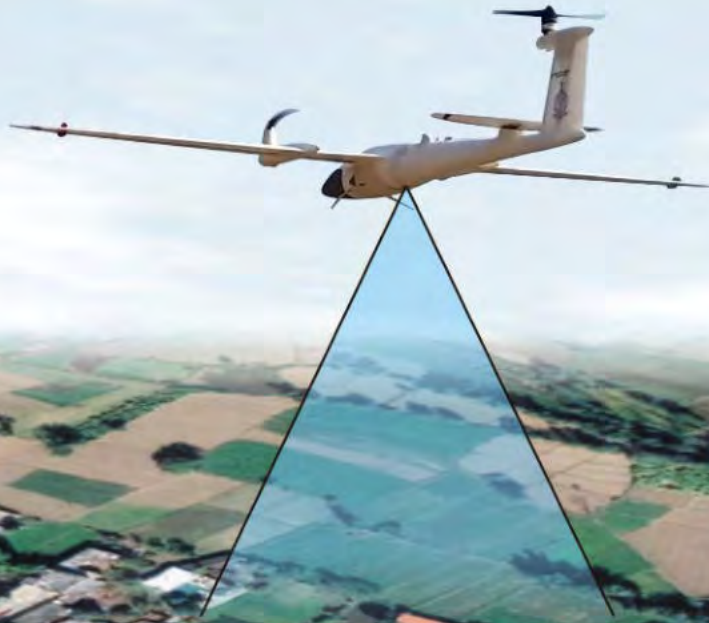




भारतीय सर्वेक्षण विभाग SURVEY OF INDIA



वार्षिक रिपोर्ट
ANNUAL REPORT
2019 - 2020

भारतीय सर्वेक्षण विभाग SURVEY OF INDIA

विज्ञान एवं प्रौद्योगिकी विभाग
(DEPARTMENT OF SCIENCE & TECHNOLOGY)

वार्षिक रिपोर्ट
ANNUAL REPORT
2019 - 2020



भारत के महासर्वेक्षक के आदेश से प्रकाशित
Published by The Order of the Surveyor General of India

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FOREWORD

Survey of India, The National Survey and Mapping Organization of the country under the Department of Science & Technology, is the oldest scientific department of the Govt. of India. It was set up in 1767 and has already completed more than 250 years of its existence. In its assigned role as the nation's Principal Mapping Agency, Survey of India bears a special responsibility to ensure that the country's domain is explored and mapped suitably, provide base maps for expeditious and integrated development and ensure that all resources contribute with their full measure to the progress, prosperity and security of our country now and for generations to come.

The Survey of India has evolved rich traditions over the years. The history of the Survey of India dates back to the 18th Century. Bit by bit the tapestry of Indian terrain was completed by the painstaking efforts of a distinguished line of Surveyors such as Mr. Lambton and Sir George Everest. The great Trigonometric series spanning the country from North to South East to West are some of the best geodetic control series available in the world. The scientific principles of surveying have since been augmented by the latest technology to meet the multidisciplinary requirement of data from planners and scientists.

After Independence, there was an upsurge of development all over the country which has continued till today. With planning for economic development, hundreds of schemes required survey data for scientific planning and execution. The survey of India had to divert most of its potential for developmental projects, the normal topographical surveys being relegated to a secondary place.

In the year 2005, the Union Cabinet approved the National Map Policy 2005 (NMP-2005), which mandates Survey of India for to produce, maintain and disseminate the topographic map database of the whole country, which is the foundation of all spatial data.

Department has now grown and spread in all parts of the country with its 8 Zonal offices and 23 Geo-spatial Data Centres covering 29 states and 7 UT's along with 4 Printing Groups and 6 Specialised Directorates providing the basic map coverage required for the development of the country. Its expert advice is being utilized by various Ministries and undertakings of Govt. of India in many sensitive areas including settlement of International Borders, State Boundaries and in assisting planned development of hitherto under developed areas.

The Specialized Directorates are the Geodetic and Research Branch, International Boundary Directorate, GIS & Remote Sensing Directorate, National Geo-spatial data centre, Digital Mapping Centre and Directorate of Map Publication.

The Training directorate i.e. Indian Institute of Surveying and Mapping (IISM), Hyderabad is a premier institution providing training & capacity building in the field of Surveying, Mapping, Photogrammetry & GIS. Besides training to officers and staff of Survey of India, IISM also imparts training to other Government Organisations, Private Individuals and Scholars from various Afro-Asian countries.

Apart from Geodetic, Topographical, SOI caters for the survey needs of all developmental projects in the country. Numerous developmental surveying & mapping tasks for small/Medium/Large projects as detailed under were carried out by the SOI for various Central/State Government agencies, Central/State PSUs and other organizations.

SOI has undertaken the National projects like National Hydrology project (NHP) and Namami Gange to generate the accurate high resolution DEM for water management of all the River Basins of the India. To be abreast with the new technology in mapping SOI is adopting LIDAR and UAV technologies in upcoming new projects. SOI is also in the process of implementing the state of art technologies available in the industry to improve the workflows in order to capture accurate, cost effective and timely Geo-spatial Data, to meet the needs of sustainable national development. SOI has developed a web – based Geo- Portal offering NTDB as service to carter for Government to citizen (G2C): www.indiamaps.gov.in and Government to Government (G2G): www.g2g.indiamaps.gov.in needs and applications or information systems and also provided a free to use mobile app “SAHYOG” for its users viz Government (Centre/State) departments, Organisations, Institutions, Govt. employees, Academic Institutions, Students and Citizens of India, to voluntary support and contribute in preparing, updating and enriching the national database of the country and is available on our website as well as Google Play store for download and use to populate the National Topographical Database (NTDB).

