442	12622	14599
	WEST GARO HILLS	2886	2924	3880	4867	5429	6411	5575	6833	8392	7366	9073	9834	10746
	WEST JAINTIA HILLS									3979	4279	4954	5466	7248
	WEST KHASI HILLS	6622	6496	3150	6426	7159	10155	9697	9799	9574	7274	7830	9165	11523
Mizoram	AIZAWL	3585	1406	2385	2945	4792	5360	4721	6182	7478	9735	10279	11464	11561
	CHAMPHAI	3427	2994	4253	7455	7630	8514	6519	7454	9488	7986	9184	9254	10694
	KOLASIB	3607	5022	4678	4720	6746	8059	7162	8786	10780	9312	9657	10762	12179
	LAWNGTLAI	3170	1236	4917	2448	4056	4189	4437	6184	8338	8877	9506	10665	13643
	LUNGLEI	3101	5410	2070	3645	4641	5680	4998	6382	8619	8799	9347	9998	10559
	MAMIT	3364	1954	2686	3726	5132	5565	4413	5599	7563	6917	7428	8503	10085
	SAIHA	3731	2153	1497	1576	3156	4552	4369	6084	8701	8131	8680	9963	12817
	SERCHHIP	2321	1655	5064	9315	4045	5987	4363	5316	6806	9704	10488	11445	12302
Nagaland	MON	2568	2783	2405	4679	4337	5449	4716	5714	6538	5431	6492	6908	8133
	DIMAPUR	3682	3127	5409	4771	5914	7208	6095	7701	9502	9093	9268	9922	11507
	KIPHIRE				4634	4187	5365	4809	5628	6160	5607	6489	7401	10510
	KOHIMA	2932	2966	3436	4516	4957	6453	6161	7267	8300	7157	7882	8222	9935
	LONGLENG				4452	4358	5627	5060	6070	6715	6117	7006	7537	9609
	MOKOKCHUNG	2722	2644	2729	4565	4479	5567	5115	6279	7214	6515	7215	7886	9422
	PEREN				5035	5143	6368	5358	6653	7889	7747	8273	9380	11043
	PHEK	2866	2627	3597	4952	5169	6750	6052	7117	8276	7012	7670	8596	11194
	TUENSANG	2419	2475	2657	4410	4578	6041	5537	6364	6882	5915	6893	7647	9988

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Nagaland	WOKHA	2743	2896	2850	4460	4794	6111	5483	6649	7657	7247	8090	8953	10767
	ZUNHEBOTO	2560	2722	2286	4968	3818	4829	4353	5230	6137	4905	5870	6617	9174
Odisha	ANUGUL	4367	4035	3049	6307	4389	2643	4586	8236	8513	10861	5627	10925	11912
	BALANGIR	3074	3491	5134	5555	6584	7350	2281	9676	14036	13707	6310	9663	6014
	BALESHWAR	3913	3850	5626	6370	7677	8481	10675	10496	6535	11604	12785	13530	18569
	BARGARH	4322	4936	6849	8732	10919	10715	11332	14621	12591	15338	15431	12736	9287
	BHADRAK	4832	4485	5268	7399	8341	7515	7574	8258	6858	6665	16755	12982	14470
	BOUDH	4021	4361	5457	5593	7675	4666	5277	9086	8182	10011	6097	12114	14219
	CUTTACK	6192	5094	6154	7441	10698	9152	10488	11403	8029	12423	14781	15193	15990
	DEOGARH	3813	3963	5503	6538	4641	3004	6956	9248	11047	13318	6552	6525	13454
	DHENKANAL	5484	4403	6609	8189	6996	6190	9797	9146	12456	15124	11209	12092	10439
	GAJAPATI	3918	4816	6314	5589	5540	6871	4581	8080	4071	6226	7982	10687	14056
	GANJAM	3939	6354	8043	8013	9359	7075	3309	21442	2390	12530	13488	12695	12360
	JAGATSINGHAPUR	5796	4771	6165	9120	10579	8178	12663	11951	11370	12325	19495	13966	15225
	JAJAPUR	5287	4742	6512	8662	8952	6537	6786	8826	6264	9606	9344	11817	9990
	JHARSUGUDA	4192	4859	6267	9391	2143	2582	5311	8440	5745	6403	6117	10144	10672
	KALAHANDI	2975	3119	4481	5770	7519	10597	4528	12478	12647	11846	7927	12246	16382
	KANDHAMAL	3398	3771	4175	5859	5405	5013	4931	7363	6607	7803	5709	7323	10724
	KENDRAPARA	5252	3791	5287	6997	8056	5983	7794	9186	6267	7596	13064	11251	9896
	KENDUJHAR	3606	3666	5200	5739	6035	4217	7423	7548	6936	10306	7607	11079	14312
	KHORDHA	4717	4796	5932	6420	8403	7187	7131	9345	4192	10089	10197	11617	11440
	KORAPUT	3823	3978	5524	5555	6551	9844	6952	9629	15000	9768	13778	10861	15256
	MALKANGIRI	3486	3745	5027	5736	4826	7607	2685	8009	8033	7348	8823	7682	11109
	MAYURBHANJ	3297	3663	4851	5837	6028	3751	8547	7591	6325	9520	6479	10608	14059
	NABARANGPUR	2963	3716	4727	4857	4838	6010	3368	8016	10749	10291	8456	11323	16135
	NAYAGARH	4413	4781	6478	6569	7994	8027	3991	26171	5233	11070	6356	10815	10543

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Odisha	NUAPADA	2577	3041	6201	6599	5236	7494	3566	8735	9098	9391	5997	6287	4724
	PURI	5800	5022	6822	7428	8836	8280	8661	14107	8353	11985	16096	13085	12957
	RAYAGADA	3310	4321	5570	5766	7094	7856	5311	7621	10748	10599	6922	8544	13162
	SAMBALPUR	5352	5626	7814	10873	6138	6572	9022	11792	10605	12145	7280	10138	8947
	SONEPUR	6458	6927	8475	11139	12571	11803	12264	15525	17258	18496	20762	20623	21656
	SUNDARGARH	2419	2775	3926	5074	3090	2691	7904	8274	8711	10980	7635	8102	12078
Puducherry	KARAIKAL	5421	8513	7021	8563	10764	10506	14714	12161	13568	13307	12653	8234	14411
	MAHE	317	438	438	376	457	955	9435				10695	4048	17102
	PONDICHERRY	11874	13348	14864	19816	23451	19805	21620	30054	31495	31089	37106	37936	39848
	YANAM	11278	17996	16487	17564	19655	15178	24798	24816	25716	20681	17392	21439	37381
Punjab	AMRITSAR	10670	12044	13941	14778	16663	18609	20736	22907	25396	23365	27786	29043	33634
	BARNALA			18574	21853	24239	27402	29544	31560	35248	35680	37147	38365	42137
	BATHINDA	11225	13789	15578	19205	20455	23862	24785	26919	29061	30670	27213	35362	37562
	FARIDKOT	12355	14368	16369	19815	21225	24829	25617	28956	32225	32389	32869	34321	38015
	FATEHGARH SAHIB	12427	13478	17812	18579	23940	23747	25923	30365	30809	30944	34290	36553	37726
	FAZILKA							19815	19014	24403	24622	24404	30108	30629
	FIROZEPUR	10848	12963	15146	17824	18170	21750	29338	33338	44043	30475	30712	33769	38199
	GURDASPUR	9465	10924	12513	13924	17057	17895	21531	23516	24655	23748	28377	29705	36607
	HOSHIARPUR	7729	8563	10019	10869	14422	15703	18753	19033	21159	20554	22068	22940	28229
	JALANDHAR	10692	11566	13928	15526	18801	19406	21014	24441	26679	25095	26939	29039	32921
	KAPURTHALA	12675	13955	16854	18390	21626	23874	24921	27951	31859	29624	32896	36517	39203
	LUDHIANA	13848	14606	17925	19785	24219	26203	27401	31111	24744	33974	36735	38805	38205
	MANSA	10992	13733	16096	18503	20178	24476	24757	26107	29076	26798	26609	33821	37818
	MOGA	12632	13838	17259	25133	22989	25102	26804	30813	34449	36111	37466	38436	41677
	MUKTSAR	11842	14251	16542	20335	21522	24029	22875	27813	29729	29238	30974	35065	37497
	NAWANSHAHR	10709	12234	14457	15758	19687	20909	23672	26077	26227	27009	32821	33333	37394

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Punjab	PATHANKOT							48514	20223	26315	18280	24762	24063	28635
	PATIALA	12182	15090	17358	19805	22476	23227	25974	28858	31833	31121	32663	36379	38789
	RUPNAGAR	8772	9801	10095	11916	15537	16444	18375	20859	21617	21920	25210	27663	31815
	S.A.S NAGAR		10667	12982	14784	17927	18997	21998	22877	23943	23930	29005	28712	31608
	SANGRUR	13019	15504	17883	21144	24098	26350	27910	32054	36921	37148	37786	40385	44259
	TARN TARAN		11458	13403	15407	16928	18518	19497	22749	26918	24228	25220	27983	33446
Rajasthan	AJMER	685	2069	1570	1798	517	4681	4289	6392	7320	4939	5042	8906	6073
	ALWAR	5156	6758	7235	8110	10269	8248	9199	11703	11827	11421	12455	16115	15848
	BANSWARA	3172	2450	3958	4215	4729	5074	4974	6168	6411	6010	6412	7030	7101
	BARAN	4505	5400	6389	5714	6708	6958	9049	13215	8011	9396	11294	13269	13006
	BARMER	265	556	424	311	229	1276	1145	1348	1470	1145	795	750	1109
	BHARATPUR	5343	5601	6719	7377	10453	8115	9909	10571	11084	10407	11546	13608	13173
	BHILWARA	2152	4623	3477	3451	2529	5282	6115	8919	8674	8040	6436	9748	7955
	BIKANER	1208	1676	1367	1921	1532	2315	2873	2776	3331	3753	4600	6064	5043
	BUNDI	5346	6620	7322	7207	6638	7782	10984	13520	11201	9399	15218	14776	12793
	CHITTORGARH	4581	5953	5606	7844	7326	7505	9507	12343	10937	11300	10451	11504	12859
	CHURU	488	1134	1088	1850	584	1857	1703	2062	2533	2792	2635	3669	2908
	DAUSA	4784	5388	6145	6949	9977	6730	7813	10239	11052	10582	9890	12917	11801
	DHOLPUR	5474	5794	6144	6709	11502	6601	9259	9516	10410	10157	11425	14838	15705
	DUNGARPUR	1819	2187	4319	1881	3565	3630	3779	4732	5364	6488	6054	7254	5896
	GANGANAGAR	4921	5666	5381	6649	7142	7969	9405	10999	10708	10646	11092	11765	12247
	HANUMANGARH	4127	4444	4859	5901	8316	7032	8687	10624	9163	9868	8593	9772	9445
	JAIPUR	4037	3899	3576	5639	5688	6327	6206	7510	9095	7533	7385	10951	8189
	JAISALMER	1233	745	725	640	513	1503	1950	1289	1590	907	3017	2912	2114
	JALORE	1629	2830	2026	1550	1243	3410	3321	4675	3124	4135	3007	4093	3560
	JHALAWAR	3503	5069	4555	4694	5878	4722	7673	9922	6685	8174	8022	9434	9989

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Rajasthan	JHUNJHUNU	3458	4122	3512	4665	4881	5890	5840	7351	8628	8440	7602	10246	8555
	JODHPUR	849	1110	1515	1744	1354	2781	3070	2622	3777	5123	5619	5603	5889
	KARAULI	5105	5425	6580	6904	12848	7878	8736	10475	11418	11281	10954	14003	13977
	KOTA	4778	5735	7605	6489	7511	6585	9174	12068	10222	6707	11339	13037	12136
	NAGAUR	1989	2065	1998	2728	2737	3602	3170	2266	4275	4322	4544	5523	4370
	PALI	859	2230	2124	1497	642	2795	2940	4086	3717	4467	4247	6262	3982
	PRATAPGARH				5537	7131	4580	6560	9289	8977	8479	8503	10065	8931
	RAJSAMAND	2889	4788	5220	3563	4215	5447	7455	10124	8692	9508	6567	9037	10092
	SAWAI MADHOPUR	3851	3918	4381	4803	7275	5842	6604	7676	7125	8108	7637	11737	9860
	SIKAR	2917	3832	2882	4759	4480	5623	5475	6532	7686	7597	7218	9027	6324
	SIROHI	3012	3335	3877	3199	2064	4605	4696	6311	4677	5604	6202	6326	2605
	TONK	2834	2467	3114	3419	2603	4732	6504	7109	7036	5457	6944	9379	8055
	UDAIPUR	3105	3326	4260	3674	3963	4125	5615	6891	7007	7744	6875	7288	6544
Sikkim	EAST DISTRICT	2186	2493	2627	5925	4378	3592	5181	5671	6771	5956	8003	8783	14797
	NORTH DISTRICT	2177	2319	2583	3970	4044	2921	4361	4863	5759	4855	6874	7695	13677
	SOUTH DISTRICT	4692	2913	3265	3206	4124	9519	5004	5578	6429	5342	8127	9093	16759
	WEST DISTRICT	2748	3358	2965	4500	4358	3051	5132	5628	6501	5390	8280	9513	18813
Tamil Nadu	ARIYALUR					5479	9326	8082	10587	11522	12783	12114	15354	19017
	COIMBATORE	5271	6207	6258	13669	8227	8420	9168	9643	21675	13834	26533	19147	25629
	CUDDALORE	6834	9144	8979	8578	9052	10334	7666	15195	15273	17318	17463	24423	25338
	DHARMAPURI	6084	6474	6699	7497	7044	10044	9308	14523	12131	12330	15212	16334	17968
	DINDIGUL	5551	6072	6239	10433	9091	11438	9504	10370	9793	11865	14400	12263	13460
	ERODE	8236	7848	8749	15082	10003	11739	11682	14758	12396	12489	15967	15700	17286
	KANCHIPURAM	8524	8778	10132	13767	9878	12175	10668	16092	12951	13570	16804	25596	20361
	KANNIYAKUMARI	10184	7250	7964	11542	10644	14756	7628	17225	18526	28437	34557	25687	34021
	KARUR	3846	3743	4139	6278	5720	8576	7635	12880	9604	9135	10779	14528	8351

