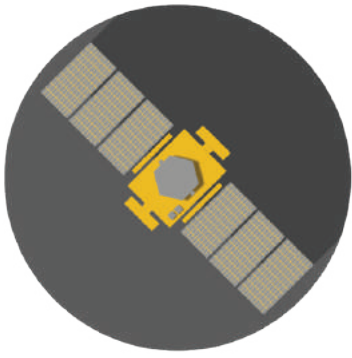


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# **WATER RESOURCES MANAGEMENT**

using Satellite Remote Sensing





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# INTRODUCTION

Our planet faces an unprecedented demand for clean water caused by the cumulative impacts of population growth, increasing consumption, declining resources, pollution and climate change. With groundwater supplies dwindling and increasing demand for clean water, both for human and commercial activities, it has become critical to assess surface water resources to ensure a constant supply of clean water is maintained. Water managers today, more than before, need comprehensive and effective tools to meet these challenges.

Satsense Solutions uses cutting edge satellite remote sensing technology combined with Artificial Intelligence and geospatial analytics to provide a suite of services for water managers to better assess water resources.

## WHAT ARE THE SERVICES?



**WATER QUALITY ASSESSMENT**  
**CATCHMENT AREA MANAGEMENT**  
**WATER BUDGET ESTIMATION**  
**FLOOD MAPPING**  
**RESERVOIR & LAKE MANAGEMENT**

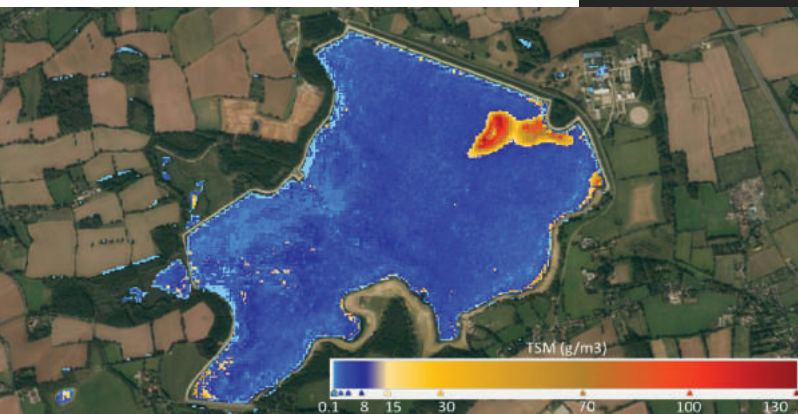


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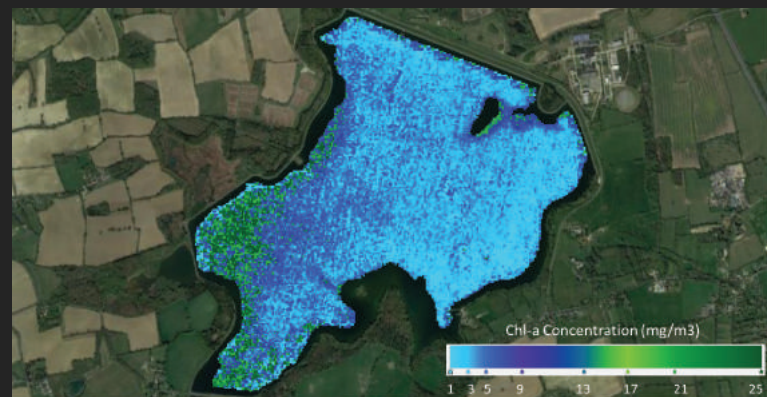
# 1