SOI has undertaken Large Scale Mapping projects using Professional Survey Grade UAV/ Drone for the States of Karnataka, Haryana, Maharashtra, Madhya Pradesh, Delhi Development Authority (DDA) & Indian Railway(IR). UAV/Drone based data acquisition provides the high resolution source data for mapping requirements in less time in comparison to other comparative technologies like Aerial Photography. UAV is providing better than 5 cm GSD images for more than 5-10 km² area per day, resulting in drastically reduced mapping timelines. It offers unique technological advantage such as flexibility of operation, convenience and low cost.

I would like to compliment Sh. Pankaj Mishra, Deputy Surveyor General, Sh. Pardeep Singh, Technical Secretary, and Sh. Vinaik Bist, Survey Assistant for their hard work in bringing out this report. I congratulate all the colleague and staff members of SOI for their sincere efforts and accomplishment during the period of 2019-20 and also thank them for their cooperation and diligent attitude towards work.

Lt General Girish Kumar, VSM (Rtd.)
Surveyor General of India

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INTRODUCTION:

Survey of India, under the Department of Science & Technology, Govt. of India, has been engaged in production and maintenance of various types of Topographical, Geographical and many other public series maps on various scales covering India, for the defence and development of the nation. Besides, being grouped under 'Scientific Surveys' the Govt. of India business rule, it has also been called upon extensively to deploy its expertise in the field of geodetic and geophysical surveys, study of seismocity and seismotectonics, environmental and disaster management, participation in Indian scientific expeditions to Antarctica, glaciology programmes and other projects related to digital cartography and digital photogrammetry etc. to provide basic data for Science & Technology requirements.

1. CHARTER OF DUTIES:

National Map Policy (NMP) – 2005 mandates Survey of India (SoI) to provide, maintain and allow access and make available the NTDB (National Topographical Data Base). NTDB comprises the following data sets:

A. National Spatial Reference Frame:

- i. Continuously Operating Reference Stations (CORS) network.
- ii. National Ground Control points (GCPs) Library: At 25-30 kms across country.
- iii. Precision Bench marks (BMs): At 35-40 kms across country.
- iv. Geodetic Surveys for precision controls (Horizontal & Vertical)
- v. Collection of tidal data along the coast line and islands and publication of Annual Tide Tables giving prediction of Tides one year in advance for 44 ports (30 Indian ports and 14 foreign ports) in the Indian Ocean, Arabian Sea and the Bay of Bengal including ports in Myanmar, Iran, Sri Lanka and Sultanate of Oman in the interest of good Neighborly relations.
- vi. Geo- physical or Gravity surveys across country.
- vii. Geo- magnetic surveys across country.

B. National Digital Elevation Model (DEM):

- i. National DEM of ± 10 metre accuracy of the country is available for use
- ii. High Resolution DEM of $\pm 3 - 5$ metre accuracy covering areas mapped under various projects.
- iii. Ultra high Resolution DEM of ± 50 cm accuracy covering areas mapped under various projects in the country.

C. National Topographical Template:

- i. Preparation of Topographic maps on all scales.
- ii. Compilation/ mapping and production of geographical maps e.g. Railway Map, Road Map, Political Map, Physical Map etc.
- iii. Surveys for development projects, e.g., power and irrigation, mineral exploration, urban and rural development etc.
- iv. Preparation/Updation of Aeronautical charts including special purpose surveys for Airports /Air fields of AAI/ Navy/ Coast guard.

- v. Preparation of Maps for Indian Air Force on 1:0.5/1/2/10 Million scales and Flip-Book Part-II.
- vi. Disaster mitigation maps & high resolution data for NDMA (NDMA plans- 2016 as per DMACT-2005)
- vii. Mapping of river topology.
- viii. High resolution or large scale GIS datasets.

D. Administrative Boundaries:

- i. International Boundary (IB) Survey/Demarcation/Relocation, Preparation of IB Strip Maps, Depiction of correct external boundaries of India on maps, Scrutiny and Certification of correct external boundaries /Coastlines of India on maps published by other agencies including Private publishers, advice on IB matters to MEA.
- ii. Inter-State Boundary (ISB) Survey/Demarcation/Relocation, Preparation of ISB Strip Maps
- iv. Advice on ISB matters to MHA/Hon'ble Supreme Court/High Court/Other Courts.
- iv. Preparation of Administrative boundaries data up to village level.
- v. Demarcation of Hazard line along the Indian coasts as per (Coastal Regulation Zone Notification dated 02 July,2018, MoEF&CC)

E. Toponymy (Place names):

SoI is responsible to provide Standardized Geographical names i.e New or change of place including names Railway station names to MHA, Govt. of India. These names are field verified to ensure correct linguistic phonetics in spellings followed with transliteration as per Govt. approved system.

Other Important Activities:

- SoI is responsible to promote the use of Geospatial knowledge and intelligence through partnerships and other mechanism by all sections of the society and work towards a knowledge based society.
- Allowing access of data through Geospatial Services, Portals, Mobile Apps etc. apart from printed / digital maps.
- Training of officers and staff of SoI, Central / State Govt.
- Support to Third World countries e.g., Nigeria, Afghanistan, Kenya, Iraq, Nepal, Sri Lanka, Zimbabwe, Indonesia, Bhutan, Myanmar and Mauritius etc. by providing technical know how and expertise in various disciplines of surveying and survey education.