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Tamil Nadu	KRISHNAGIRI	4237	4181	5430	5807	7103	5863	8066	8986	12667	11469	13374	23078	20291
	MADURAI	7152	7080	7356	10433	7937	11147	9661	11381	12172	11296	14826	16874	15547
	NAGAPATTINAM	4085	11159	6475	6198	10303	9208	11330	6885	14367	14147	11565	16205	18464
	NAMAKKAL	6760	8048	7158	10181	8616	13317	10760	12340	13471	13193	13746	13391	12839
	PERAMBALUR	5501	4759	4038	11018	7143	8096	10518	8735	12846	14566	14015	12582	17185
	PUDUKKOTTAI	6250	6301	5049	6463	5576	6889	8750	11184	7272	11180	13754	11348	12439
	RAMANATHAPURAM	4551	3672	1400	4515	4079	5451	6668	2335	2512	8829	8630	1908	2550
	SALEM	6368	5289	5348	8444	7227	13137	10393	17616	12377	14035	16766	24606	17273
	SIVAGANGA	5476	3492	3335	5746	5185	6634	8627	7669	4241	8531	10336	6024	6468
	THANJAVUR	9350	9714	10136	10657	10076	10611	14283	13500	19863	18113	25349	34051	35275
	THE NILGIRIS	3105	2647	3356	2980	2413	10162	3503	13960	5033	7527	7643	8812	15439
	THENI	10101	7082	7716	10719	11495	14272	14721	20942	17846	14520	22813	31344	28530
	THIRUVALLUR	9938	9962	11217	15361	10350	11026	10852	17456	15628	16902	16624	26850	26041
	THIRUVARUR	5601	9811	7956	5791	10677	7326	13919	5828	18478	19697	20955	19136	23441
	TIRUCHIRAPPALLI	5629	6103	6690	8447	8969	10988	8105	10071	9510	10230	12680	15661	16134
	TIRUNELVELI	8784	8550	9439	11319	10718	12932	11399	12536	13136	15027	17547	13303	17367
	TIRUPPUR					5734	10001	10526	14209	9852	10250	12588	21165	10636
	TIRUVANNAMALAI	7466	7477	9368	11012	8176	9751	11126	16232	13080	14307	15228	20704	25523
	TUTICORIN	4373	4046	6109	6380	5089	5879	7290	3594	5168	10946	10712	4041	8646
	VELLORE	6367	6052	6942	9564	6942	8351	8319	13158	12934	13453	16676	27601	23903
	VILLUPURAM	8499	8163	8541	10827	9166	11402	10208	16209	18866	17911	19758	24730	22892
	VIRUDHUNAGAR	5070	6235	5899	7195	5234	7344	7919	7312	10369	11797	13419	12128	14678
Telangana	ADILABAD									13591	13149	16841	19993	20852
	BHADRADRI												26003	27570
	JAGITIAL												27566	22803
	JANGOAN												28266	27857

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Telangana	JAYASHANKAR												26192	24745
	JOGULAMBA												11261	15085
	KAMAREDDY												29532	34628
	KARIMNAGAR									30679	29301	27390	48732	43288
	KHAMMAM									21863	22048	23218	25118	32150
	KOMARAM BHEEM ASIFABAD												21376	14778
	MAHABUBABAD												18635	20064
	MAHBUBNAGAR									14996	13612	9018	10817	12447
	MANCHERIAL												25575	26274
	MEDAK									20210	16436	16784	24527	33432
	MEDCHAL												26331	37836
	NAGARKURNOOL												12093	14833
	NALGONDA									21453	19790	18867	19195	21593
	NIRMAL												21105	26724
	NIZAMABAD									27826	27922	15221	38423	37402
	PEDDAPALLI												43515	36309
	RAJANNA												34252	31497
	RANGAREDDI									14414	14401	16760	16376	16029
	SANGAREDDY												16309	24734
	SIDDIPET												23531	26375
	SURYAPET												24495	33278
	VIKARABAD												13404	14460
	WANAPARTHY												14511	19297
	WARANGAL									24462	24691	25223	35930	25762
	WARANGAL URBAN												41136	36638
	YADADRI												23144	29914

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Tripura	DHALAI	2424	2489	3216	4331	4081	5094	4129	5460	7337	7865	7118	7510	9150
	GOMATI								6546	8662	9369	9112	9822	10651
	KHOWAI								5759	7839	8060	8713	8718	10233
	NORTH TRIPURA	3173	2638	3178	4648	4763	5295	4080	5140	6853	7390	7370	7721	8850
	SEPAHIJALA								7730	10211	11096	11482	12186	13384
	SOUTH TRIPURA	3402	3055	3839	4979	5654	6452	4961	6602	9187	9013	9788	10564	12613
	UNAKOTI								6018	7805	8430	8649	8718	9968
	WEST TRIPURA	2955	2849	3773	4631	5185	6394	4698	6151	8256	8625	9033	9547	10340
Uttar Pradesh	AGRA	6821	6293	7124	9480	10419	11848	11546	13400	15478	18219	19488	22345	19711
	ALIGARH	7311	7417	8125	10884	11699	12836	13890	15984	18184	17616	20803	21598	21176
	ALLAHABAD	5135	5812	5809	8190	7030	8914	9883	11347	11335	9737	10155	15086	16124
	AMBEDKAR NAGAR	7779	6817	8465	11594	12528	13266	14197	15207	16454	16713	17625	17765	19264
	AMETHI						8992	9949	11693	10837	10911	13631	14415	15682
	AMROHA	10302	10494	9736	12248	14412	16024	17767	19994	21219	23205	24991	24566	26328
	AURAIYA	6681	7571	7983	11573	10951	12731	13462	14602	16754	16938	18982	21110	18417
	AZAMGARH	6351	5828	6827	9453	9674	11014	12066	13176	14340	15336	16889	17344	16463
	BAGHPAT	12727	15177	14308	17361	23144	22775	26779	29902	31359	33646	33518	33011	31976
	BAHRAICH	5359	5598	5551	7219	7999	8736	9690	10450	12301	14748	14404	14201	15422
	BALLIA	4973	5125	5728	7572	7912	9865	11280	12255	11558	13472	14225	16592	15021
	BALRAMPUR	6584	7267	7314	9022	9162	10575	11303	11582	11888	12728	15552	15101	16722
	BANDA	2847	2576	2499	4208	3785	4513	6054	7117	5529	4342	6022	9475	8412
	BARABANKI	8318	7476	6909	10398	12670	13539	17218	18074	19288	21369	22124	21196	21169
	BAREILLY	8135	7384	8215	10363	11542	12222	14981	16228	17056	17083	18893	20158	21183
	BASTI	5759	5790	6051	8523	9230	9846	11979	12835	14283	13483	16542	17599	20007
	BIJNOR	10322	10314	9987	11908	15208	15044	17381	20333	19064	21725	22581	22789	21916
	BUDAUN	6691	7076	7257	9205	12497	11574	13652	14184	16419	15371	18188	18229	17682

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Uttar Pradesh	BULANDSHAHR	8977	9894	9867	12595	14425	15223	16912	18768	20442	20987	22924	23191	23741
	CHANDAULI	5919	7735	7467	10440	8321	11628	11689	14000	13778	15379	17302	16442	17420
	CHITRAKOOT	2377	1923	2030	3462	3491	3636	5583	5765	4055	4073	4106	9442	7202
	DEORIA	5806	6197	6645	9276	8580	10297	11569	12730	14298	13489	12016	15882	14681
	ETAH	6399	6729	7208	8856	10400	10947	12617	13965	15765	14996	16511	18538	17298
	ETAWAH	7108	7658	7698	11130	11064	12312	12921	15605	16688	13457	19011	25025	18397
	FAIZABAD	7521	6446	6877	9355	10533	11201	12598	13599	13516	15280	16325	17388	17124
	FARRUKHABAD	7402	7338	7117	9594	10135	10637	11308	12892	14133	15107	15311	15592	16737
	FATEHPUR	4799	5146	5637	7669	7676	9463	10292	11546	12222	10402	12297	15227	13758
	FIROZABAD	7807	7728	8491	11192	12653	13047	13050	14867	17403	16606	21034	21330	17068
	GAUTAM BUDDHA NAGAR	5099	7073	7623	9881	12430	12195	14121	15075	17942	15361	23200	22233	20680
	GHAZIABAD	10187	11685	11557	14481	17194	17824	21076	21992	23971	24110	26584	25487	25511
	GHAZIPUR	5944	6112	6315	8697	8366	9725	10471	11765	11493	13661	14483	15533	14528
	GONDA	6193	5878	6269	8428	10404	11500	12972	13795	15628	15931	16511	16107	15703
	GORAKHPUR	5218	5481	6016	8171	8850	9767	10683	11828	13495	12434	12590	15984	17044
	HAMIRPUR	3327	2573	2406	3803	4366	4925	5678	7095	7513	5277	6826	10262	8753
	HAPUR								23680	24824	27434	27918	28342	26930
	HARDOI	6200	6674	6966	9055	10424	10424	11841	12210	14814	14001	17113	17638	16689
	HATHRAS	7718	7367	7819	8920	10948	12144	11424	14753	17701	18021	21050	20488	18802
	JALAUN	4783	3861	2884	5662	5508	6385	7943	8573	8087	5434	7519	13032	11030
	JAUNPUR	5925	6223	6490	9039	9780	10410	11614	12849	13050	14330	14794	16969	16432
	JHANSI	3959	3252	2936	5102	5259	6477	9390	9414	6894	6647	9605	11489	8062
	KANNAUJ	7118	7588	7840	10153	10529	11384	11745	13996	14915	12406	18129	18976	22099
	KANPUR DEHAT	5997	6321	6715	9131	8546	10421	10927	11660	11766	9302	14340	19528	16387
	KANPUR NAGAR	5558	5824	5685	7979	8679	9674	10444	11391	12397	9355	11513	15081	15514
	KASGANJ					10513	11421	13714	15709	18208	18128	19203	20872	19987

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Uttar Pradesh	KAUSHAMBI	4422	4247	4829	6903	6567	7555	8884	9724	9093	9758	13694	16068	13553
	KHERI	8861	8828	8496	10305	13041	14167	16701	17956	19533	22012	23035	22322	22729
	KUSHI NAGAR	7473	7981	8447	10501	11634	12635	13859	14910	17914	15527	16490	17371	18492
	LALITPUR	3667	3868	3142	4830	6624	7500	7788	9415	7403	11624	6075	11864	8329
	LUCKNOW	5501	5596	5779	8009	8772	9195	9343	9998	10884	11751	12531	12300	13411
	MAHARAJGANJ	6792	8031	8089	10552	12329	12830	14235	15203	16606	18326	19592	19362	17770
	MAHOBA	2463	2274	1268	4026	3343	3599	4887	5408	5239	4089	3112	7317	4329
	MAINPURI	7929	8512	9214	11755	11682	13221	13965	15810	18460	17586	19436	19743	19680
	MATHURA	7334	6728	8123	10912	10795	11976	12486	13762	14362	13959	18193	18320	15758
	MAU	6312	5098	6380	9192	8256	10404	11790	13290	14088	14091	13431	16090	16021
	MEERUT	13545	13782	14028	16568	20252	21097	24157	26281	27646	32632	32513	32711	33618
	MIRZAPUR	3404	4885	4109	6119	5411	7097	7725	9080	9190	11970	10508	14602	12708
	MORADABAD	8828	9268	9196	11854	13455	12859	15078	17244	18238	17790	22507	21556	21559
	MUZAFFARNAGAR	13262	13270	12727	15254	21136	19944	24074	27401	28155	30055	31409	33043	31008
	PILIBHIT	9695	9425	10177	12542	14797	15492	17129	17889	19940	23556	25502	24457	24943
	PRATAPGARH	4456	4738	4796	6916	7631	8391	9079	11276	12490	11603	11654	14121	13712
	RAE BARELI	5428	5145	5795	8017	8777	9081	9815	10786	12496	11822	11990	14979	14165
	RAMPUR	8652	8930	9600	12277	14109	14221	16601	16853	17721	16715	22016	21181	20240
	SAHARANPUR	10670	10481	10517	11902	16210	16832	18701	20337	20759	22222	24298	26215	25415
	SAMBHAL								14721	17185	17024	20729	21281	19942
	SANT KABEER NAGAR	6117	5739	6517	8989	10229	10573	11383	13172	14766	14221	13746	17278	15262
	SANT RAVIDAS NAGAR	4306	4658	4623	6997	7045	8926	10174	10820	11295	11024	13156	15151	15733
	SHAHJAHANPUR	8330	8966	9209	11313	13531	12717	15517	15613	17753	16162	21395	20672	19686
	SHAMLI								25519	27611	29866	32118	31813	32304
	SHRAVASTI	4482	4172	4061	6280	7827	7946	8033	9988	10505	12530	13375	14068	13208
	SIDDHARTH NAGAR	5791	5518	5600	8508	8466	10498	11224	12787	14758	14979	17656	17394	16655

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Uttar Pradesh	SITAPUR	6941	7022	7029	8719	10611	11490	14190	15784	16801	17295	18680	18471	17919
	SONBHADRA	1989	2801	2963	3320	4206	4403	5027	6927	7700	9349	7860	11197	9552
	SULTANPUR	6170	5883	6197	8314	9512	11028	11343	11923	10912	13843	14689	15738	17352
	UNNAO	5318	5787	5927	8286	8491	8724	9501	10249	12146	11656	11706	13483	13607
	VARANASI	5469	5762	6157	9114	8592	10008	11052	12925	12329	13814	14671	16195	14714
Uttarakhand	ALMORA	2233	3365	3316	6296	8466	8401	5024	4903	4943	3794	4544	5610	6737
	BAGESHWAR	3524	3985	4699	8111	10586	8769	6781	7227	7728	4768	8043	9274	9672
	CHAMOLI	3327	3995	4719	6982	9941	9162	6385	5860	6371	4426	7312	7600	8675
	CHAMPAWAT	3738	3522	3113	6965	8512	8462	5496	5564	6740	4475	7292	8965	11489
	DEHRADUN	4916	6036	6950	10187	12115	12673	9499	9643	9953	6403	13348	15355	16236
	HARIDWAR	9483	9533	11200	17414	22413	21882	13413	14596	16035	14984	25558	29022	33361
	NAINITAL	6623	6744	8469	12314	15781	15212	11781	13636	12880	9755	17853	17244	18624
	PAURI GARHWAL	2149	3249	3264	6121	7656	7389	5148	5130	5131	3973	5864	7052	7969
	PITHORAGARH	3904	4503	5076	8153	10846	9859	6959	7256	8328	5537	8435	9682	10743
	RUDRA PRAYAG	3074	4273	5134	8933	10484	10372	6464	6419	6515	4691	7399	7551	7998
	TEHRI GARHWAL	3094	3907	4523	8067	7635	9302	6007	5993	5919	4540	7898	8072	9010
	UDAM SINGH NAGAR	9302	11525	14114	21376	26453	24248	18482	18541	19550	14654	27728	30376	31196
	UTTAR KASHI	3963	4610	5130	7726	9996	10049	6357	6664	6896	4775	8739	8411	8878
West Bengal	24 PARAGANAS NORTH	6623	7541	8224	9623	13537	15347	12679	14848	16909	18082	19779	19393	19982
	24 PARAGANAS SOUTH				5563	6783	7526	7383	8404	10212	10536	9769	10297	11139
	ALIPURDUAR										12446	9391	9726	16917
	BANKURA	5641	6046	6911	6944	8915	8872	10763	10550	11683	11445	12283	13332	15011
	BIRBHUM	6130	6663	7759	8847	9206	8564	10681	11738	14939	14299	16809	15881	17233
	COOCHBEHAR	5608	5594	6575	7512	10150	11910	10938	13194	14679	15667	18809	16447	19752
	DARJEELING	4490	3901	3452	6186	5946	7025	6400	6538	7968	7199	9633	8341	9414
	DINAJPUR DAKSHIN	5678	5319	6246	7478	8649	11530	9108	11589	12637	12738	14561	14201	18083