# WATER QUALITY ASSESSMENT

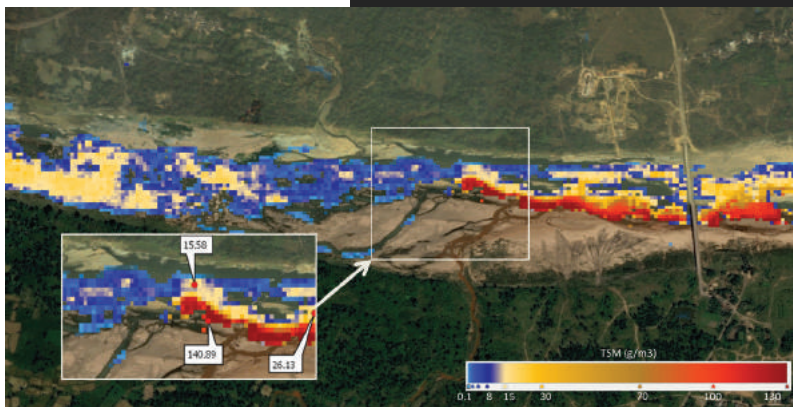
This solution assesses the water quality of inland water bodies such as lakes, reservoirs and rivers and coastal waters. The assessment is based on the water's inherent optical properties observed from multispectral satellite data. The water quality parameters assessed are Total Suspended Solids (TSS), Chlorophyll-a (Chl-a), Coloured Dissolved Organic Matter (CDOM) and transparency or turbidity. These parameters provide a good understanding of the state of the water bodies under observation. For example, TSS indicates industrial effluence being discharged into the water, Chl-a shows algae-bloom, CDOM points to organic materials in the water and turbidity signifies the murkiness of the water.



**Total Suspended Solids (g/m3)  
in reservoir**



**Chlorophyll-a concentration  
(mg/m3) in reservoir**



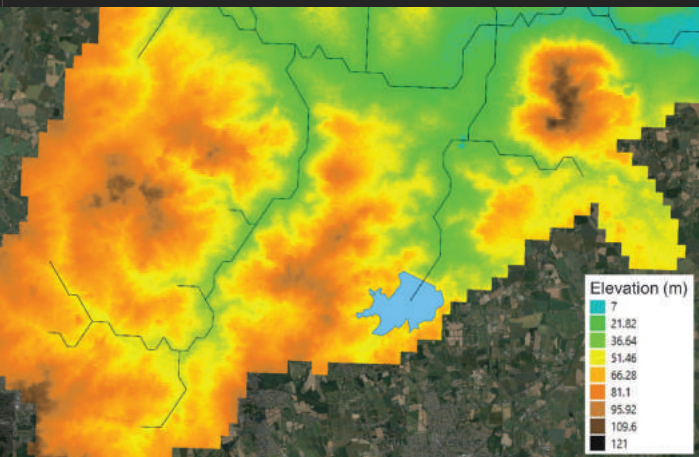
**Total Suspended Solids (g/m3) in river**



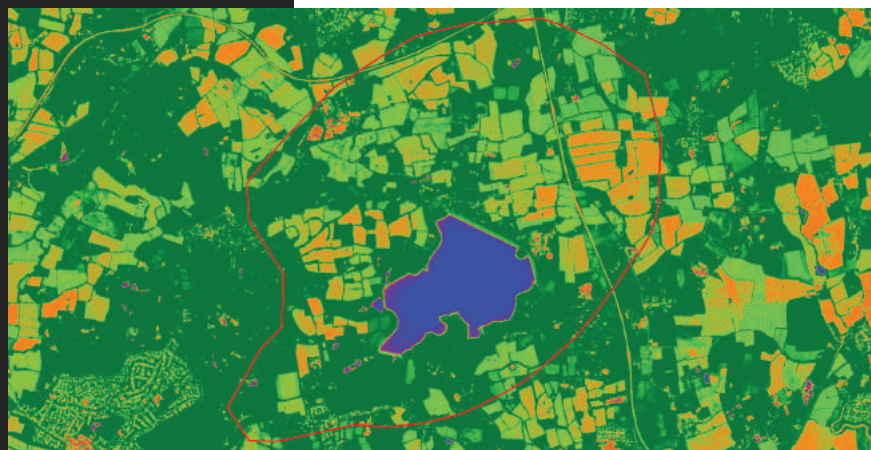
# CATCHMENT AREA MANAGEMENT

# 2

The maintenance of healthy catchment areas is fundamental to the supply of safe and reliable drinking water. This solution uses precise topography data from satellites to determine the flow direction of water within the catchment area. The catchment area is observed for land use and changes in land cover in order to identify potential risks and hazards based on flow directions and land use activities. Surface water quality can then be monitored to determine both point and diffuse sources of pollution and appropriate remediation actions recommended.