Besides above activities, the Surveyor General of India is associated with the under mentioned Expert Groups/ Committees/ High Level forums

- As delegation leader/Member of Indian representation in all United Nations Groups, High level forums, Committee, Divisions, Sessions and conferences on Cartography, Geo- information management & Surveying and Toponymy.
- Surveyor General of India spearheads the matter related to Inter State Boundaries (ISB) disputes resolution as forwarded by Ministry of Home Affairs, Supreme Court, High Court and other Courts.
- Surveyor General of India heads the International Boundary meetings as under :
 - Heads of Survey Departments (HOSD) : India and Myanmar
 - Boundary Working Group (BWG) : India and Nepal
 - Joint Boundary Conference (JBC) : India and Bangladesh

2. NATIONAL MAP POLICY (NMP) - 2005:

Preamble:

All socio-economic developmental activities, conservation of natural resources, planning for disaster mitigation and infrastructure development require high quality spatial data. The advancements in digital technologies have now made it possible to use diverse spatial databases in an integrated manner. There responsibility for producing, maintaining and disseminating the topographic map database of the whole country, which is the foundation of all spatial data vests with the Survey of India (SOI). Recently, SOI has been mandated to take a leadership role in liberalizing access of spatial data to user groups without jeopardizing national security. To perform this role, the policy on dissemination of maps and spatial data needs to be clearly stated.

National Map Policy (NMP), 2005 mandates SoI to prepare, maintain and update the National Topographic database (NTDB) of the country comprising the following datasets:

1. National Spatial Reference Framework (NSRF).
2. National Digital Elevation Model (DEM).
3. National Topographic Template.
4. Administrative boundaries.
5. Toponymy (Place names).

SoI prepares two series of maps out of NTDB as per National Map Policy 2005 (NMP-2005):

(a) Open Series Map (OSM):

OSMs are brought out exclusively by Survey of India, primarily for supporting development activities in the country. OSMs are published in UTM Projection on WGS-84 datum. OSMs hard copy and digital data are classified as "Unrestricted" as one-time security vetting has been done by the MOD. No civil and military Vulnerable Areas and Vulnerable Points (VA's/VP's) are shown on OSMs.

- Hard copy of OSMs are sold through Map Sales office of SOI and authorised sales agents across the country.
- Digital data is sold under digital licence through MA & DC Dehradun,
- OSM maps in pdf (watermarked) form have been made available as free download for all users in MANCHITRA PORTAL: <http://soinakshe.uk.gov.in>.
- OSM data can be procured by any user through MTR application in MANCHITRA PORTAL: <http://soinakshe.uk.gov.in>.

SOI also offer various licences to enable users to publish value add and develop products based on SOI maps and data product. Users are allowed to publish OSMs on hardcopy and on website with or without GIS database, with due permission under appropriate agreement with Survey of India. However, if the international boundary is depicted on a map, being published as paid of any publication certification by Survey of India is necessary. In addition, Survey of India is currently preparing City Maps. These City Maps are on large scales in WGS-84 datum and in public domain. The contents of such maps are decided by Survey of India in consultation with Ministry of Defence.

(b) Defence Series Map (DSM):

Maps of this series are based on WGS-84 Datum and LCC projection on various scales. These contain full features of map with grid, height, contours and other classified information without any dilution of accuracy. These are being published for defence force of India and national security agencies.

This series of maps (in analogue or digital forms) for the entire country is classified, as appropriate, and the guidelines regarding their use are being issued by the Ministry of Defence (MoD)

3. NATIONAL DATA SHARING AND ACCESSIBILITY POLICY (NDSAP) -2012:

Preamble:

Asset and Valuable potential of data are widely recognised at all levels. Data collected or developed through public investments, when made publicly available and maintained over time, their potential value could be more fully realised. There has been an increasing demand by the community, that such data collected with the deployment of public funds should be made more readily available to all, for enabling rational debate, better decision making and use in meeting civil society needs.

A large quantum of data generated using public funds by various organisations and institutions in the country remains inaccessible to civil society, although most of such data may be non-sensitive in nature and could be used by public for scientific, economic and developmental purposes. The National Data Sharing and Accessibility Policy (NDSAP) is designed so as to apply to all sharable non – sensitive data available either in digital or analogue forms but generated using public funds by various Govt. of India. The NDSAP policy is designed to promote data sharing and enable access to Govt. of India owned data for national planning and development.

Objective:

The objective of this policy is to facilitate the access to Govt. of India owned sharable data and information in both human readable and machine readable forms through a network all over the country in a proactive and periodically updated manner, within the framework of various related policies. Acts and rules of Govt. of India, thereby permitting wider accessibility and use of public data and information.

4. CITIZEN CHARTER:

Survey of India, under the Ministry of Science and Technology, Government of India, is the national survey and mapping organization and has mandate to take a leadership role in liberalizing access of spatial data to user groups without compromising with the national security. The responsibility for producing, maintaining and disseminating the topographic map database of the whole country, which is the foundation of all spatial data vests with Survey of India (SOI). In order to improve the delivery of our services, Survey of India has decided to formulate this Citizens' Charter.

This Charter is the declaration of our vision, values and standards to achieve excellence in the formulation and implementation of National Map Policy for the benefit of Public, Govt. / Private organizations

and other stakeholders. This Citizens' Charter will also be the benchmark to determine our efficiency and would be a dynamic document, which would be reviewed at least once in five years.

Our Strategy:

The strategy for achieving our mission shall comprise the following:

- Bench marking of products / data.
- Enhancing the use of information technology.
- Measuring conformance to service delivery standards.
- Evolving cooperative initiatives with other government and private agencies.

Our Clients:

Government and private organizations as well as private individuals associated with defence / security, information technology, education and research, navigation, tourism, disaster management, engineering and production, environment, mining, drilling, development, agriculture, fishing, utilities etc.

Our Expectations:

We expect citizens to:

- Uphold and respect the rules and regulations governing the geospatial data dissemination.
- Fulfill their duties and legal obligations in time.
- Be honest in furnishing information.
- Be co-operative and forthright in inquiries and verifications.
- Avoid unnecessary litigation.