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 2.1: District-wise Estimates of Crop Provisioning Services per hectare of Net Area Sown

(Rs./ha)

State	District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
West Bengal	DINAJPUR UTTAR	4923	5246	6303	7448	8355	10768	9736	10638	11426	12455	14452	14027	17823
	HOOGHLY	13978	11120	12172	14263	17980	24775	20398	23578	24542	24750	25461	24663	34432
	HOWRAH				7087	8005	13725	9860	13327	14905	15632	14932	16415	15920
	JALPAIGURI	4213	5399	5247	6499	7419	9541	9227	10412	12693	11679	19521	13567	17445
	JHARGRAM												14812	11485
	KALIMPONG												6451	9340
	MALDAH	6598	6677	7439	9509	11466	12865	11273	13239	15203	15936	17308	17437	19551
	MEDINIPUR EAST						12126	10167	11706	10864	14125	13921	14811	14663
	MEDINIPUR WEST				7749		13115	10655	12600	13603	15310	17892	17353	24136
	MURSHIDABAD	8040	8035	9311	9871	13327	14908	13104	15071	17269	19369	20445	22497	21124
	NADIA	8419	8650	9199	11277	12907	15116	14282	16291	18461	20302	20609	20896	20081
	PASCHIM BARDHAMAN												18620	9923
	PURBA BARDHAMAN	7884	7945	8194	9494	13326	12849	11858	14773	16913	15671	18296	15436	19540
	PURULIA	2527	3676	4422	4794	4907	3682	6190	7000	7696	6347	5433	7735	8632

Source: Calculated using datasets received from Ministry of Agriculture and Farmers Welfare

Annexure 3.1: State-wise Nutrient-wise Soil Nutrient Indices

(As on 19.08.2021)

Low
Medium
High

Sl. No.	State	Nitrogen (N)			Phosphorus (P)			Potassium (K)			Organic Carbon (OC)			Boron(B)		
		Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)
1	Andaman And Nicobar	1.01	1.01	1.00	1.08	1.02	1.00	1.16	1.03	1.00	1.32	1.15	1.00	1.97	1.96	2.00
2	Andhra Pradesh	1.07	1.25	1.19	2.47	2.49	2.48	1.96	2.40	2.49	2.00	1.70	1.55	1.52	1.83	1.81
3	Arunachal Pradesh	2.72	2.98		1.15	1.11		2.02	1.36		2.74	2.99		1.24	1.18	
4	Assam	1.91	1.90	2.13	1.36	1.16	1.21	1.29	1.27	1.35	2.33	2.00	2.38	1.20	1.04	1.22
5	Bihar	1.29	1.41	1.36	1.79	1.96	2.07	1.75	1.92	1.94	1.87	1.88	1.78	1.00	1.01	1.70
6	Chhattisgarh	1.31	1.26	1.12	1.87	1.82	1.65	2.06	2.21	2.11	1.75	1.70	1.38	1.60	1.70	1.90
7	Delhi	1.22	1.72		1.50	1.12		2.07	2.33		1.40	2.11		1.75	1.86	
8	Goa	1.91	1.85	1.80	1.31	1.48	1.33	2.07	1.99	1.79	2.72	2.58	2.50	1.52	1.45	1.48
9	Gujarat	1.00	1.34	1.28	2.01	2.10	2.05	2.31	2.37	2.39	1.83	1.91	2.01	1.33	1.50	1.44
10	Haryana	1.00	1.00	1.01	1.22	1.25	1.27	1.89	2.02	1.92	1.04	1.12	1.16	1.85	1.60	1.27
11	Himachal Pradesh	1.59	1.64	1.65	2.10	2.12	2.07	2.20	2.22	2.13	2.67	2.57	2.40	1.90	1.95	1.96
12	Jammu and Kashmir	1.94	1.98	1.99	1.58	1.54	1.47	1.73	1.77	1.83	2.30	2.39	2.36	1.37	1.75	1.34
13	Jharkhand	1.49	1.47	1.45	1.46	1.45	1.69	1.75	1.75	1.72	1.94	2.03	1.87	1.66	1.75	1.74
14	Karnataka	1.62	1.57	1.26	1.97	1.89	1.90	2.16	2.16	2.06	1.76	1.77	1.63	1.54	1.45	1.43
15	Kerala	1.02	1.02	1.00	1.84	1.81	2.04	1.87	1.92	1.77	2.41	2.43	2.38	1.46	1.52	1.45
16	Ladakh	2.06	1.98		1.79	1.70		1.75	2.37		2.65	2.90		1.82	1.45	
17	Madhya Pradesh	1.22	1.24	1.36	1.40	1.42	1.49	2.27	2.20	2.11	1.86	1.92	2.00	1.67	1.72	1.69
18	Maharashtra	1.63	1.39	1.47	1.92	2.03	2.04	2.56	2.57	2.55	1.66	1.68	1.82	1.24	1.54	1.59
19	Manipur	1.03	1.51	1.65	1.45	1.68	1.36	1.17	1.77	1.41	2.28	2.87	2.86	1.95	1.53	
20	Meghalaya	1.25	1.64		1.23	1.23	1.45	1.38	1.46	1.83	2.72	2.75	2.39	1.12	1.80	
21	Mizoram	1.88	1.88	1.58	1.05	1.03	1.26	1.86	1.93	2.27	1.56	1.59	1.83	1.67	2.00	
22	Nagaland	2.48	2.71		1.19	1.15		1.93	1.83		2.87	2.77		1.79	1.96	
23	Odisha	1.24	1.21	1.30	1.38	1.35	1.25	1.76	1.83	1.63	1.56	1.54	1.64	1.34	1.31	1.28
24	Puducherry	1.01	1.01	1.01	1.12	1.23	1.15	1.89	2.25	2.43		2.50		1.00	1.00	1.00
25	Punjab	1.27	1.13	1.02	1.39	1.54	1.48	1.95	2.01	1.88	1.10	1.28	1.81	1.22	1.35	1.19
26	Rajasthan	1.00	1.00		1.86	1.80		2.18	2.10		1.23	1.19		1.00	1.43	
27	Sikkim	1.77	1.29	1.05	1.67	2.21	1.72	2.29	2.17	2.01	2.98	2.93	2.98	1.64	1.52	1.20
28	Tamil Nadu	1.02	1.03	1.03	1.79	1.90	1.85	1.91	2.23	2.40	1.26	1.22	1.22	1.38	1.46	1.50
29	Telangana	1.27	1.19	1.19	1.71	2.15	2.22	1.86	2.13	2.29	1.15	1.61	1.57	1.20	1.77	1.73
30	Dadra & Nagar Haveli and Daman & Diu		1.27		1.36	1.42		2.86	2.69		1.82	1.89		2.00	1.98	
31	Tripura	1.93	1.47	1.38	1.66	1.71	1.70	1.25	1.38	1.43	2.18	1.74	1.86	1.89	1.82	1.77
32	Uttar Pradesh	1.02	1.02	1.06	1.10	1.18	1.14	1.82	1.79	1.87	1.15	1.13	1.25	1.64	1.65	1.77
33	Uttarakhand	1.02	1.14	1.00	1.95	2.02	2.19	1.81	1.94	1.81	1.79	1.89	2.26	1.07	1.48	1.61
34	West Bengal	1.54	1.66		2.63	2.54		2.07	1.60		1.77	2.33		1.28	1.82	

Blank cells denote either data is not available or is available for too few samples.

Source: Calculated using information received from Ministry of Agriculture and Farmers Welfare

Annexure 3.1: State-wise Nutrient-wise Soil Nutrient Indices

(As on 19.08.2021)

Low
Medium
High

Sl. No.	State	Copper(Cu)			Iron(Fe)			Manganese(Mn)			Sulphur(S)			Zinc(Zn)		
		Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)	Cycle I (2015-2017)	Cycle II (2017-2019)	Model Village Programme (2019-20)
1	Andaman And Nicobar	1.96	1.84	1.06	1.98	2.00	2.00	1.99	1.99	2.00	1.01	1.00	1.01	1.76	1.85	1.62
2	Andhra Pradesh	1.93	1.95	1.95	1.67	1.72	1.69	1.88	1.90	1.88	1.84	1.89	1.85	1.59	1.64	1.62
3	Arunachal Pradesh	1.77	1.86		1.93	1.99		1.76	1.78		1.81	1.62		1.57	1.58	
4	Assam	1.94	1.99	2.00	1.96	1.99	1.99	1.96	1.95	1.98	1.90	1.97	1.98	1.93	1.92	1.97
5	Bihar	1.25	1.55	1.97	1.23	1.54	1.82	1.23	1.53	1.83	1.00	1.08	1.76	1.15	1.49	1.68
6	Chhattisgarh	1.95	1.96	1.97	1.86	1.90	1.93	1.92	1.97	1.99	1.74	1.65	1.42	1.63	1.57	1.78
7	Delhi	1.88	1.99		1.60	1.93		1.67	1.88		2.00	1.77		1.86	1.99	
8	Goa	1.98	1.98	1.99	1.99	2.00	1.99	1.99	1.99	1.99	1.70	1.27	1.35	1.80	1.84	1.89
9	Gujarat	1.85	1.94	1.89	1.51	1.75	1.64	1.84	1.95	1.90	1.42	1.78	1.84	1.41	1.68	1.58
10	Haryana	1.91	1.96	1.98	1.69	1.58	1.73	1.75	1.57	1.87	1.92	1.92	1.94	1.78	1.70	1.84
11	Himachal Pradesh	1.94	1.97	1.96	1.89	1.90	1.91	1.71	1.80	1.87	1.97	1.85	1.93	1.89	1.90	1.88
12	Jammu and Kashmir	1.75	1.79	1.79	1.65	1.68	1.66	1.51	1.56	1.64	1.67	1.61	1.73	1.56	1.65	1.72
13	Jharkhand	1.94	1.94	1.92	1.91	1.91	1.91	1.92	1.87	1.84	1.60	1.72	1.70	1.66	1.72	1.80
14	Karnataka	1.92	1.92	1.93	1.49	1.46	1.63	1.82	1.83	1.84	1.65	1.63	1.63	1.46	1.38	1.48
15	Kerala	1.95	1.96	1.98	1.96	1.97	1.97	1.90	1.95	1.96	1.52	1.65	1.72	1.89	1.92	1.94
16	Ladakh	1.99	1.94		1.91	1.76		1.52	1.67		1.27	1.42		1.77	1.71	
17	Madhya Pradesh	1.93	1.94	1.88	1.76	1.79	1.75	1.90	1.91	1.91	1.70	1.76	1.70	1.55	1.57	1.50
18	Maharashtra	1.97	1.97	1.98	1.38	1.34	1.41	1.89	1.86	1.87	1.24	1.46	1.50	1.49	1.47	1.51
19	Manipur	1.83	1.77		1.36	1.97		1.44	1.97		1.79	1.47		1.72	1.64	
20	Meghalaya	1.90	1.87	1.88	1.64	1.90	1.99	1.69	1.64	1.64	1.39	1.46	2.00	1.76	1.64	1.80
21	Mizoram	2.00	2.00		1.94	2.00		1.99	2.00		1.68	1.44		1.93	1.81	
22	Nagaland	1.57	1.93		1.86	2.00		1.73	1.93		1.94	1.98		1.61	1.67	
23	Odisha	1.55	1.38	1.97	1.62	1.43	1.95	1.51	1.28	1.97	1.45	1.43	1.46	1.53	1.52	1.58
24	Puducherry	1.97	1.99	2.00	1.82	1.89	1.90	1.91	1.98	1.99	2.00	2.00	1.00	1.90	1.92	1.94
25	Punjab	1.99	1.99	1.99	1.89	1.89	1.83	1.58	1.54	1.50	1.92	1.86	1.69	1.91	1.87	1.81
26	Rajasthan	1.94	1.95		1.49	1.48		1.89	1.92		1.52	1.84		1.56	1.49	
27	Sikkim	1.72	1.88	1.86	1.95	1.92	1.99	1.67	1.93	1.99	1.79	1.91	1.98	1.75	1.68	1.13
28	Tamil Nadu	1.96	1.96	1.97	1.67	1.66	1.69	1.80	1.76	1.83	1.63	1.63	1.74	1.72	1.70	1.60
29	Telangana	1.18	1.91	1.89	1.05	1.56	1.56	1.11	1.78	1.81	1.15	1.81	1.86	1.12	1.60	1.59
30	Dadra & Nagar Haveli and Daman & Diu	2.00	1.99		1.92	1.96		2.00	1.99		2.00	1.99		1.89	1.92	
31	Tripura	1.97	1.99	1.99	1.93	1.99	2.00	1.97	1.98	1.97	1.63	1.95	1.94	1.89	1.80	1.72
32	Uttar Pradesh	1.95	1.96	1.96	1.76	1.74	1.71	1.88	1.84	1.89	1.63	1.63	1.71	1.71	1.70	1.68
33	Uttarakhand	1.90	1.89	1.94	1.86	1.84	1.91	1.87	1.82	1.87	1.71	1.75	1.81	1.77	1.81	1.86
34	West Bengal	1.97	1.99		1.94	1.99		1.77	1.89		1.38	1.33		1.52	1.95	

Blank cells denote either data is not available or is available for too few samples.
Source: Calculated using information received from Ministry of Agriculture and Farmers Welfare

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Ashti			**155583**	**2159196**	**174890**		**3170**	**2492839**
	June			2897				2897
	July				174890			174890
	August			158452				158452
	September			1864840				1864840
	October			114743				114743
	November		139945					139945
	December		15638					15638
	January			3975				3975
	February			10043				10043
	March			2836				2836
	April			1410				1410
	May						3170	3170
Bamni			**27791**	**32597**	**88803**	**3866**	**2203**	**155259**
	June						2203	2203
	July		27791					27791
	August				11709			11709
	September				62638			62638
	October			22222				22222
	November				8163			8163
	December				5725			5725
	January			4860				4860
	February			5515				5515
	March					3593		3593
	April				568			568
	May					273		273
Bhadrachalam				**199148**	**4188469**		**2142**	**4389759**
	June			12814				12814
	July				633280			633280
	August				655688			655688
	September				2139432			2139432
	October				666375			666375
	November			149788				149788
	December				44057			44057
	January				47229			47229
	February			33143				33143
	March			3403				3403
	April						2142	2142
	May				2409			2409
Bhatpalli			**18095**	**10345**	**6346**		**1022**	**35807**
	June						1022	1022
	July		9932					9932
	August		3132					3132
	September				5284			5284
	October			5709				5709
	November			2781				2781
	December			1855				1855
	January		1337					1337
	February				1061			1061
	March		1792					1792
	April		968					968
	May		934					934
Hivra			**10213**	**6103**	**6323**			**22640**
	June							
	July			4150				4150