Topography map of catchment area



Land cover and land use within catchment area



Identifying potential risks and hazards within the catchment area

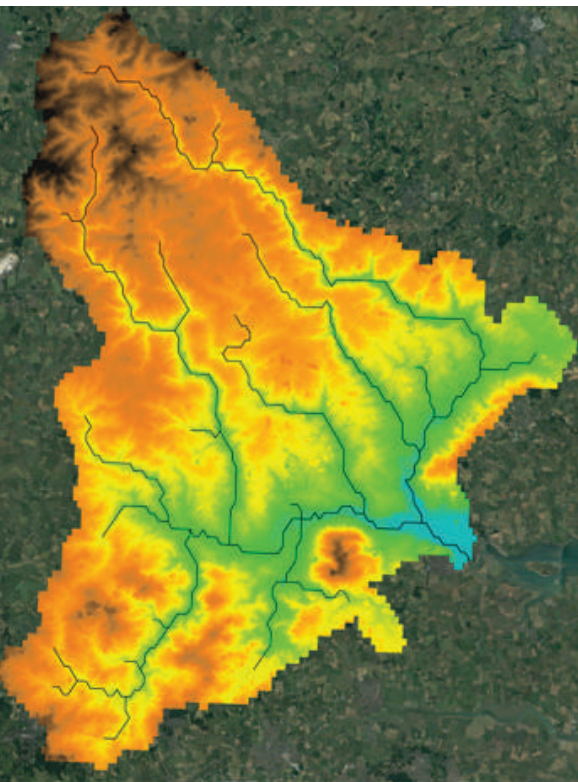




# 3

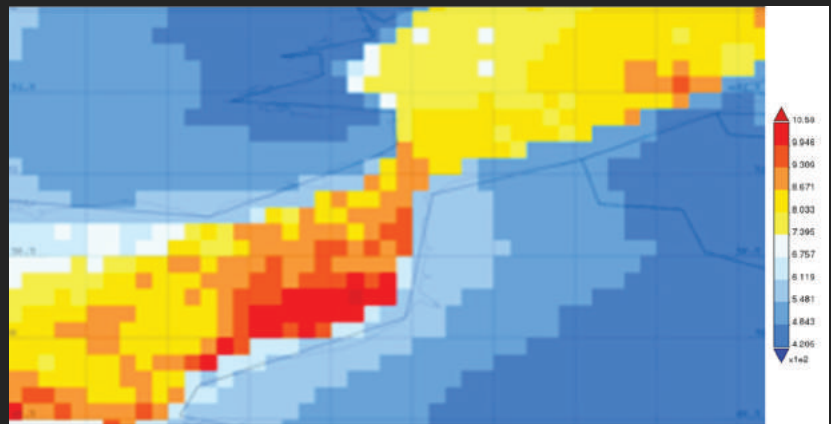
# WATER BUDGET ESTIMATION

The understanding of the water quantity entering and leaving a river basin or catchment area is fundamental for water budgeting. This service provides an important tool for water managers to budget and allocate water, depending on the availability, for domestic, industrial and agricultural usage. The factors assessed are total precipitation, which includes water entering a catchment in the form of rain and snow, evapotranspiration, runoffs and changes in groundwater levels. In addition, water availability values can be made more accurately by the use of in-situ data and hydrology models developed specifically for a particular area of interest.

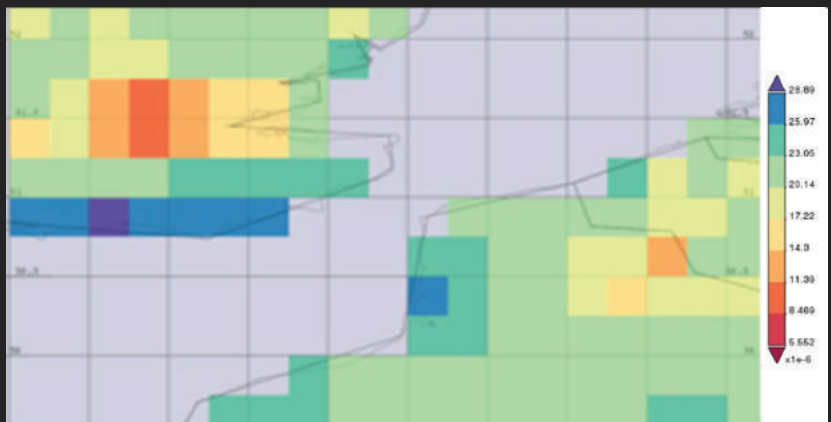


Elevation (in m)