This will enable us to serve the nation in an effective and efficient manner.

Our Commitment:

We shall strive to:

- Be at the service of our country
- Work to ensure the national security.
- Make our procedures and transactions as transparent as possible
- Carry out our tasks with:
 - integrity and judiciousness
 - impartiality and fairness
 - courtesy and understanding
 - objectivity and transparency
 - Promptness and efficiency

5. INTERNATIONAL BOUNDARIES MATTERS:

(i) Boundary Survey Work:

Survey of India has been given the responsibility by the Ministry of External Affairs for all surveying works i.e. Boundary demarcation, relocation of boundary pillars of International boundary with Nepal, Bhutan, Bangladesh, Myanmar, Pakistan and China. SoI also advises State Govt. and Govt. of India on matters of International Boundary and State/UTs Boundaries and carries out Surveys as and when required to resolve the disputes as Extra- Departmental jobs.

Surveying tasks associated with the International Boundary were carried out as under:

- **India- Myanmar International Boundary:**

The tasks of Joint boundary survey of Indo -Myanmar for approximate boundary length of 1650.34 lin. km comes under the AoR of Megh. & Ar. Pradesh GDC. And as per the decision taken between the heads of Survey Department of both the countries in the Directors' Level Meeting held on August 07-18,2019 at Moreh, Manipur, India, the survey team was deployed in due time and the assigned tasks was completed in all respect except for the assigned survey and construction of Subsidiary boundary pillars between BP 82 & BP 83 could not be completed in the Mainpur sector due to confrontation by the local villagers and the same is yet to be solved by the State Government of Manipur.



Picture from India – Myanmar International Border

- **India-Bangladesh International Boundary:**

Joint International Boundary Survey Work along Tripura & Mizoram sectors.

Mizoram sector:

The following field work was assigned for the team.

- Reconnaissance, construction and observation of 24 Nos. new Reference pillars which were earmarked on Strip Map at 35th JBC in between BP-2352/22-S to MP-2359.

- Stability checking of MP-2359.

After initial reconnaissance of new reference pillar position, construction of 24 Nos. Boundary pillars were completed by 50:50 share basis by India & Bangladesh. Construction work of BP was monitored by BSF (India side).

After construction of BPs, GPS coordinates of all 24 newly constructed reference pillars were observed. Stability of MP-2359 was also checked by GPS and Total Station. The closing meeting between Two Camp officers was held on 09.03.2020.

Tripura sector:

According to 3rd JBC, following two sectors were earmarked for Survey work.

- Moulvibazar (Bangladesh) - Khowai (India) Sector from MP 1930 to MP 1936.
- Habiganj (Bangladesh) - Khowai (India) Sector from MP 1971 to MP 2001.

Sector from MP 1930 to MP 1936:

The joint reconnaissance and relaying of missing pillars were done in the field season 2018-19 for Moulvibazar (Bangladesh) – Khowai (India) Sector i.e., from MP 1930 to MP 1936. As maximum nos. of erected wooden pegs were uprooted/destroyed, the surveyed team from both the countries decided to relocate the missing pillar (Main & Subsidiary) positions again for this field season by erecting wooden pegs once again from MP 1930 to MP 1936. The position of missing pillars is fixed by calculating Khaka (Distance & Bearing) from the known strip map coordinates.

Sector from MP 1971 to MP 2001:

For the Habiganj (Bangladesh) - Khowai (India) Sector from MP 1971 to MP 2001 both the survey teams started reconnaissance works from MP 1971.

After reconnaissance work, relaying of missing pillars was done with the help of known strip map coordinates and calculating the bearing and fixing the position of missing pillars by erecting wooden pegs.



Sol team at India-Bangladesh International Border



Surveying Teams of India & Bangladesh at India – Bangladesh International Border

- **India - Pakistan International Boundary (Punjab and Rajasthan Sector):**

Joint inspection / relocation / maintenance of boundary pillars.

The Joint O.C. Inspection was carried out in the field season 2019-20 on January 15, 2020 at Boundary Pillar No. 56M (Pak side) in sector B. The delegation from Pakistan was led by Mr. Nisar Ali Hussain, Officer – In charge No. 7 Party, Survey of Pakistan and the Indian delegation was led by Sh. Vijay Chandra, Superintending Surveyor, Survey of India.

- **India - Nepal International Boundary:**

Indo- Nepal International boundary Survey work had been carried out by UK & WUP GDC during the field season 2019-20.

The field survey work of INB was executed by Uttarakhand & West Uttar Pradesh GDC through establishing 4 No. of camps along India – Nepal boundary from November, 2019 to 10th May, 2020 Total 409 No. of pillars constructed and 64 No. of pillars repaired.

1ST Joint inspection was carried out by officials of India & Nepal from February 7- 17, 2020.

- **India- Bhutan International Boundary (Assam– Bhutan Sector):**

Joint boundary survey work regarding inspection of missing / damaged boundary pillars is as under:

The tasks of Joint boundary survey of Indo-Bhutan for about approximate boundary length of 699 lin. km comes under the jurisdiction of Megh. & Ar. Pradesh GDC. And as per the decision taken between the heads of Survey Department of both the countries in the Joint Technical Level meeting held on –September 25-26, 2019 at Phuentsholing, Bhutan, the survey team was deployed in due time and the assigned tasks couldn't be completed as field work was de-inducted in the last week of March 2020 due to pandemic spread of COVID-19 and subsequently nationwide lockdown which was imposed by the Govt of India.