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	August		6562					6562
	September				4755			4755
	October			1225				1225
	November			727				727
	December		1202					1202
	January		598					598
	February		1637					1637
	March				1569			1569
	April		215					215
	May							
Jagdalpur				**15072**	**93409**			**108481**
	July				18498			18498
	September				74911			74911
	October			15072				15072
Keolari			**13394**	**33342**	**19789**			**66525**
	June							
	July		659					659
	August		5909					5909
	September			30826				30826
	October				18234			18234
	November		1443					1443
	December		1803					1803
	January			2516				2516
	February		2202					2202
	March				1555			1555
	April		1377					1377
	May							
Konta				**203304**	**697584**			**900888**
	June			29622				29622
	July				86857			86857
	August				57594			57594
	September				393543			393543
	October				91446			91446
	November			42931				42931
	December				31728			31728
	January			30063				30063
	February			33966				33966
	March			40269				40269
	April			26454				26454
	May				36415			36415
Kopergaon					**424839**			**424839**
	July				9976			9976
	August				6428			6428
	September				263509			263509
	November				144925			144925
Kumhari			**13069**	**62495**				**75564**
	June		131					131
	July			2208				2208
	August			1467				1467
	September			56438				56438
	October		2593					2593
	November		1386					1386
	December		4024					4024
	January		3785					3785
	February			2382				2382

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	March		762					762
	April		256					256
	May		132					132
Mancherial				**82578**	**168359**		**73345**	**324282**
	July				56999			56999
	August				65651			65651
	September						51551	51551
	October			66051				66051
	November						21795	21795
	December				17695			17695
	January				16450			16450
	February			15560				15560
	March				11564			11564
	April			967				967
Nandgaon			**1169**	**5382**	**3617**	**34360**		**44527**
	June							
	July		684					684
	August				1526			1526
	September					34360		34360
	October				1448			1448
	November			3328				3328
	December			283				283
	January		484					484
	February			1771				1771
	March				643			643
	April							
	May							
Nowrangpur			**450**	**12034**	**46131**			**58615**
	June		450					450
	July				3170			3170
	August			1860				1860
	September				38667			38667
	October			7263				7263
	November				2051			2051
	December			1383				1383
	January				1208			1208
	February			835				835
	March				600			600
	April			693				693
	May				435			435
P.G.Bridge			**30993**		**10909**		**92**	**41994**
	June							
	July		18765					18765
	August		1664					1664
	September				10909			10909
	October		10414					10414
	November		150					150
	December							
	January							
	February						92	92
Pachegaon					**72996**		**10014**	**83010**
	November				72996			72996
	December						10014	10014
Pathagudem				**876831**	**2239182**		**7499**	**3123512**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	June			64177				64177
	July			321164				321164
	September				2194346			2194346
	October			423560				423560
	November			60461				60461
	December				28977			28977
	January				15448			15448
	February						7499	7499
	March			3705				3705
	April			3764				3764
	May				411			411
Perur				**211945**	**4686720**		**9762**	**4908427**
	June			19115				19115
	July				663474			663474
	August				62172			62172
	September				3138280			3138280
	October				726574			726574
	November			147449				147449
	December				56233			56233
	January				38134			38134
	February			25439				25439
	March			19941				19941
	April						9762	9762
	May				1854			1854
Polavaram			**64964**	**309181**	**4685428**		**95777**	**5155350**
	June		64964					64964
	July				840026			840026
	August				769731			769731
	September				2203457			2203457
	October				754207			754207
	November			151105				151105
	December			94166				94166
	January				72902			72902
	February						55357	55357
	March			63910				63910
	April						40420	40420
	May				45106			45106
Rajegaon			**3321**	**30096**	**105**			**33521**
	June							
	July		2953					2953
	August			2293				2293
	September			21324				21324
	October			4385				4385
	November			1587				1587
	December			506				506
	January		368					368
	February							
	March				105			105
	April							
	May							
Ramakona			**1095**	**2950**	**22959**			**27004**
	June							
	July		888					888
	August				11850			11850
	September				9474			9474

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	October			2871				2871
	November				1599			1599
	December		138					138
	January			79				79
	February		69					69
	March				36			36
	April							
	May							
Sakmur			**98697**	**86958**	**85734**		**9767**	**281158**
	June						9767	9767
	July		56667					56667
	August				30540			30540
	September			86958				86958
	October				50463			50463
	November		18228					18228
	December		7239					7239
	January		7564					7564
	February		7883					7883
	March				4731			4731

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	April		1115					1115
	May							
Sangam				**695**	**17305**		**74**	**18074**
	June							
	July				8141			8141
	August				492			492
	September				4615			4615
	October				3339			3339
	November			695				695
	December				543			543
	January				174			174
	February						74	74
Satrapur			**3149**	**5568**	**38327**			**47043**
	June		656					656
	July				4667			4667
	August				7062			7062
	September				17831			17831
	October				6244			6244
	November			4582				4582
	December				2313			2313
	January		1183					1183
	February		925					925
	March			986				986
	April		384					384
	May				208			208
Tekra		**24718**	**259100**	**341944**				**625762**
	June			3883				3883
	July		115648					115648
	August		63373					63373
	September			338062				338062
	October		52835					52835
	November	24718						24718
	December		8959					8959
	January		4902					4902
	February		5237					5237
	March		4196					4196
	April		2500					2500
	May		1451					1451
Wairagarh			**802**	**11203**	**1588**			**13593**
	July		599					599
	August		202					202
	September			10829				10829
	October				1576			1576
	November			374				374
	December				12			12
Grand Total		**24718**	**701884**	**4698966**	**17779812**	**38225**	**214867**	**23458473**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Ashti			**230177**	**4049754**			**2201**	**4282132**
	June						2201	2201
	July			418528				418528
	August			843696				843696
	September			1347736				1347736
	October			1327596				1327596
	November		179680					179680
	December		11262					11262
	January		28762					28762
	February			57480				57480
	March			54241				54241
	April		10473					10473
	May			476				476
Bamni			**930**	**29885**	**1410615**			**1441430**
	June				1971			1971
	July				454709			454709
	August				646139			646139
	September				63203			63203
	October				233565			233565
	November			13143				13143
	December				10821			10821
	January			6459				6459
	February			5615				5615
	March			4668				4668
	April		930					930
	May				208			208
Bhadrachalam			**23645**	**484632**	**8931834**		**34887**	**9474999**
	June			1954				1954
	July				617422			617422
	August				1996366			1996366
	September				2358684			2358684
	October				3922751			3922751
	November			317088				317088
	December			98422				98422
	January						34887	34887
	February			60398				60398
	March				36611			36611
	April		23645					23645
	May			6771				6771
Bhatpalli			**41127**	**22648**	**35372**	**15698**		**114844**
	June		401					401
	July					14448		14448
	August		40726					40726
	September				26637			26637
	October			17763				17763
	November				4376			4376
	December			3266				3266
	January				2354			2354
	February			1619				1619
	March				1397			1397
	April					1250		1250
	May				607			607
Dhalegaon								
	October							
Hivra			**46012**	**5570**	**6190**	**298**		**58070**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	June			1433				1433
	July				6042			6042
	August		11774					11774
	September		7887					7887
	October		24288					24288
	November			1523				1523
	December		1311					1311
	January		753					753
	February			1258				1258
	March			1356				1356
	April					298		298
	May				148			148
Jagdalpur				**5089**	**208592**			**213681**
	July				122649			122649
	August				43651			43651
	September				17694			17694
	October				24597			24597
	November			5089				5089
Keolari			**67500**	**29947**	**76340**	**9151**	**12797**	**195736**
	August		55520					55520
	September				63303			63303
	October			16307				16307
	November				2247			2247
	December				10791			10791
	January		11980					11980
	February						12797	12797
	March			13641				13641
	April					9151		9151
	May							
Konta		**40546**	**112952**	**251851**	**283270**			**688619**
	June		18795					18795
	July				133331			133331
	August				58754			58754
	September			130294				130294
	October				91184			91184
	November			61661				61661
	December		29426					29426
	January			40677				40677
	February		24984					24984
	March			19220				19220
	April	40546						40546
	May		39746					39746
Kopergaon					**464616**			**464616**
	July				464616			464616
Kumhari			**9737**	**369879**	**125**	**7207**		**386949**
	June				125			125
	July					7207		7207
	August			203099				203099
	September			136540				136540
	October			24919				24919
	November		1759					1759
	December		3058					3058
	January			2374				2374
	February		4558					4558
	March			2947				2947

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	April		237					237
	May		124					124
Mancherial			**60295**	**112516**	**2857684**			**3030495**
	July				42062			42062
	August				68986			68986
	September			63827				63827
	October				2722098			2722098
	November		57845					57845
	December			32848				32848
	January				16998			16998
	February			15842				15842
	March				7539			7539
	April		2450					2450
Nanded					**457104**			**457104**
	October				457104			457104
Nandgaon			**1250**	**9661**	**46939**	**60**	**1122**	**59032**
	June							
	July					60		60
	August				44873			44873
	September			2575				2575
	October			5315				5315
	November		284					284
	December				2067			2067
	January		966					966
	February						1122	1122
	March			1771				1771
Nowrangpur		**834**	**3022**	**14032**	**82666**		**612**	**101166**
	June						612	612
	July				54772			54772
	August				12158			12158
	September			11476				11476
	October				15138			15138
	November		1833					1833
	December			1580				1580
	January			977				977
	February		800					800
	March				598			598
	April		389					389
	May	834						834
P.G.Bridge			**362343**	**3349**	**731797**		**245**	**1097734**
	June							
	July				328292			328292
	August		356659					356659
	September				136924			136924
	October				264260			264260
	November		5683					5683
	December				2321			2321
	January			2533				2533
	February						245	245
	March			730				730
	April			86				86
	May							
Pachegaon					**115442**			**115442**
	August				58649			58649
	September				22621			22621

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	October				34172			34172
Pathagudem		**2579**	**122353**	**828909**	**889281**			**1843122**
	June			6612				6612
	July				287051			287051
	August			235909				235909
	September			553523				553523
	October				596844			596844
	November		66618					66618
	December		54942					54942
	January			21516				21516
	February			11349				11349
	March				5386			5386
	April	2579						2579
	May		793					793
Perur		**60594**	**25748**	**430802**	**12004708**		**109264**	**12631116**
	June			3673				3673
	July				896386			896386
	August				2770353			2770353
	September				3302060			3302060
	October				5035909			5035909
	November			301997				301997
	December						109264	109264
	January			66301				66301
	February			58831				58831
	March	60594						60594
	April		21992					21992
	May		3756					3756
Polavaram			**281414**	**2093562**	**5958588**		**362312**	**8695877**
	June		44344					44344
	July				811908			811908
	August				1692939			1692939
	September			1865162				1865162
	October				3376212			3376212
	November						362312	362312
	December			136079				136079
	January			92321				92321
	February		78496					78496
	March				77530			77530
	April		81894					81894
	May		76680					76680
Purna					**16254**			**16254**
	August				10647			10647
	September				2976			2976
	October				2631			2631
Rajegaon			**12358**	**31663**				**44021**
	June							
	July			2204				2204
	August			9323				9323
	September			19879				19879
	October		9255					9255
	November		1808					1808
	December		789					789
	January		476					476
	February			210				210
	March		30					30

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	April			47				47
	May							
Ramakona			**176**	**51**	**45001**	**7136**		**52364**
	July					7136		7136
	August				15380			15380
	September				19835			19835
	October				8540			8540
	November				1246			1246
	December		176					176
	January			29				29
	February			23				23
Sakmur		**34604**	**15789**	**358345**	**679671**	**579961**		**1668370**
	June							
	July					573641		573641
	August				570655			570655
	September				108856			108856
	October			347369				347369
	November	34604						34604
	December		9044					9044
	January		6745					6745
	February			9207				9207
	March					6320		6320
	April			1769				1769
	May				160			160
Sangam			**45**	**1532**	**151957**		**771**	**154306**
	June							
	July				126961			126961
	August				2689			2689
	September				8131			8131
	October				14176			14176
	November			1278				1278
	December						771	771
	January			254				254
	February		45					45
	March							
	April							
	May							
Satrapur				**4953**	**164161**	**597**	**497**	**170208**
	June				229			229
	July				9255			9255
	August				51493			51493
	September				78636			78636
	October				19046			19046
	November			4953				4953
	December				2709			2709
	January				2240			2240
	February						497	497
	March				553			553
	April					382		382
	May					215		215
Tekra		**66808**	**887227**	**16225**	**503864**		**23775**	**1497899**
	June			1399				1399
	July				249983			249983
	August		395928					395928
	September				253881			253881

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	October		472312					472312
	November	52299						52299
	December	14509						14509
	January		13596					13596
	February						14863	14863
	March			14826				14826
	April						8913	8913
	May		5392					5392
Wairagarh			**9835**	**47013**		**923**		**57771**
	July					923		923
	August		8143					8143
	September			25879				25879
	October			20782				20782
	November		1671					1671
	December			352				352
	January		21					21
Grand Total		**205966**	**2313933**	**9201870**	**36122072**	**621032**	**548485**	**49013358**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Ashti			**871279**	**129747**	**209128**		**735**	**1210888**
	June						735	735
	July			18621				18621
	August		220613					220613
	September		641753					641753
	October				209128			209128
	November			107993				107993
	December		5334					5334
	January			2613				2613
	February		2075					2075
	March		1504					1504
	April			482				482
	May			37				37
Bamni			**39369**	**46449**	**155**	**3444**		**89416**
	June					2431		2431
	July			21062				21062
	August		10133					10133
	September		28714					28714
	October			11763				11763
	November			5933				5933
	December					840		840
	January			7691				7691
	February		521					521
	March					173		173
	April				155			155
Bhadrachalam		**681112**	**663718**	**835440**	**87857**			**2268128**
	June		2405					2405
	July			312262				312262
	August		628454					628454
	September			268549				268549
	October	659480						659480
	November			241143				241143
	December				84219			84219
	January		32860					32860
	February	21632						21632
	March			13486				13486
	April				2643			2643
	May				995			995
Bhatpalli			**9696**	**7235**				**16931**
	June			667				667
	July			1280				1280
	August		1475					1475
	September		4357					4357
	October		2034					2034
	November			1841				1841
	December			1045				1045
	January			1203				1203
	February			1199				1199
	March		830					830
	April		722					722
	May		279					279
Dhalegaon				**135910**				**135910**
	October			135910				135910
Hivra			**6530**		**880**	**1754**		**9164**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	June					143		143
	July				880			880
	August		1696					1696
	September					598		598
	October					763		763
	November		1303					1303
	December		744					744
	January		1340					1340
	February		465					465
	March		982					982
	April					251		251
	May							
Jagdalpur				**63947**	**24112**			**88059**
	July			7405				7405
	August				24112			24112
	September			35645				35645
	October			15740				15740
	November			5156				5156
Keolari			**3425**	**4354**	**29590**	**3418**		**40787**
	June							
	July				11951			11951
	August				10344			10344
	September				4039			4039
	October		2345					2345
	November			2249				2249
	December			2106				2106
	January					3418		3418
	February		1079					1079
	March				2438			2438
	April				432			432
	May				386			386
Konta		**33231**	**19922**	**537358**	**233040**			**823551**
	June			30406				30406
	July			126979				126979
	August			124693				124693
	September			208366				208366
	October				127093			127093
	November			46915				46915
	December				23596			23596
	January				40824			40824
	February		19922					19922
	March	33231						33231
	April				24952			24952
	May				16575			16575
Kopergaon				**130086**	**65477**			**195563**
	July				18238			18238
	August				47239			47239
	September			130086				130086
Kumhari		**462**	**18808**	**13074**	**82239**			**114584**
	June		232					232
	July				80250			80250
	August			9591				9591
	September		12878					12878
	October			3420				3420
	November				1990			1990