Area and topography profile of river basin



Precipitation data



Evaporation and transpiration data

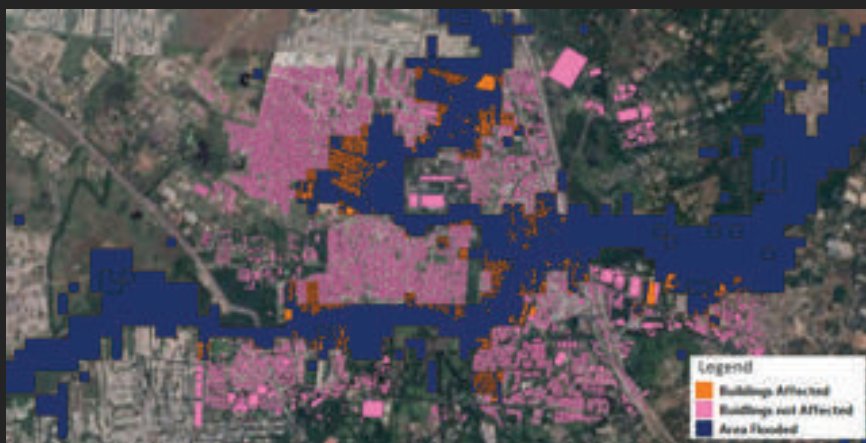


# FLOOD MAPPING

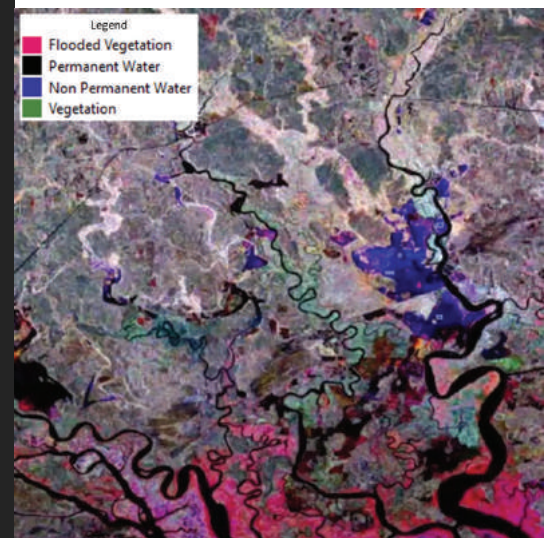
# 4

This service helps water companies understand if water resources, both surface and ground water, have been contaminated with flood and storm water. The service can also provide insights to protect water companies' vital assets such as water pumping stations and treatment works from being flooded, in order to ensure there is minimum disruption of services and/or contamination of potable water supplies due to sewage overflowing. This solution uses precise topography data from satellites to determine the flow direction of water and demarcates high risk areas to provide insights that can help mitigate the risk of flooding.