Picture from India – Bhutan International Border

(ii) Conference/Meeting:**(a) India - Myanmar Boundary:**

- 24th Sectoral Level meeting India and Myanmar was held on September 23-24, 2019 in Nay Pyi Taw, Myanmar. The Indian delegation was led by Sh. Satyendra Garg, Joint Secretary, Ministry of Home Affairs, Government of Republic of India and Myanmar delegation was led by Mr. U. Khaing Tun Oo, Director General, Ministry of Home Affairs, Government of Republic of the Union of Myanmar. Lt Col Vivek Malik, Director, International Boundary Directorate, New Delhi also attended the meeting as a member.
- Director's Level Meeting between the Survey Departments of India and Myanmar on joint inspection, restoration, relocation, construction and maintenance of boundary pillars was held on August 07-08, 2019 at Moreh, Manipur (India). Indian delegation was led by Sh. T.P. Mallik, Director, Megh. & Arunachal Pradesh GDC and the Myanmar delegation was led by U Ze Ya Htwe, Director, Survey Department, Ministry of Natural Resources and Environmental Conservation.



Indian and Myanmar delegation at Director's Level Meet

(b) India – Bangladesh Boundary:

- 44th Joint Boundary Conference between India and Bangladesh (Mizoram Sector) was held in Dhaka, Bangladesh from October 15-17, 2019. Indian delegation led by Col Rajat Sharma, Director Land Revenue & Settlement (Ex-officio), Mizoram & Director, West Bengal & Sikkim GDC, Kolkata and Bangladesh delegation was led by Brigadier General Md Muniruzzaman, ndc, psc, Surveyor General of Bangladesh, Survey of Bangladesh.



- 3rd Joint Boundary Conference (JBC) between India and Bangladesh was held in Dhaka, Bangladesh from December 23-25, 2019. Indian delegation was led by Lt Gen Girish Kumar, VSM, Surveyor General of India while Mr. Taslimul Islam, ndc, Director General, Department of Land Records and Surveys, Bangladesh.



Joint Boundary Conference(JBC) Meeting

(c) India – Pakistan Boundary:

- Staff Officers Level Meeting for survey work of relocation of missing / uprooted /buried /displaced land and riverine boundaries pillars on India- Pakistan (Punjab Sector) was held on 10th April,2019 at joint check post Attari (India side). Indian side was led by sh.V. Karuppasamy, Superintending Surveyor, Survey of India and Pakistan side was led by Mr. Nisar Ali Hussain, O C No. 7 Party, Survey of Paikistan.

(d) India – Nepal Boundary:

- The 11th meeting of India-Nepal Survey Officials Committee (SOC) was held at Deharadun from September 24-26, 2019. The Indian delegation was led by Mr. Rajender Kumar Meena, Director, Uttarakhand & West Uttar Pradesh GDC, Survey of India and the Nepali delegation was led by Ms. Karuna K.C, Deputy Director General, Topographical Survey and Land Use Management Division, Survey Department of Nepal.
- The 10th meeting of Nepal- India Boundary Survey Officials Committee (SOC) was held in Kathmandu, Nepal from June 26-28, 2019. The Nepali delegation was led by Ms. Karuna K.C, Deputy Director General, Topographical Survey and Land Use Management Division, Survey Department of Nepal and the Indian delegation was led by Mr. Rajender Kumar Meena, Director, Uttarakhand & West Uttar Pradesh GDC, Survey of India
- The 6th meeting of the India-Nepal Boundary Working Group (BWG) was held in Dehradun from August 28-30, 2019. The Indian delegation was led by Lt Gen Girish Kumar, VSM, Surveyor General of

India, The Nepali delegation was led by Mr. Prakash Joshi, Director General, Survey Department, Government of Nepal. Both sides have decided to prepare a detail plan for establishing the common framework; India Nepal Boundary Reference Framework (INBRF) by carrying out GNSS observation on already agreed and constructed monuments.



India - Nepal boundary working group meeting

(e) India – Bhutan Boundary:

- Joint Technical Level Meeting between Survey Departments of India & Bhutan on boundary talks was held at Phuentsholing from September 25-26, 2019. The delegation from Survey of Bhutan was led by Mr. Choeki Khorlo, Director General/Specialist, International Boundaries, Thimpu and the Indian delegation was led by Sh.T. P. Mallik, Director, Megh. Arunachal Pradesh GDC, Shillong along with representation from central and state Governments like IBD(SGO), MHA, MEA etc.



India – Bhutan, Joint Technical Level Meeting

6. TECHNICAL ACTIVITIES IN SOI:

Topographical Data Base (NTDB) plays very significant role in the planning for developmental activities of the Nation. Survey of India, the National Survey and Mapping Organisation of the country, under the Department of Science & Technology, Ministry of Science & Technology has the unique responsibility of providing timely, updated, cost effective and accurate Topographical Data Base for expeditious and integrated development and

ensure that all resources contribute their full measure to the progress, prosperity and security of our country now and for generations to come. In this prominent role, the Department ensures that the country's domain is explored and mapped suitably to meet the emerging needs of the user community.

Survey of India is also responsible for Geodetic Control (Horizontal and Vertical) and Geodetic & Geophysical surveys, Production of Aeronautical Charts; undertaking specialised surveys for Developmental Projects, demarcation of the external boundaries of India, ensuring their accurate depiction on the maps published in the country and also advice on the demarcation of inter-state boundaries.

6.1 Departmental Activities:

6.1.1 Generation of National Topographical Data Base (NTDB):

- **On 1:50K Scale:** Survey of India has Completed generation of National Topographical Data Base (NTDB) on 1:50,000 scale for entire country.

- **OSM & DSM Maps:**

SoI prepares two series of maps viz Defence Series Maps (DSMs) for Defence uses and the Open Series Maps (OSMs) for public use as per National Map Policy (NMP-2005). DSM Maps are printed exclusively for defence uses as per defence requirements, where-as OSM Maps are printed strictly as per users requirements across the country and are prepared by State Geo-spatial data centres of SoI. Printing of 4838 DSM sheets out of 4843 has been completed.