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	December		2768					2768
	January		1532					1532
	February	361						361
	March		1398					1398
	April	102						102
	May			62				62
Mancherial			**7200**	**5569**	**5826**		**3315**	**21910**
	August		2965					2965
	September				3577			3577
	November						3315	3315
	December		3108					3108
	January			2244				2244
	February			1446				1446
	March		1128					1128
	April			1878				1878
	May				2249			2249
Nanded				**696730**	**441528**			**1138257**
	August			696730				696730
	October				441528			441528
Nandgaon			**12265**	**5715**	**1830**			**19810**
	June							
	July		5427					5427
	August		1836					1836
	September		2490					2490
	October		2511					2511
	November			854				854
	December			1865				1865
	January			1843				1843
	February			1153				1153
	March				1830			1830
Nowrangpur		**1132**	**1308**	**22583**	**29988**			**55012**
	June		414					414
	July				7312			7312
	August			21144				21144
	September				8993			8993
	October				7955			7955
	November				2846			2846
	December				2234			2234
	January			1439				1439
	February		894					894
	March	562						562
	April	570						570
	May				648			648
P.G.Bridge			**33113**	**2030**			**72**	**35215**
	June						72	72
	July		12239					12239
	August		2374					2374
	September		18500					18500
	October			1218				1218
	November			813				813
Pachegaon			**20585**	**151325**				**171910**
	August			56177				56177
	September			95147				95147
	October		20585					20585

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	November							
Pathagudem		**28159**	**299133**	**2336546**	**5095**			**2668932**
	June			2862				2862
	July			339247				339247
	August		258984					258984
	September			1352329				1352329
	October			490788				490788
	November			151319				151319
	December		38706					38706
	January	17373						17373
	February	7472						7472
	March	3314						3314
	April		1443					1443
	May				5095			5095
Perur		**1501091**	**6175**	**4049234**	**974**			**5557475**
	June		6175					6175
	July			418267				418267
	August	653267						653267
	September			3410165				3410165
	October	739565						739565
	November			220802				220802
	December	60641						60641
	January	31842						31842
	February	13446						13446
	March	2331						2331
	April							
	May				974			974
Polavaram		**194190**	**75538**	**5011714**	**43847**			**5325289**
	June			43905				43905
	July			608931				608931
	August			645836				645836
	September			2771382				2771382
	October			673954				673954
	November			267707				267707
	January		75538					75538
	February	54684						54684
	March	77676						77676
	April	61830						61830
	May				43847			43847
Purna			**1782**	**4577**	**2815**			**9174**
	May				2815			2815
	August			1153				1153
	September		1782					1782
	October			3424				3424
Rajegaon			**16180**	**5244**				**21424**
	June		100					100
	July		6636					6636
	August		3983					3983
	September		4145					4145
	October			4861				4861
	November		1073					1073
	December			383				383
	January		244					244
Ramakona			**5374**	**961**	**2571**			**8905**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	June							
	July		2476					2476
	August		1393					1393
	September		1505					1505
	October				2571			2571
	November			862				862
	December			98				98
Sakmur				**14069**	**336584**	**1223**		**351876**
	June			1322				1322
	July				111742			111742
	August				55572			55572
	September				97443			97443
	October				41107			41107
	November				28370			28370
	December			627				627
	January			12120				12120
	February				2350			2350
	March					934		934
	April					290		290
	May							
Sangam				**6622**	**6427**		**1239**	**14288**
	June							
	July			1490				1490
	August			1073				1073
	September				6427			6427
	October			3329				3329
	November						1239	1239
	December			632				632
	January			99				99
Satrapur			**6860**		**16784**	**7865**	**199**	**31709**
	June					249		249
	July					7165		7165
	August				4439			4439
	September		6860					6860
	October				6575			6575
	November				3433			3433
	December				1749			1749
	January				381			381
	February					287		287
	March				208			208
	April					164		164
	May						199	199
Tekra		**14496**	**478427**	**11221**				**504144**
	June			6481				6481
	July		34403					34403
	August		96497					96497
	September		205030					205030
	October		88578					88578
	November		33977					33977
	December		9785					9785
	January		10158					10158
	February	8928						8928
	March	5567						5567
	April			3281				3281
	May			1459				1459

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Wairagarh		**907**	**5414**	**4607**				**10929**
	August		3153					3153
	September		2125					2125
	October			4607				4607
	November	907						907
	December		87					87
	January		49					49
Grand Total		**2454780**	**2602101**	**14232346**	**1626746**	**17705**	**5559**	**20939238**

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Ashti			**669329**	**1216059**	**176360**	**172985**		**2234732**
	June			1147				1147
	July			136624				136624
	August		497291					497291
	September			1073399				1073399
	October		158506					158506
	November					172985		172985
	December		6401					6401
	January		4073					4073
	February				176360			176360
	March			4355				4355
	April		3059					3059
	May			533				533
Bamni			**38702**	**80228**	**88419**	**11362**	**284**	**218995**
	June					3687		3687
	July			58507				58507
	August		35669					35669
	September				81858			81858
	October			17257				17257
	November		3033					3033
	December					4419		4419
	January			4465				4465
	February				6561			6561
	March					3020		3020
	April					235		235
	May						284	284
Bhadrachalam			**3369785**	**1731382**				**5101168**
	June		1833					1833
	July			187950				187950
	August			735322				735322
	September		3177776					3177776
	October			674993				674993
	November		143341					143341
	December		46436					46436
	January			45298				45298
	February			79220				79220
	March			8381				8381
	April		399					399
	May			218				218
Bhatpalli			**6262**	**6955**	**41212**	**9719**		**64149**
	June				566			566
	July				11454			11454
	August				6127			6127
	September				19422			19422
	October					9719		9719
	November		3671					3671
	December			2694				2694
	January		2592					2592
	February			2382				2382
	March			1879				1879
	April				1831			1831
	May				1812			1812

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Dhalegaon								**ZERO**
Hivra			**7978**	**333**	**2115**	**1436**		**11863**
	June					4		4
	July				2115			2115
	August		2231					2231
	September		5304					5304
	October					924		924
	November			333				333
	December					508		508
	January		443					443
Jagdalpur			**29841**	**96305**				**126147**
	August			86799				86799
	September		29841					29841
	October			9507				9507
Keolari			**5257**	**25009**	**19497**		**1294**	**51057**
	June			249				249
	July			11363				11363
	August			5105				5105
	September				5033			5033
	October				13143			13143
	November			2707				2707
	December			3646				3646
	January		5257					5257
	February			1938				1938
	March				1321			1321
	April							
	May						1294	1294
Konta			**471444**	**369441**	**1189464**			**2030349**
	June		69254					69254
	July		46719	48025				94744
	August				537766			537766
	September			182565	300301			482866
	October		233448					233448
	November		54018		181095			235114
	December		25474		47813			73287
	January			71458				71458
	February		37313	33247				70560
	March			34145	27891			62036
	April				38913			38913
	May		5217		55684			60901
Kopergaon			**6231**	**136514**				**142745**
	July							
	August		6231					6231
	September			5813				5813
	October							
	November			130702				130702
Kumhari			**55553**	**20343**	**12469**			**88366**
	June		38					38
	July				10615			10615
	August			17210				17210
	September		52228					52228
	October			2605				2605

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	November		1091					1091
	December		899					899
	January				1854			1854
	February		979					979
	March			528				528
	April		238					238
	May		81					81
Mancherial			**6030**	**136105**	**11505**			**153640**
	June			857				857
	July			1453				1453
	August		2076					2076
	September			130471				130471
	October				11505			11505
	November		936					936
	December			993				993
	January		941					941
	February		1400					1400
	March			1678				1678
	April		676					676
	May			652				652
Nandgaon				**5008**	**7813**			**12821**
	June							
	July				2327			2327
	August			2534				2534
	September				3133			3133
	October			1422				1422
	November			1051				1051
	December				179			179
	January				889			889
	February				1078			1078
	March				208			208
Nowrangpur			**33463**	**1641**	**18183**			**53288**
	June		544					544
	July			714				714
	August		16439					16439
	September				18183			18183
	October		7548					7548
	November		2916					2916
	December		1946					1946
	January		1565					1565
	February		1310					1310
	March			927				927
	April		505					505
	May		691					691
P.G.Bridge			**23961**	**110582**	**150**			**134693**
	July			10066				10066
	August		16997					16997
	September			97277				97277
	October		5136					5136
	November			1145				1145
	December			1704				1704
	January			40				40

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	February		1828					1828
	March			350				350
	April				150			150
Pachegaon			**53414**					**53414**
	August		53414					53414
Pathagudem			**1250817**	**823751**				**2074568**
	June		5647					5647
	July		102617					102617
	August			443972				443972
	September		1074985					1074985
	October			320942				320942
	November			52828				52828
	December		25621					25621
	January		26392					26392
	February		11016					11016
	March			6007				6007
	April		3881					3881
	May		657					657
Perur			**971178**	**3287339**				**4258517**
	June			495				495
	July			202151				202151
	August		816584					816584
	September			2389435				2389435
	October			515932				515932
	November			175287				175287
	December		39665					39665
	January		39859					39859
	February		75070					75070
	March			4039				4039
Polavaram			**1433697**	**871658**	**2562957**			**4868312**
	June		69036					69036
	July		234932					234932
	August			871658				871658
	September				2406141			2406141
	October		661945					661945
	November		145481					145481
	December		86434					86434
	January		113263					113263
	February		66194					66194
	March				74249			74249
	April				82567			82567
	May		56412					56412
Purna			**4370**	**7729**				**12098**
	June			4200				4200
	July			2523				2523
	August		4370					4370
	September			1006				1006
Rajegaon			**3495**	**53234**	**527**			**57255**
	July				527			527
	August			6924				6924
	September			44402				44402
	October		3495					3495

Source: Calculated using data received from Central Water Commission, Ministry of Jal Shakti.

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	November			1075				1075
	December			256				256
	January			576				576
Ramakona			**2983**	**6025**				**9007**
	July		1789					1789
	August			3184				3184
	September			2643				2643
	October		1193					1193
	November			197				197
Sakmur			**77755**	**122964**	**125511**		**1624**	**327854**
	June						1624	1624
	July				69441			69441
	August		66057					66057
	September			113136				113136
	October				56070			56070
	November		8092					8092
	December			3371				3371
	January		3606					3606
	February			4529				4529
	March			1267				1267
	April			662				662
Sangam			**5482**	**3387**	**1737**			**10606**
	June							
	July		803					803
	August				1737			1737
	September		3590					3590
	October			2815				2815
	November		505					505
	December			573				573
	January		420					420
	February		164					164
Satrapur				**6304**	**26512**	**6892**		**39709**
	June					414		414
	July				18085			18085
	August					6478		6478
	September			6304				6304
	October				5124			5124
	November				2714			2714
	December				167			167
	January				110			110
	February				161			161
	March				153			153
Tekra		**58451**	**198444**	**518238**	**14278**			**789411**
	June			2508				2508
	July		58013					58013
	August		98117					98117
	September			401410				401410
	October			96533				96533
	November	58451						58451
	December		17896					17896
	January				14278			14278
	February			17786				17786

Source: Calculated using data received from Central Water Commission, Ministry of Jal Shakti.

Annexure 4.1: Quality Accounts of River Water in Godavari Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	March		12000					12000
	April		7638					7638
	May		4780					4780
Wairagarh			**1558**	**11**	**10201**	**2837**		**14606**
	July				1130			1130
	August					2837		2837
	September				9071			9071
	October		1366					1366
	November		192					192
	December			11				11
Yelli				**23131**				**23131**
	September			23131				23131
Grand Total		**58451**	**8727027**	**9659677**	**4308912**	**205231**	**3202**	**22962501**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Arjunwad				**80423**		**86530**		**166953**
	July					26017		26017
	August			80423				80423
	September					13338		13338
	October					47175		47175
Bawapuram		**601**		**33**	**1989**	**657**	**355**	**3635**
	June			33				33
	July				205			205
	August					657		657
	September				20			20
	October				1715			1715
	November				49			49
	December	601						601
	January						212	212
	February						143	143
Dameracherla				**6010**	**7036**			**13046**
	June				1458			1458
	July			3171				3171
	September				5577			5577
	November			1910				1910
	December			929				929
Halia				**140**	**4607**	**1127**		**5874**
	July				304			304
	September				2340			2340
	October				1512			1512
	December				451			451
	April			140				140
	May					1127		1127
Huvinhedgi				**4950**	**392952**		**2428**	**400330**
	June			4950				4950
	July				854			854
	August				9459			9459
	September				36437			36437
	October				77243			77243
	November				60465			60465
	December				49658			49658
	January						2428	2428
	February				38517			38517
	March				87707			87707
	May				32612			32612
Karad				**83794**				**83794**
	August			83794				83794
Keesara				**4977**	**125183**			**130161**
	July				55289			55289
	August			4977				4977
	September				46192			46192
	October				22926			22926
	November				211			211
	December				566			566
Kurundwad				**47057**		**219127**		**266184**
	July					50646		50646
	August					141024		141024
	September					27458		27458
	October			47057				47057
Madhira				**681**	**2433**	**3253**		**6367**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	July					3253		3253
	August				327			327
	September				1383			1383
	October			681				681
	November				462			462
	December				262			262
Malkhed				**896**	**3156**		**563**	**4615**
	June			141				141
	July			150				150
	August			165				165
	September				416			416
	October				680			680
	November				71			71
	December				665			665
	January				665			665
	February						563	563
	March				464			464
	April			440				440
	May				195			195
Mantralayam			**5706**	**31295**	**225819**		**15355**	**278175**
	June		5706					5706
	August							
	September				6847			6847
	October				111676			111676
	November			18649				18649
	December				35026			35026
	January						15355	15355
	February			12646				12646
	May				72270			72270
Paleru Bridge						**468**		**468**
	June					216		216
	July					229		229
	September					24		24
Phulgaon						**8811**		**8811**
	August					8811		8811
Samdoli				**60467**		**39555**		**100022**
	July			23701				23701
	August			36766				36766
	September					13716		13716
	October					25839		25839
T. Rampuram			**34255**	**47046**	**203667**		**1845**	**286813**
	June		34255					34255
	August				60327			60327
	September				14510			14510
	October				82843			82843
	November				13704			13704
	December				25571			25571
	January				6713			6713
	February						1845	1845
	May			47046				47046
Wadenapally			**16962**	**114423**	**129036**		**1193**	**261615**
	June		16962					16962
	July			20536				20536
	August			93689				93689
	September				14988			14988