Demarcating flood plains and avulsion zones



Buildings affected by flooding



Mapping flooded areas

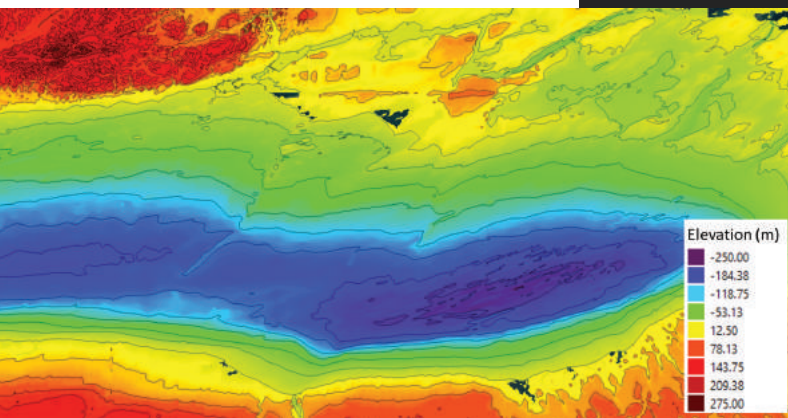




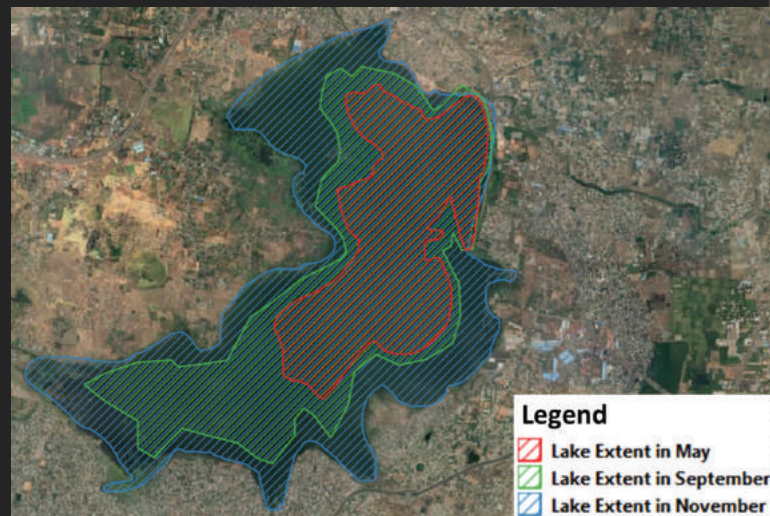
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# RESERVOIR AND LAKE MANAGEMENT

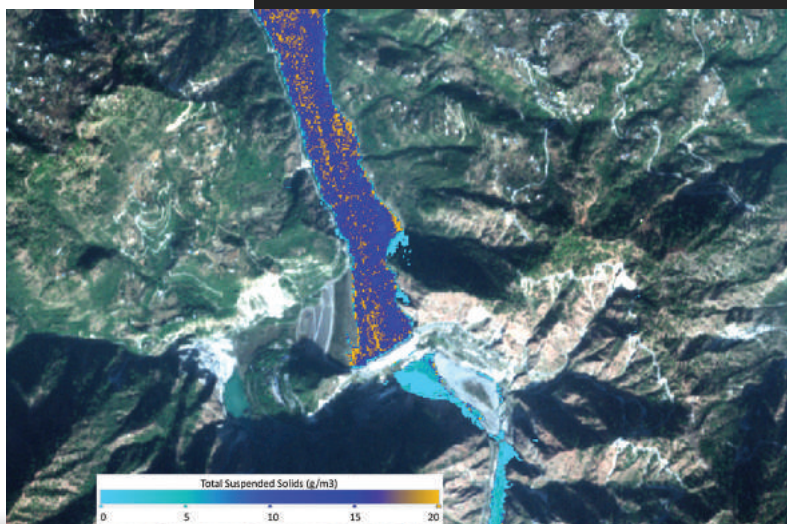
Lakes and reservoirs are important resources used for drinking water, fishing, and recreational activities. A variety of factors affect lakes and reservoirs, including climate variability and change, land use and other watershed activities that influence surface runoff and groundwater – making the active management of lakes and reservoirs critical for preserving and, at times, restoring ecological balance. Using satellite remote sensing technology, this service monitors water extent, water level height, bathymetry and sedimentation – which are vital for effective management of these water resources.



Bathymetric map of lake



Lake extent over a period of 6 months



Sediment loads upstream to a dam





# WHY USE THESE SERVICES?

## **LOWER COST**

Reduced need for on-site visits or infrastructure (such as sensors), as assessment is carried out through remote sensing, thereby incurring significant cost savings.

## **COMPREHENSIVE**

Complete spatial coverage provided as entire areas of interest are assessed.

## **EFFICIENT**

Water bodies can be assessed more frequently and easily, including those located in remote or hard to access areas. In addition, several sites can be assessed in a single instance.

## **INNOVATIVE**

In many cases these solutions would be the only feasible method of obtaining valuable insights.





# CONTACT US

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Satsense Solutions uses satellite remote sensing technology and geospatial analytics to develop business and governance solutions.

Please visit our website for more details: [www.satsense.co](http://www.satsense.co)

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Disclaimer: Satellite remotely sensed data are generally recorded under changing environmental conditions, which might impact the accuracy of output data. Although results are based on well-established methods and tools are thoroughly validated for accuracy, remotely sensed data are subject to natural variations of the atmosphere, local conditions etc., therefore Satsense Solutions Limited cannot take any responsibility caused by the usage and interpretation of remote sensing products. As with all measuring tools / systems, calibration based on in-situ data is recommended.