- **On 1:250K Scale:**

NTDB on 1:250,000 scale for entire country has been completed. New cycle of updation of DSM Maps has been started. Total 337 No. of DSM Maps out of 385 have been printed up to March 2020.

- **High Resolution National Topographical Data Base (HRNTDB):**

With the rapid development and industrialization in the country, there is a tremendous pressure on the resources which makes planning & utilization of resources more challenging. Effective planning for the development requires accurate resource mapping at optimum resolution. Survey of India has undertaken preparation of HRNTDB for entire country by using High Resolution Satellite Imageries (HRSI) to cater for accurate high resolution data requirements/demands from various users and organisations.

- HRSI for approx. 2.79 lakh sq. km, Geo-referencing of about 2 lakh sq.km and Feature extraction of 0.36 lakh sq.km. and Ground Validation of approx. 5000 sq.km. has been completed.



Ground Control Points (GCPs)



Ground Validation Work

6.1.2 Toponymy database:

National Map Policy (NMP) - 2005 mandates Survey of India to prepare Toponymy (Place Name) data layer as one of the fundamental dataset. Toponymy layer comprises standardised Geographical names as per Topographical Maps of the country. Place name data as collected during field data collection is used while preparing Toponymy data layer. SoI has generated the Toponymy layer in 10 languages as English/Hindi/Bengali/Gujarati/Kannada/Telugu/Malayalam/Tamil/ Punjabi and Marathi languages and the same has been made available for public in SoI public portal i.e. www.indiamaps.gov.in. for 4312 sheets.

Survey of India is the nodal agency for correct spelling of geographical/Place names in India. Spelling of 36 geographical/place names have been provided to different State Govt. and Indian Railway.

6.1.3 Administrative Boundary Database (ABDB):

Administrative boundaries database comprises data of the administrative set-ups across districts & states in the country. First cycle of preparing ABDB data up to village level had been completed in the past, however next cycle of preparing latest up-to-date ABDB data is under process. ABDB data of Madhya Pradesh, Gujarat, Kerala and Delhi has been completed and rest is under progress. ABDB data of 553 Districts updated and uploaded on G2G Portal <https://g2g.indiamaps.gov.in>.

6.1.4 National Spatial Reference Frame (NSRF):

a) *Indian Geodetic Reference Frame : Horizontal Datum:*

If we look back in history, the primary control in India and adjacent countries was established during British era. It took more than a century to cover the entire region with instruments like vernier theodolite, chains, tapes etc. This control was on the Everest Ellipsoid. This horizontal control was established on the Everest Ellipsoid, which is a locally best fitting ellipsoid and suits to the Indian subcontinent only. However, with the advent of satellite based technology, all the products, such as, satellite imageries etc., used WGS-84, so country switched over to this new ellipsoid. As a part of this activity, Ground Control Point (GCP) Library was established for the India based on WGS-84 ellipsoid. In all 2520 GCP Library Stations have been established throughout the country. For extension of horizontal control to the area of work, one has to occupy established GCP Library stations.

b) *Continuously Operated Reference Station (CORS) Network:*

SoI has initiated the ambitious project to establish the CORS Network in the country under various partnerships with Centre/State government projects, as this Geo-spatial Infrastructure will facilitate location information of cm level accuracy in real-time across the country and will improve the productivity and reliability of surveying and mapping, Which will provide major boost to GoI initiatives like Smart City, Digital India, DILRMP, Urban Planning and Development. To augment this horizontal control, an array of Continuously Operated Reference Stations (approx distance of 40-50 km) is being established.

c) *Indian Vertical Datum:*

SoI took up mammoth task to re-define the Indian Vertical Datum



to remove the lacunae which the datum defined during 1905 was having in terms of the limitation of accuracy instrumentation and methodology adopted. These heights have been derived to meet the international standards. The modernization of Indian vertical reference system was started in the past decade by SoI and is now completed as Indian Vertical Datum (IVD2009). In IVD2009 Geoid has been used as reference in place of Mean Sea level (MSL)

d) Geoid Model:

SoI is in the process of developing the high resolution Geoid model of the country with accuracy of ± 10 cm to obtain the accurate relationship between the geoid and spheroid, so that heights given by satellite based technologies and products viz., GPS, satellite imageries can directly be converted to the optometric heights with geodetic accuracy for developmental projects, River basin management, Flood forecasting, Urban mapping, inundation mapping etc.

Geoid Model Development for entire country is under progress. 50,000 Linear km High Precision levelling and Gravity Observation for 2500 stations has been completed.

6.1.5 Geodetic Activities:

a) Tidal Observations:

Geodetic & Research Branch of Survey of India has established a series of tidal observations located along Indian coast and Islands. Tidal Data generated from these tidal observatories is used for the tidal data analysis to derive latest harmonic constituents needed for the accurate tidal predictions. These tidal predictions are essential for the harbour development and safe navigation.

In addition to this, the tidal data so generated forms a basis for the vertical datum of the entire country. During the period under report, 36 tidal observatories out of 36 proposed as a part of “Modernisation & Expansion of Indian Tide Gauge network” have been commissioned.

Installation, Maintenance of Tide-gauges and data acquisition from the various Tidal observatories located along the Indian coast and Islands viz., Port Blair (05 times), Nancowry (02 times), Campbell Bay (02 times), Aerial Bay (02 times), Haldia, Garden Reach, Mumbai, Marmagao, Cochin, New Mangalore, Kandla, Vadinar, Okha, Veraval, Porbandar, Ratnagiri & Daman has been carried out.

b) Geomagnetic observations:

Geomagnetic observations are being recorded continuously at Digital Geomagnetic observatory at Sabhawala, which is the only observatory of its kind located in the region for determination of Automated recording by Askania and DFM Variometer for the variation of three geomagnetic elements i.e. Horizontal Force (HF), Vertical Force (VF) and Declination (D) throughout the year. Absolute measurement from Declination Inclination Magnetometer (DIM) and ENVI Mag has been done in order to control the baseline values of variographs. Data has been made available for scientific studies to other departments also. In addition a study to analyse Geo-magnetic data for identifying earthquake precursors is underway.