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	October				35351			35351
	November				22525			22525
	December			197				197
	January				868			868
	February				29789			29789
	March						1193	1193
	April				17409			17409
	May				8106			8106
Warunji						**33156**		**33156**
	August					33156		33156
Yadgir					**156824**			**156824**
	September				42808			42808
	October				114016			114016
Grand Total		**601**	**56924**	**482192**	**1252703**	**392684**	**21739**	**2206843**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Arjunwad			**33902**	**21629**		**99926**		**155457**
	July					34426		34426
	August					65500		65500
	September			21629				21629
	October		33902					33902
Bawapuram				**3468**	**3204**		**1273**	**7945**
	June						742	742
	July						531	531
	August				2407			2407
	September				797			797
	October			3468				3468
Dameracherla		**8582**	**2490**	**8513**	**54703**		**37159**	**111447**
	August				16620			16620
	September				36869			36869
	October						37159	37159
	November			6104				6104
	December		2490					2490
	January			2409				2409
	February				1215			1215
	March	5044						5044
	April	3538						3538
Halia				**9733**	**26607**			**36340**
	June			142				142
	July				245			245
	August				1937			1937
	September				24424			24424
	October			6847				6847
	November			1027				1027
	December			1207				1207
	January			184				184
	February			165				165
	March			161				161
Huvinhedgi				**636951**	**305043**		**1433**	**943427**
	June			662				662
	July						1433	1433
	August				305043			305043
	September			302086				302086
	October			228735				228735
	November			24428				24428
	December			22997				22997
	January			28682				28682
	February			7640				7640
	March			11360				11360
	April			10359				10359
Karad						**135396**		**135396**
	August					135396		135396
Keesara				**126368**	**124226**	**32046**		**282641**
	June				9729			9729
	July				52364			52364
	August				24077			24077
	September					32046		32046
	October			124819				124819
	November				36899			36899
	December			1549				1549
	January				1157			1157
Kurundwad				**182136**		**40800**		**222936**
	July					40800		40800
	August			97150				97150

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	September			44149				44149
	October			40837				40837
Madhira				**320**	**6473**			**6793**
	July				3741			3741
	September				1043			1043
	October				1429			1429
	December				259			259
	January			320				320
Malkhed			**92**	**67691**	**79933**			**147716**
	June			63				63
	July				906			906
	August				38523			38523
	September			66596				66596
	October				30932			30932
	November				9063			9063
	December			534				534
	February				508			508
	March			307				307
	April			191				191
	May		92					92
Mantralayam				**4866**	**99988**		**145835**	**250689**
	June						68520	68520
	July						12609	12609
	August				69661			69661
	September						35099	35099
	October						29607	29607
	November				30328			30328
	December			4866				4866
Paleru Bridge				**264**		**101**	**20**	**385**
	September			32				32
	October			231				231
	November						20	20
	December					73		73
	January					28		28
Phulgaon				**13746**		**45827**		**59573**
	August					45827		45827
	October			13746				13746
Samdoli				**55150**		**40823**		**95973**
	August					40823		40823
	September			28726				28726
	October			26424				26424
Sarati			**52407**					**52407**
	October		52407					52407
T. Rampuram				**17503**	**14043**	**7091**		**38637**
	June			8667				8667
	July				2147			2147
	August				10010			10010
	September					7091		7091
	October				1885			1885
	November			8835				8835
Takali			**101745**					**101745**
	October		101745					101745
Vijayawada					**101872**	**47711**		**149583**
	September					47711		47711
	October				101872			101872
Wadenapally			**101048**		**1466689**	**124357**	**122873**	**1814967**
	June		26805					26805
	August						122873	122873

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	September		15896					15896
	October				731961			731961
	November				427157			427157
	December					124357		124357
	January				176397			176397
	February				74436			74436
	March				56738			56738
	April		53308					53308
	May		5038					5038
Warunji				**134351**				**134351**
	August			134351				134351
Yadgir					**1461603**	**443945**	**60231**	**1965779**
	July					443945		443945
	August				925234			925234
	September						50453	50453
	October				536369			536369
	November						9778	9778
Grand Total		**8582**	**291685**	**1282690**	**3744384**	**1018022**	**368824**	**6714186**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Arjunwad				**315826**		**41468**		**357294**
	July			69427				69427
	August			171578				171578
	September					41468		41468
	October			74820				74820
Bawapuram			**1287**	**117047**				**118333**
	July			490				490
	September							
	October			116557				116557
	November		603					603
	December		467					467
	January		216					216
Dameracherla			**11405**	**156873**		**19374**		**187653**
	July			1715				1715
	August			18021				18021
	September			13071				13071
	October			112348				112348
	November					19374		19374
	December		6238					6238
	February		3287					3287
	March			3424				3424
	April			8295				8295
	May		1881					1881
Halia			**738**	**8375**	**624**		**700**	**10437**
	June			466				466
	July			99				99
	August			3065				3065
	September				205			205
	October			4598				4598
	November		129					129
	December		443					443
	January			146				146
	February						700	700
	March				126			126
	April				293			293
	May		166					166
Huvinhedgi		**10798**	**82270**	**1322750**		**60827**		**1476645**
	June			75545				75545
	August		48322					48322
	September			69240				69240
	October			1126504				1126504
	November					60827		60827
	December			51461				51461
	January	10798						10798
	February		33948					33948
Karad						**139284**		**139284**
	July					71290		71290
	August					67993		67993
Keesara			**7829**	**58638**	**64002**	**4109**		**134577**
	June				5126			5126
	July				12089			12089
	August		1432					1432
	September				46787			46787
	October			54953				54953
	November					4109		4109
	December			2119				2119
	March		6397					6397

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	April			1566				1566
Kurundwad				**401815**		**210533**		**612348**
	July			206668				206668
	August					210533		210533
	September			91169				91169
	October			103978				103978
Madhira			**924**	**3623**	**6340**	**127**		**11014**
	June					127		127
	July			931				931
	August				2070			2070
	September				1707			1707
	October				2563			2563
	November		201					201
	December			200				200
	January		363					363
	February		360					360
	March			1405				1405
	April			1086				1086
Malkhed			**445**	**8011**	**29546**			**38002**
	June			96				96
	July				627			627
	August			380				380
	September				8365			8365
	October				20554			20554
	November			6889				6889
	December			207				207
	January			202				202
	February		357					357
	March			138				138
	April			98				98
	May		88					88
Mantralayam			**34506**	**620707**			**24634**	**679847**
	June						14771	14771
	August			4108				4108
	September						9863	9863
	October			572977				572977
	November			40200				40200
	December		34506					34506
	February			3422				3422
Paleru Bridge			**148**	**1047**	**196**	**348**		**1739**
	June					137		137
	July				104			104
	August				61			61
	September			589				589
	October			199				199
	November					47		47
	December					164		164
	January				31			31
	February			31				31
	March			44				44
	April			184				184
	May		148					148
Phulgaon				**39958**		**31085**		**71044**
	July					19075		19075
	August			39958				39958
	September					12010		12010
Samdoli			**63629**	**199000**		**7796**		**270424**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	June					7796		7796
	July			92245				92245
	August		63629					63629
	September			47511				47511
	October			59243				59243
Sarati				**16161**				**16161**
	October			16161				16161
T. Rampuram			**32392**	**54502**	**161324**			**248218**
	August			21062				21062
	September			13881				13881
	October				159930			159930
	November		21484					21484
	December			19559				19559
	January		4707					4707
	February		6201					6201
	March				1395			1395
Takali				**101555**		**187198**		**288754**
	September			101555				101555
	October					187198		187198
Vijayawada					**27439**			**27439**
	July				27439			27439
Wadenapally			**654760**		**306341**		**165694**	**1126795**
	June						162562	162562
	July		1294					1294
	August		1931					1931
	September						3132	3132
	October		2743					2743
	November		219487					219487
	December				98315			98315
	January		92623					92623
	February		72807					72807
	March				206085			206085
	April		263875					263875
	May				1941			1941
Warunji						**130134**		**130134**
	July					57466		57466
	August					72667		72667
Yadgir				**1243486**	**682331**	**202144**	**47677**	**2175638**
	June				517201			517201
	July						47677	47677
	August			149597				149597
	September				165130			165130
	October			1093889				1093889
	November					202144		202144
Grand Total		**10798**	**890333**	**4669373**	**1278143**	**1034426**	**238705**	**8121778**

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
Arjunwad			**46520**		**423687**		**470207**
	July		46520				46520
	August				204957		204957
	September				197496		197496
	October				21234		21234
Bawapuram		**28237**	**90059**	**633**		**2259**	**121189**
	June					2259	2259
	July						
	August	28004					28004
	September		88799				88799
	October		1260				1260
	November			474			474
	December	103					103
	January			159			159
	February	131					131
Dameracherla		**27320**		**32023**	**2751**		**62093**
	July	1991					1991
	August	9243					9243
	September			6982			6982
	October	8216					8216
	November	7871					7871
	December			2710			2710
	January			12733			12733
	February				2751		2751
	March			3616			3616
	April			3945			3945
	May			2036			2036
Halia		**2301**		**3709**			**6010**
	July	127					127
	September	1060					1060
	October			1601			1601
	November			682			682
	December			1180			1180
	January			152			152
	February	485					485
	March			93			93
	April	422					422
	May	208					208
Huvinhedgi		**4777092**		**1297464**			**6074556**
	July	4401092					4401092
	August	197067					197067
	September			965302			965302
	October	31010					31010
	November	44144					44144
	December			21901			21901
	January						
	February	103780					103780
	March			196685			196685
	April			50507			50507
	May			63069			63069
Karad					**148055**		**148055**
	August				87122		87122
	September				60933		60933
Keesara		**34415**	**47218**				**81633**
	July		2535				2535
	August		1847				1847
	September	19027					19027

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
	October		25678				25678
	November		9485				9485
	December	8722					8722
	January		7672				7672
	February	6665					6665
Kurundwad		**97058**	**287642**		**189921**		**574622**
	July	97058					97058
	August		287642				287642
	September				189921		189921
Madhira		**85**	**3206**	**18**			**3308**
	June			18			18
	July		360				360
	August						
	September		694				694
	October		938				938
	November		699				699
	December		515				515
	January	85					85
Malkhed		**477**	**1463**	**440**			**2380**
	June		73				73
	July		430				430
	August		202				202
	September			440			440
	October	368					368
	November		116				116
	December	109					109
	January		66				66
	February		42				42
	March		534				534
Mantralayam		**366778**	**1521125**	**8237**			**1896140**
	July			8237			8237
	August		1255440				1255440
	September		189046				189046
	October	270248					270248
	November	96530					96530
	December		44460				44460
	February		27791				27791
	March		4387				4387
Paleru Bridge		**469**		**1254**		**17**	**1740**
	June			65			65
	July			146			146
	August					17	17
	September			145			145
	October			693			693
	November	30					30
	December	342					342
	January			21			21
	February			93			93
	March			49			49
	April			43			43
	May	97					97
Phulgaon			**30163**				**30163**
	August		10812				10812
	September		19351				19351
Samdoli		**167905**			**56663**		**224568**
	July	26796					26796
	August	141109					141109

Annexure 4.1: Quality Accounts of River Water in Krishna Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
	September				46013		46013
	October				10650		10650
Sarati			**94482**				**94482**
	September		94482				94482
T. Rampuram		**41558**	**16565**	**29572**			**87695**
	June	14578					14578
	August	9788					9788
	September		2743				2743
	October			27663			27663
	November		13822				13822
	December	17191					17191
	January			1909			1909
Takali			**155424**				**155424**
	September		155424				155424
Vijayawada				**161369**			**161369**
	July			5357			5357
	August			143501			143501
	September			12511			12511
Wadenapally		**5326**		**1354380**			**1359707**
	June	1817					1817
	July			1784			1784
	August			164003			164003
	September			297598			297598
	October			311721			311721
	November			291689			291689
	December			129113			129113
	January			65457			65457
	February			3555			3555
	March			84754			84754
	April	3509					3509
	May			4705			4705
Warunji			**114932**		**19841**		**134773**
	July				19841		19841
	August		61977				61977
	September		52956				52956
Yadgir		**7491**	**678586**				**686076**
	October		678586				678586
	November	3511					3511
	December	2720					2720
	January	1260					1260
Grand Total		**5556514**	**3087385**	**2889099**	**840917**	**2277**	**12376191**

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Abu Road					**668**			**668**
	September				491			491
	October				177			177
Chitrasani			**102**		**1647**			**1749**
	August				1482			1482
	September				165			165
	October		102					102
Derol Bridge			**206**	**1081**	**55619**		**137**	**57044**
	July						137	137
	August				50048			50048
	September				5571			5571
	October			869				869
	November			212				212
	December		115					115
	January		92					92
Kamalpur					**40628**		**1761**	**42389**
	August				40628			40628
	September							
	October						1761	1761
Khanpur			**20189**	**44018**	**468310**		**10086**	**542603**
	June						4968	4968
	July				17509			17509
	August				450801			450801
	September			10210				10210
	October			12520				12520
	November			7059				7059
	December			7030				7030
	January		7133					7133
	February		7013					7013
	March		6042					6042
	April			7200				7200
	May						5118	5118
Luwara				**1474**			**347**	**1822**
	July						347	347
	August			711				711
	September			205				205
	October			444				444
	November			115				115
Mataji					**129599**	**3199**		**132799**
	June					1577		1577
	July					1622		1622
	August				121176			121176
	September				7183			7183
	October				1240			1240
Paderdibadi		**5899**	**50100**	**2083**	**20760**	**143082**		**221924**
	June				637			637
	July				2221			2221
	August					143082		143082
	September		41481					41481
	October		6213					6213
	November			2083				2083
	December				1225			1225
	January				6114			6114
	February	5899						5899
	March				7160			7160
	April				3403			3403
	May		2406					2406
Rangeli			**15191**		**87201**			**102392**
	June				201			201
	July				1046			1046

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	August				52618			52618
	September				26755			26755
	October				3570			3570
	November				3010			3010
	December		3050					3050
	January		3127					3127
	February		3274					3274
	March		2928					2928
	April		2813					2813
Vautha					**315983**	**30218**	**20724**	**366925**
	June						2529	2529
	July					4840		4840
	August				315983			315983
	September					7932		7932
	October					6662		6662
	November					8149		8149
	December						4573	4573
	January						5230	5230
	February						4273	4273
	March						1951	1951
	April					2635		2635
	May						2168	2168
Grand Total		**5899**	**85788**	**48656**	**1120416**	**176500**	**33056**	**1470314**

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Abu Road				**2106**	**129**		**52**	**2288**
	July						52	52
	August			263				263
	September			1843				1843
	October				77			77
	November				52			52
Chitrasani			**6**				**529**	**535**
	September						529	529
	October		6					6
Derol Bridge			**97**	**207514**				**207612**
	September			206563				206563
	October			613				613
	November			97				97
	December			143				143
	January			97				97
	February		63					63
	March		34					34
Kamalpur							**5950**	**5950**
	September						5950	5950
Khanpur				**285497**	**116453**		**17501**	**419452**
	June						5499	5499
	July			7817				7817
	August			13901				13901
	September			243565				243565
	October				85101			85101
	November				25323			25323
	December			9406				9406
	January			6436				6436
	February				6030			6030
	March						6735	6735
	April						5267	5267
	May			4371				4371
Luwara			**661**	**229**				**890**
	August			31				31
	September			198				198
	October		316					316
	November		240					240
	December		106					106
Mataji			**926**	**283954**	**98519**			**383398**
	August			73840				73840
	September			210114				210114
	October				96617			96617
	November				1902			1902
	February		926					926
Paderdibadi			**48524**	**9992**	**165336**		**70401**	**294252**
	August						66662	66662
	September				160150			160150
	October		28616					28616
	November		6977					6977
	December			5698				5698
	January		6440					6440
	February		6491					6491
	March				5186			5186
	April			4294				4294
	May						3739	3739
Rangeli			**23401**	**59487**		**2345**		**85234**
	August			35461				35461