6.2 Extra Departmental Activities:

6.2.1 National Hydrology Project (NHP):

This project is very important for national interest in which Survey of India (SoI) is one of the Central Implementation Agency in execution of National Hydrology Project (NHP). The Main objective of the World Bank assisted project is to improve the extent quality and accessibility of water resources information and to strengthen capacity of targeted water resources management institutions in India. This Project aims to improve the planning, development and management of water resources as-well-as flood forecasting and reservoir observations in real time.

SoI has been entrusted with the responsibility to generate, prepare and provide various types of Geo-spatial datasets i.e. for mapping/preparing the Digital Elevation Model (DEM) of 0.5m, 5m & 10 m for River Basin areas (plain), up to 5 km on both the sides of river and GIS ready data of SOI Topo sheets on 1: 25 K scale.

The Project is to be completed in eight years duration with two phases of four years each. In first phase Ganga, Brahmaputra, Mahanadi, Godavari, Gandak, Kosi, Narmada, Satluj etc. river basins will be completed by 2021.

Project Deliverables:

- DEM of vertical accuracy of 3-5m & 0.5m for flood modeling
- Digital Geo-Database of 1:25K scale
- Creation of Geoidal Model of 10 cm. accuracy
- Establishment of CORS network

Status:



Work on NHP in the field and Data processing in the office

6.2.2 National Mission for Clean Ganga (NMCG) Project:

This project is an integrated conservation mission, approved as flagship programme by the Union Government in June 2014 to accomplish the twin objectives of

- effective abatement of pollution
- conservation and rejuvenation of the national river Ganga.

Objective of the Project is to generate High Resolution DEM and GIS ready database for the part of River Ganga with latest technology. The mapping of main stream of river Ganga in five major states namely Uttarakhand, Uttar Pradesh, Jharkhand, Bihar and West Bengal has been proposed covering major towns and cities along the river Ganga and its tributaries in these states with an area of Two lakh fifty thousand square km. To provide a major support to Ganga River basin Management by embedding GIS in different aspects of - planning and implementation at national/state/local levels; bringing GIS support in decision-making; enable a sound process of monitoring development and identifying critical hotspots. To make GIS data available at all levels and groups associated in this process – that helps bringing accountability and responsibility in policy decisions.



Survey of India has been tasked for generation of High Resolution Digital Elevation Model (DEM) of 0.5 metre resolution and GIS based for the part of River Ganga covering up to 10 km extent on both sides of the river using latest Technology.

Status: The project is under progress with various activities outsourced and procurement being made through Open e-tendering as per Government of India public procurement guidelines

6.2.3 LSM Project for the state of Karnataka:

Memorandum of Understanding has been signed on 28th Feb, 2019 with Revenue Department, State Govt of Karnataka for undertaking the large scale mapping of rural and urban land and properties (nearly 51,000 km²) area using UAV/Drone. Prior to MoU a pilot project was carried out by Survey of India at Jayanagar in Bengaluru city and Ramanagar town separately.

Inauguration of Drone Survey for land parcels in Karnataka was done by Hon'ble CM of Karnataka Shri H.D. Kumaraswamy on 16th July 2018 at Ramanagar, Karnataka. MoU with Govt. of Karnataka

Status:

- Data Acquisition using UAV/Drone - 500 Sq.Km
- Data Processing - 100 Sq.Km

6.2.4 LSM Project for the state of Haryana:

Memorandum of Understanding (MoU) has been signed between Survey of India, Govt. of India and Revenue and Disaster Management, Govt. of Haryana on 8th March, 2019 for undertaking the large scale mapping project which include to generate up-to-date digital topographical map of entire state of Haryana for 44,212 km² area using Professional Survey Grade Unmanned Aerial Vehicle / Drone for Large Scale Mapping and field measurements, Continuous Operating Reference System (CORS) and Differential Global Positioning System (DGPS) survey.



Status:

- Data Acquisition using UAV/Drone = 1242 Sq.Km
- Data Processing = 1000 Sq.Km

6.2.5 LSM Project for the state of Maharashtra:

Survey of India has signed a Memorandum of Understanding (MoU) on 3rd March, 2019 with Revenue department, State Govt of Maharashtra (GoM) for undertaking the large scale mapping of the Village Gaothan (Abadi) areas of \approx 40,000 villages in the state of Maharashtra using Professional Survey Grade UAV/Drone consisting of onboard kinematics GNSS and IMU. A pilot project was carried out to check the accuracy, output and results of drone based survey at Sonari village of Pune district of Maharashtra. It was successfully completed and accepted.

Status:

- Data Acquisition using UAV/Drone = 400 Gaothan village.
- Data Processing = 150 Gaothan village.

6.2.6 LSM for Delhi Development Authority(DDA):

Survey of India has signed a Memorandum of Understanding (MoU) with Delhi Development Authority (DDA), New Delhi on August 23, 2019 for preparation of Base Map of Delhi for the preparation of GIS Based Master Plan for Delhi-2041. SoI will design an application for DDA to provide a framework for spatial data visualisation, analysis & Geospatial analysis GIS data in the context of Master Plan -2041 for Delhi. Web GIS services (WMS/WFS/REST) will be enabled for DDA to integrate with DDA applications, for both public centric as well as internal DDA. As per MoU Signed by DDA & SoI on dated 23-08-2019, Delineation of boundaries of 1731 Unauthorized colonies of Delhi under PM UDAY scheme completed and handed over to DDA.