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	September			15923				15923
	October		12657					12657
	November		4195					4195
	December			4035				4035
	January			4068				4068
	February		4119					4119
	March		2431					2431
	April					2345		2345
Vautha						**68337**	**36959**	**105296**
	June						6999	6999
	July						6975	6975
	August						8968	8968
	September					51069		51069
	October					5517		5517
	November					4757		4757
	December					3395		3395
	January						3202	3202
	February						3359	3359
	March					3598		3598
	April						3609	3609
	May						3848	3848
Grand Total			**73616**	**848779**	**380437**	**70682**	**131392**	**1504906**

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
Abu Road			**429**		**7701**		**1089**	**9218**
	August				7684			7684
	September						1089	1089
	October		429					429
	November				16			16
Chitrasani			**18**	**3780**	**330**			**4128**
	July			171				171
	August			3508				3508
	September				330			330
	October			101				101
	November		18					18
Derol Bridge			**8678**	**16393**	**8481**	**313626**	**19957**	**367135**
	August					313626		313626
	September						19957	19957
	October		8678					8678
	November			7871				7871
	December				6364			6364
	January				2117			2117
	February							
	March			3003				3003
	April			2804				2804
	May			2715				2715
Kamalpur				**263990**				**263990**
	August			263990				263990
Khanpur				**30533**	**399964**		**82297**	**512795**
	June			3214				3214
	July			12736				12736
	August				372460			372460
	September						64074	64074
	October				22200			22200
	November						7834	7834
	December			4599				4599
	January			6553				6553
	February						4483	4483
	March						5906	5906
	April			3432				3432
	May				5304			5304
Luwara			**600**		**269**			**870**
	August		437					437
	September				224			224
	October		163					163
	November				46			46
Mataji				**50438**	**10378**			**60816**
	August			40565				40565
	September				9947			9947
	October			9399				9399
	November				227			227
	February			474				474
	March				204			204
Paderdibadi		**5040**	**146039**	**55946**	**77986**		**1502**	**286513**
	June						1502	1502
	July				3160			3160
	August		131424					131424
	September				65310			65310
	October			44076				44076
	November	5040						5040
	December			5738				5738
	January			6133				6133

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	A	B	C	D	E	U	Grand Total
	February		8081					8081
	March		6535					6535
	April				5091			5091
	May				4426			4426
Rangeli		**1927**	**53864**		**30968**			**86759**
	July		2462					2462
	August		46993					46993
	September				13024			13024
	October				12958			12958
	November		2036					2036
	December	1927						1927
	January				2613			2613
	February		2373					2373
	March				2373			2373
Vautha						**89178**	**19200**	**108378**
	June						1886	1886
	July					5306		5306
	August					63601		63601
	September					5168		5168
	October					6526		6526
	November					5298		5298
	December						4737	4737
	January						3671	3671
	February						2957	2957
	March					3279		3279
	April						2702	2702
	May						3246	3246
Grand Total		**6967**	**209629**	**421080**	**536078**	**402804**	**124045**	**1700603**

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
Abu Road		**260**					**260**
	July	102					102
	August	31					31
	September	127					127
Chitrasani							**ZERO**
Derol Bridge		**2775**	**790**				**3565**
	June	1454					1454
	July						
	August	723					723
	September		790				790
	October	598					598
Ganod							**ZERO**
Kamalpur							**ZERO**
Khanpur		**76640**	**24201**	**3225**		**13541**	**117607**
	June					1930	1930
	July			3225			3225
	August					8315	8315
	September	14461					14461
	October	49269					49269
	November		8120				8120
	December	6627					6627
	January	6283					6283
	February		6084				6084
	March		5989				5989
	April		4009				4009
	May					3296	3296
Luwara							**ZERO**
Mataji			**7815**	**10243**	**10575**	**8029**	**36662**
	July				10575		10575
	August					8029	8029
	September			9574			9574
	October		7815				7815
	November			668			668
Paderdibadi		**28803**	**174067**	**24260**			**227130**
	July		8490				8490
	August	28803					28803
	September		65310				65310
	October		69915				69915
	November			6962			6962
	December		8344				8344
	January		10336				10336
	February			10336			10336
	March		8344				8344
	April			6962			6962
	May		3330				3330
Rangeli		**61277**	**1943**		**14686**		**77906**
	July				9609		9609
	August				5077		5077
	September	23729					23729

Annexure 4.1: Quality Accounts of River Water in Mahi Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
	October	23736					23736
	November	3658					3658
	December	3727					3727
	January	2125					2125
	February	2422					2422
	March		1943				1943
	April	1150					1150
	May	731					731
Vautha					**29662**	**30695**	**60358**
	June					2630	2630
	July					3440	3440
	August					3274	3274
	September				9071		9071
	October				8745		8745
	November				7334		7334
	December					4947	4947
	January					3095	3095
	February					2832	2832
	March					2893	2893
	April					1808	1808
	May				4512	5777	10289
Grand Total		**169756**	**208817**	**37728**	**54923**	**52265**	**523488**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
Burhanpur			**338572**				**338572**
	August		85705				85705
	September		211389				211389
	October		41478				41478
Chandwada		**33924**				**677**	**34601**
	June						
	July					677	677
	August	32067					32067
	September	655					655
	October	1202					1202
Durvesh			**18119**	**73511**			**91630**
	June						
	July		12983				12983
	August			59004			59004
	September			14507			14507
	October		4594				4594
	November		542				542
Gadat			**35999**			**8450**	**44448**
	August		31874				31874
	September		4124				4124
	October					8450	8450
Garudeshwar			**5922584**				**5922584**
	June		76590				76590
	July		55315				55315
	August		4500282				4500282
	September		71656				71656
	October		591271				591271
	November		80816				80816
	December		82323				82323
	January		69942				69942
	February		74227				74227
	March		125819				125819
	April		118491				118491
	May		75852				75852
Gopalkheda					**16528**		**16528**
	July				3114		3114
	August				2393		2393
	September				5953		5953
	October				5067		5067
Mahuwa			**29690**				**29690**
	August		26398				26398
	September		946				946
	October		2346				2346
Motinaroli			**30187**	**2177**			**32364**
	June		1648				1648
	July		1143				1143
	August		11346				11346
	September		3359				3359
	October		2548				2548
	November		2591				2591
	December		2733				2733
	January						
	February			2177			2177
	March		1209				1209
	April		1192				1192
	May		2417				2417
Pingalwada					**36858**		**36858**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2015-16

All values in Standard River Units (in million)

Site	Month	B	C	D	E	U	Grand Total
	June				813		813
	July				3195		3195
	August				12341		12341
	September				2194		2194
	October				1940		1940
	November				2853		2853
	December				2681		2681
	January				2171		2171
	February				2025		2025
	March				2442		2442
	April				2378		2378
	May				1823		1823
Sarangkheda							**ZERO**
Grand Total		**33924**	**6375151**	**75688**	**53386**	**9127**	**6547275**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	C	D	E	U	Grand Total
Burhanpur			**608072**	**221009**		**829081**
	August		335449			335449
	September		230129			230129
	October			221009		221009
	November		33745			33745
	December		3606			3606
	January		2558			2558
	February		1980			1980
	March		605			605
Chandwada		**33427**				**33427**
	August	3962				3962
	September	18667				18667
	October	8604				8604
	November	1872				1872
	December	321				321
Durvesh		**260956**				**260956**
	August	238132				238132
	September	14644				14644
	October	7994				7994
	November	187				187
Gadat		**142323**				**142323**
	August	106600				106600
	September	17587				17587
	October	18137				18137
Garudeshwar		**16214756**				**16214756**
	June	120234				120234
	July	137225				137225
	August	4057050				4057050
	September	6657345				6657345
	October	2763995				2763995
	November	119111				119111
	December	98663				98663
	January	90094				90094
	February	96034				96034
	March	1832026				1832026
	April	79161				79161
	May	163819				163819
Gopalkheda				**50125**	**56138**	**106262**
	July				56138	56138
	August			29933		29933
	September			10439		10439
	October			7121		7121
	November			2632		2632
Mahuwa		**87498**				**87498**
	August	63219				63219
	September	9933				9933
	October	12952				12952
	November	1395				1395
Motinaroli		**18884**	**2149**			**21032**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2016-17

All values in Standard River Units (in million)

Site	Month	C	D	E	U	Grand Total
	June	2025				2025
	July					
	August	1854				1854
	September		2149			2149
	October	2729				2729
	November	2317				2317
	December	2446				2446
	January					
	February	1230				1230
	March	2798				2798
	April	386				386
	May	3098				3098
Pingalwada		**7608**	**8182**	**14250**		**30040**
	September	7608				7608
	October			4038		4038
	November			3330		3330
	December		2201			2201
	January			2632		2632
	February		3846			3846
	March		2135			2135
	April			1546		1546
	May			2705		2705
Sarangkheda		**401324**			**11684**	**413009**
	July				11684	11684
	August	389640				389640
	September	11684				11684
Grand Total		**17166776**	**618403**	**285384**	**67822**	**18138384**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	C	D	E	U	Grand Total
Burhanpur		**341541**				**341541**
	July	933				933
	August	137053				137053
	September	112691				112691
	October	75523				75523
	November	15342				15342
Chandwada		**28156**	**6231**			**34387**
	August	5127				5127
	September	23028				23028
	October		6231			6231
Durvesh		**245849**	**133716**			**379566**
	July	124540				124540
	August		133716			133716
	September	97978				97978
	October	20644				20644
	November	2688				2688
Gadat		**155564**	**9373**			**164937**
	August	109878				109878
	September	45686				45686
	October		9373			9373
Garudeshwar		**996060**	**68051**			**1064111**
	June	94468				94468
	July	90419				90419
	August	163050				163050
	September	148483				148483
	October	109685				109685
	November	95206				95206
	December	87021				87021
	January	93522				93522
	February	114206				114206
	May		68051			68051
Gopalkheda		**5764**				**5764**
	August	1450				1450
	September	4314				4314
Mahuwa		**105988**				**105988**
	July	686				686
	August	76143				76143
	September	25539				25539
	October	3621				3621
Motinaroli		**27807**	**1901**		**1384**	**31092**
	June		1901			1901
	July	9399				9399
	August	7000				7000
	September	5968				5968
	October	2602				2602

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2017-18

All values in Standard River Units (in million)

Site	Month	C	D	E	U	Grand Total
	November	953				953
	December	1712				1712
	January	173				173
	May				1384	1384
Pingalwada			**34086**	**20683**		**54769**
	August		15164			15164
	September		16246			16246
	October			6264		6264
	November			3519		3519
	December			3578		3578
	January			4027		4027
	February			3295		3295
	May		2676			2676
Sarangkheda		**551553**	**264605**			**816158**
	August		264605			264605
	September	551553				551553
Grand Total		**2458282**	**517964**	**20683**	**1384**	**2998313**

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	D	E	U	Grand Total
Burhanpur		**287115**			**287115**
	August	79021			79021
	September	129682			129682
	October	72025			72025
	November	4383			4383
	December	2005			2005
Chandwada		**19109**			**19109**
	August	3375			3375
	September	12864			12864
	October	2871			2871
Durvesh		**95959**		**58693**	**154652**
	July	34339			34339
	August			58693	58693
	September	53157			53157
	October	4790			4790
	November	3673			3673
Gadat			**89080**	**33393**	**122473**
	August			33393	33393
	September		89080		89080
Garudeshwar		**424262**	**71154**		**495415**
	September		71154		71154
	October	45564			45564
	November	54695			54695
	December	53483			53483
	January	57118			57118
	February	55079			55079
	March	52863			52863
	April	54458			54458
	May	51001			51001
Gopalkheda		**5534**			**5534**
	August	3827			3827
	September				
	October	1707			1707
Mahuwa		**51462**			**51462**
	August	13540			13540
	September	35818			35818
	October	2104			2104
Motinaroli		**9224**	**6523**		**15748**
	June	654			654
	July				
	August	6989			6989
	September		6140		6140
	October	1581			1581
	November		383		383
Pingalwada			**24869**	**10926**	**35795**
	June			2578	2578

Annexure 4.1: Quality Accounts of River Water in Tapi Division, Site-wise & Month-wise, for the year 2018-19

All values in Standard River Units (in million)

Site	Month	D	E	U	Grand Total
	July			3647	3647
	August			4700	4700
	September		5657		5657
	October		3649		3649
	November		2885		2885
	December		3028		3028
	January		4332		4332
	February		5319		5319
Sarangkheda		**699189**			**699189**
	August	86558			86558
	September	612630			612630
Grand Total		**1591853**	**191626**	**103012**	**1886492**

Annexure 4.2: Quality Accounts for Groundwater - Maharashtra

All values are in Hectare meter

	2016						2017						2018						
District	A	C	E	U	Total	%Share	A	C	E	U	Total	%Share	A	C	E	U	Total	%Share	Availability
Ahmednagar	5913	42185	8010	9967	66074	2.2	17884	45069	29272	7292	99516	3.3	19683	59119	33135	21430	133367	4.5	151756
Akola		9827	7285	9966	27078	0.9		11665	3547	16934	32145	1.1	2105	13461	11232	5347	32145	1.1	39456
Amravati	1730	55361	13439	5677	76208	2.5	2476	29515	39785	16151	87927	2.9	2772	58963	13431	6970	82136	2.7	87927
Aurangabad		49597	16571		66169	2.2		26102	60767	6572	93441	3.1		52088	29187	12165	93441	3.1	97872
Beed	2664	14984	32905	25519	76072	2.5	2664	21724	73427	12024	109838	3.7	16623	55348	24730	14257	110957	3.7	119325
Bhandara	1381	73141	3908	1381	79811	2.7	1718	56368	23843	3611	85540	2.9		71441	6712	1657	79811	2.7	85540
Buldhana		49882	32424	1286	83592	2.8		23899	33592	1929	59420	2.0		56433	15553	3858	75844	2.5	83592
Chandrapur	2025	66467	22442	5655	96588	3.2		62463	36172	9274	107909	3.6	8457	38754	38295	6668	92173	3.1	107909
Dhule		41993	15642	10144	67779	2.3	3207	33130	18644	12798	67779	2.3	6838	4355	34487	22099	67779	2.3	67779
Gadchiroli	7670	62657	8706		79033	2.6	1949	34931	54299	1327	92506	3.1	11993	55495	11545		79033	2.6	100599
Gondia	13666	29979	7659	1800	53103	1.8	17034	36394	8577		62005	2.1	20965	21406	10732		53103	1.8	62005
Hingoli	2845	36857	3271	3040	46014	1.5	7828	19967	46022		73817	2.5	5885	49943	3040		58869	2.0	73817
Jalgaon	11045	74388	16444	1360	103238	3.5		32941	68081	13385	114408	3.8		69058	25242	1729	96030	3.2	130930
Jalna		22376	25500	11892	59769	2.0		33449	39072	7715	80235	2.7		37719	20492	16478	74689	2.5	80235
Kolhapur	53546	53864	4040		111450	3.7	53295	55845	12944		122084	4.1	47855	59555	4040		111450	3.7	122084
Latur	2514	31858	16395		50767	1.7		10952	52375	2086	65413	2.2	1257	40250	12780	9365	63652	2.1	65413
Nagpur		82521	7084		89605	3.0	2122	46477	31771	3085	83455	2.8	9840	61092	14961	3712	89605	3.0	89605
Nanded		48225	30049		78275	2.6		49567	45724	2085	97376	3.3	7820	58552	27682		94055	3.1	113963
Nandurbar	3380	42268		1775	47423	1.6	939	39155	5199	2130	47423	1.6	5155	40494		1775	47423	1.6	47423
Nashik	19700	95820	28495	12159	156173	5.2	22396	72158	75263	15818	185635	6.2	41008	84068	36161	18563	179800	6.0	185635
Osmanabad	5700	36593	18463		60756	2.0	6566	27844	37967	2295	74672	2.5	1530	55326	15046	2331	74233	2.5	80963
Palghar	1006	16574	354		17934	0.6	6946	7137	547		14630	0.5	11588	4638		2700	18926	0.6	21317
Parbhani	1008	35445	9042		45495	1.5		26671	45343	7700	79714	2.7	8535	28350	8611	11519	57014	1.9	79714
Pune	39994	81710	12439	8080	142223	4.8	15050	119774	38773	1782	175379	5.9	27139	133542	14698		175379	5.9	175379
Raigad	19630	13388		790	33808	1.1	14026	16722	1875	1184	33808	1.1	22145	11390	1402		34937	1.2	37431
Ratnagiri	35539	3021	1271	1271	41102	1.4		29067	12035		41102	1.4	23673	2589	13932	908	41102	1.4	41102
Sangli		88832	10283	11441	110556	3.7	9535	81367	30844	1941	123688	4.1		98679	15898	3373	117951	3.9	123688
Satara	9448	53429	31544		94421	3.2	3975	63463	22990	3993	94421	3.2	4221	81731	5732	2737	94421	3.2	94421
Sindhudurg	14145	6462	1614	553	22774	0.8		21660	1782		23442	0.8	12906	1773	8096		22774	0.8	23442
Solapur	4457	55170	12013	13967	85608	2.9	1690	60930	70629	4018	137267	4.6		69508	54722	13037	137267	4.6	137267
Thane	2967	12941	743		16651	0.6	7123	8502	943		16568	0.6	6290	9750	610		16651	0.6	16651
Wardha	3714	61282	12140	1932	79068	2.6		27356	45661	6051	79068	2.6	3848	59098	16122		79068	2.6	79068
Washim		32734	20166		52899	1.8	1558	20852	27613	2876	52899	1.8		40917	11982		52899	1.8	52899
Yavatmal		70340	23081		93422	3.1	2480	52240	39849	4174	98743	3.3		81675	23843	948	106467	3.6	113552
Grand Total	**265687**	**1552170**	**453423**	**139656**	**2410936**	**80.6**	**202459**	**1305356**	**1135226**	**170233**	**2813275**	**94.1**	**330133**	**1666561**	**564134**	**183625**	**2744452**	91.8	**2989760**
Missing Blocks				578824	578824	19.4				176485	176485	**5.9**				245308	245308	8.2	
Grand Total	**265687**	**1552170**	**453423**	**718480**	**2989760**	**100.0**	**202459**	**1305356**	**1135226**	**346719**	**2989760**	**100.0**	**330133**	**1666561**	**564134**	**428932**	**2989760**	100.0	**2989760**

Source: Calculated using datasets received from Central Ground Water Board, Ministry of Jal Shakti.

Annexure 4.2: Quality Accounts for Groundwater - Odisha

YEAR: 2018

All values are in Hectare meter

District	A	C	E	U	Grand Total	% Share	Availability
Anugul	30860	13297	9080	1462	54699	3.51	54699
Balangir	21148	17441	14624	537	53750	3.45	56091
Baleshwar	19518	29242	32785		81545	5.24	111581
Bargarh	20206	27737	3053	396	51393	3.30	62067
Bhadrak	31402	7770	2316	3139	44625	2.87	44625
Boudh	6560	9238	6295		22093	1.42	22093
Cuttack	24777	29379	662	1183	56001	3.60	68227
Deogarh	15834	4103	4760	4103	28800	1.85	28800
Dhenkanal	18274	20110	2973	1605	42962	2.76	42962
Gajapati	7738	4294	869		12902	0.83	20792
Ganjam	15477	51095	4778	2463	73813	4.74	86043
Jagatsinghapur	22323			6404	28727	1.84	41882
Jajpur	14010	20916		1187	36113	2.32	52302
Jharsuguda	15859	4149			20008	1.28	20008
Kalahandi	16664	25220	12727	9818	64429	4.14	64429
Kandhamal	19705	6049			25754	1.65	35268
Kendrapara	3028	8481			11509	0.74	15989
Kendujhar	52545	30202	1122		83869	5.39	83869
Khordha	26049	8754		2229	37032	2.38	44136
Koraput	42618	3578			46197	2.97	47608
Malkangiri	7293	12005			19298	1.24	30219
Mayurbhanj	100867	36547	4140		141553	9.09	141553
Nabarangapur	19216	24044			43260	2.78	55733
Nayagarh	13879	17011	3569	2516	36975	2.37	36975
Nuapada	6832	15871	1159	2782	26644	1.71	30246
Puri	27343	25665			53008	3.40	61118
Rayagada	13945	7764			21709	1.39	28915
Sambalpur	24501	29623	5252	1426	60802	3.90	60802
Sonepur	7607	16938	1075	851	26471	1.70	26471
Sundargarh	39905	24801	240	120	65066	4.18	81586
Grand Total	**685983**	**531326**	**111476**	**42221**	**1371005**	88.05	**1557089**
Missing Blocks				186083	186083	11.95	
Grand Total	**685983**	**531326**	**111476**	**228304**	**1557089**	100.00	**1557089**

Source: Calculated using datasets received from Central Ground Water Board, Ministry of Jal Shakti.

Annexure 4.2: Quality Accounts for Groundwater - Rajasthan

All values are in Hectare meter

	2016						2017						2018						
Districts	**A**	**C**	**E**	**U**	**Total**	**%Share**	**A**	**C**	**E**	**U**	**Total**	**%Share**	**A**	**C**	**E**	**U**	**Total**	**%Share**	**Availability**
Ajmer	7846	1940	4215	16782	30783	2.57	4810	4008	3039	18926	30783	2.57		11779	4049	14955	30783	2.57	35933
Alwar		45603	16476	15178	77256	6.44		54818	8720	13718	77256	6.44	21492	42168	3105	10490	77256	6.44	77256
Banswara		6242	5007		11249	0.94	1112	2698	10140		13950	1.16	1804	8165	3654	1984	15607	1.30	18954
Baran	3795	18285	18273	2852	43206	3.60	1592	32112	7452	7678	48834	4.07	1592	5761	30977	4876	43206	3.60	48834
Barmer		457	2265	7135	9857	0.82	206	411	1661	7579	9857	0.82		835	1954	7069	9857	0.82	27591
Bharatpur		6634	8308	22552	37494	3.13		6087	13859	21688	41634	3.47		5746	9153	22595	37494	3.13	41634
Bhilwara		4297	14963	25124	44384	3.70		6809	7943	29632	44384	3.70		14011	3909	16131	34051	2.84	54363
Bikaner	1843	2331	4787	7803	16764	1.40		2456	3516	5169	11141	0.93	1752	4872		8744	15368	1.28	24099
Bundi	8228	16566	4978	11281	41053	3.42	8228	12429	15015	11702	47373	3.95	8228	15305	12139	11702	47373	3.95	47373
Chittorgarh		15023	5987	8985	29995	2.50		14350	15645	2824	32818	2.74		20729	4599		25328	2.11	52478
Churu	1342		785	6864	8992	0.75	1794		217	6980	8992	0.75	1846	0	312	6834	8992	0.75	11569
Dausa	517	1301	9321	10695	21834	1.82		1723		5320	7043	0.59		1477	5356	15001	21834	1.82	23123
Dholpur		5610	6763	8394	20767	1.73		10581		10187	20767	1.73		8324	3781	8663	20767	1.73	24359
Dungarpur			2873		2873	0.24		2084	5873		7956	0.66		3779	3599	578	7956	0.66	13466
Ganganagar	21497	3771	2571	2053	29893	2.49	7436	2555	12906	6995	29893	2.49	22685	4525	1815	868	29893	2.49	40924
Hanumangarh	5261	7717	431	1452	14861	1.24	6645	8204	2499	1699	19047	1.59	9408	6685	862	2093	19047	1.59	19047
Jaipur	2235	10182	7513	14768	34698	2.89	587	18473	14486	16005	49552	4.13	2960	15399	12089	30805	61252	5.11	71970
Jaisalmer		928	1234	3925	6088	0.51		894	929	4265	6088	0.51		808	684	4596	6088	0.51	6088
Jalore				21522	21522	1.80				14826	14826	1.24		1394	16087	24104	41585	3.47	48033
Jhalawar	3295	14467	6966	13532	38261	3.19	2765	5544	16038	7015	31362	2.62	2377	5748	17730	5507	31362	2.62	51136
Jhunjhunu		3675	2512	859	7045	0.59		11686	3212	859	15757	1.31				0	0	0.00	20785
Jodhpur	1064	3569	3078	18983	26693	2.23	2988	4003	3278	10101	20370	1.70	2719	7590	496	12058	22862	1.91	39710
Karauli		15042	8206	8212	31460	2.62		5550	14000	11909	31460	2.62		13944	7201	10315	31460	2.62	35848
Kota	3172	19874	12867	3530	39444	3.29	1190	17359	7881	13014	39444	3.29		24592	8786	6066	39444	3.29	51737
Nagaur			389	26380	26770	2.23	3027	10581		8813	22421	1.87		4048	454	20911	25413	2.12	52142
Pali		7684	6003	21438	35125	2.93		11877	6683	21621	40181	3.35		7022	3170	29368	39560	3.30	45557
Pratapgarh		8002	7840	3330	19173	1.60	1854	5723	10644	951	19173	1.60	2457	9880	5726	1110	19173	1.60	19173
Rajsamand		3030	2936	2952	8919	0.74		2576	3782	2561	8919	0.74	352	5347	2539	681	8919	0.74	10114
Sawai Madhopur		21952	6527	11865	40344	3.37		9058	17579	13708	40344	3.37		11225	14710	14410	40344	3.37	44983
Sikar		8276	4710	11091	24078	2.01		6141	972	19773	26885	2.24	1060	6429	5542	13854	26885	2.24	27893
Sirohi		1575	24992	5094	31662	2.64	3097	7632	16589	4344	31662	2.64		5460	12114	14088	31662	2.64	31662
Tonk	1359	15402	8777	16208	41746	3.48		12783	7351	21612	41746	3.48		5506	13272	17615	36393	3.04	41746
Udaipur		13258	8208	5376	26842	2.24		9009	12891	6043	27943	2.33	887	13337	8279	6385	28889	2.41	39342
Total	**61456**	**282694**	**220761**	**336217**	**901129**	**75.16**	**47331**	**300213**	**244802**	**327516**	**919861**	**76.72**	**81618**	**291885**	**218142**	**344457**	**936102**	**78.08**	**1198921**
Missing Blocks				297793	297793	24.84				279060	279060	23.28				262819	262819	21.92	
Grand Total	**61456**	**282694**	**220761**	**634010**	**1198921**	100.00	**47331**	**300213**	**244802**	**606576**	**1198921**	100.00	**81618**	**291885**	**218142**	**607276**	**1198921**	100.00	**1198921**

Source: Calculated using datasets received from Central Ground Water Board, Ministry of Jal Shakti.

Annexure 4.2: Quality Accounts for Groundwater - Kerala

All values are in Hectare meter

	2016						2017						2018						
District	A	C	E	U	Total	% share	A	C	E	U	Total	% share	A	C	E	U	Total	% share	Availability
Alappuzha	15921	4112	11395	919	32346	6.21	29963	10495			40457	7.76	35604	1304	2784	765	40457	7.76	40457
Ernakulam	35199	5552	1703		42454	8.15	39138	5989	2371	208	47705	9.15	30372	3928	15652		49953	9.58	49953
Idukki	10417		8196		18614	3.57	6909	1036	10668		18614	3.57	5471		12570	573	18614	3.57	18614
Kannur	25743	2369	9459		37571	7.21	34776	1403	1392		37571	7.21	24476	782	13239	1613	40109	7.70	41255
Kasargod	14048		2729	662	17439	3.35	15267		1604	567	17439	3.35	13104		9251	1002	23358	4.48	28575
Kollam	19230	1972	6991	2481	30673	5.89	20972	1496	5081	5744	33294	6.39	11129	335	8074		19538	3.75	33294
Kottayam	29193		4609	847	34649	6.65	8795	1163	24125	567	34649	6.65	10848	952	21529	1321	34649	6.65	37454
Kozhikode	24171		4673	1768	30612	5.87	19072	267	8731	267	28336	5.44	997	1138	25605	2872	30612	5.87	30612
Malappuram	28624	4168	3108	1151	37051	7.11	25443	5089	6059	460	37051	7.11	26728	2642	7681		37051	7.11	47053
Palakkad	20245	27384	8796	2718	59144	11.35	28659	23228	4229		56117	10.77	35039	12706	10184	1215	59144	11.35	59144
Pathanamthitta	13348		8891	1225	23464	4.50	20381		3083		23464	4.50	9336		14128		23464	4.50	25583
Thiruvananthapuram	10722	1517	798	4462	17499	3.36	11452	958	6316	4048	22774	4.37	17264	506	3016	1425	22210	4.26	26970
Thrissur	19467	1826	26355	4259	51907	9.96	28399	10400	19161	1088	59048	11.33	44217	3463	11368		59048	11.33	59048
Wayanad	6410		5593	7352	19355	3.71	16546	2280	4337		23163	4.44	6855		12500		19355	3.71	23163
Total	**272738**	**48901**	**103295**	**27844**	**452778**	86.88	**305772**	**63803**	**97158**	**12948**	**479682**	92.04	**271440**	**27755**	**167580**	**10786**	**477562**	91.63	**521175**
Missing Blocks				68397	68397	13.12				41493	41493	7.96				43613	43613	8.37	
Grand Total	**272738**	**48901**	**103295**	**96241**	**521175**	100.00	**305772**	**63803**	**97158**	**54441**	**521175**	100.00	**271440**	**27755**	**167580**	**54399**	**521175**	100.00	**521175**

Source: Calculated using datasets received from Central Ground Water Board, Ministry of Jal Shakti.