**6.2.7 LSM for the state of Madhya Pradesh:**

SOI has signed a Memorandum of Understanding (MoU) with Commissioner, Land Records Madhya Pradesh, Government of Madhya Pradesh on February 06, 2020 for Large Scale Mapping of Rural & Urban Settlements using very High Resolution imagery collected from Professional Survey Grade UAV/Drone and Establishment of Continuous Operating Reference System CORS Network in the state of Madhya Pradesh.



MoU with Govt. of Madhya Pradesh

(i) Special Survey for Indian Air Force:

Survey of India also prepared IAF-OGM, PGM, JGM, Landing Approach charts LAC, LNC etc. and carried out abstracting survey work for Indian Air Force. SOI has completed the following maps and data for IAF.

IAF Work	Work completed
IAF(OGM)/PGM(1:1M&1:1/2M) scale Digitisation, Patterning , QC	52 sheets
IAF- Landing Approach Charts (LAC) Series, scale 1:50K	14 Charts
IAF- LNC Series (scale 1:2M)	08 parts
I Flip part -II	01 Book
Flip part -III	01 Book
Post Field updation of IAF Sheets	13 Airfields
Verification of Landing Charts on 1:50 K including Obstruction Survey up to 30 NM from ARP	16 Airfields

6.3 Other Special Survey Projects:

The following projects were continued / carried out during the year 2019 – 2020

Sl. No.	Name of GDC/Centre	Name of Special Survey
1.	J&K GDC	Dal Lake and Nageen Lake, Srinagar
3.	G&RB	SPROC PROJECT
4.	-do-	Rammam H.E. Project
5.	-do-	Janghi Thopan HE Project
6.	Kerala & Lakh. GDC	Gravity Survey Work at Kerala Flood Marking Project
7.	Himachal Pradesh	Mapping of Morni, Panchkula of Haryana State

6.4 Status of Printing:

The following maps/specials products were printed during the period under report:

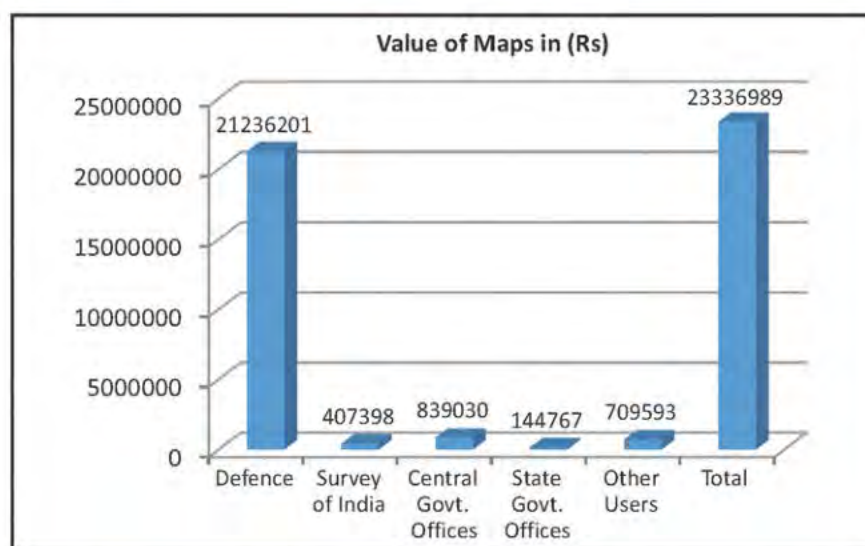
STATUS OF PRINTING OF MAPS

Sl. No.	Name of Job	No of Maps
1.	OSM on 1:50K (Final & Reprint)	18
2.	DSM on 1:50K (Final & Reprint)	643
3.	IAF(PGM,OGM,LAC,LNC etc.)	43
4.	Railway Map on 1:10M (Hindi & English)	02

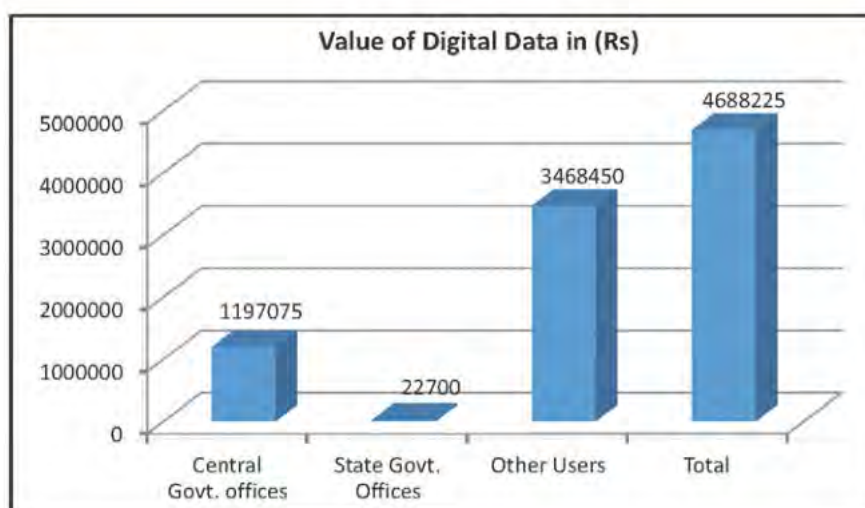
Name of Publication	Status
Hugli River Tide Table, 2020	Published
Indian Tide Table, 2020	Published
Annual Magnetic Bulletin, 2018 of Sabhawala observatory	Published

6.5 Sale of Maps and Digital Data:

Sl. No.	Name of Organisation	Value of Maps in (Rs.)
1.	Defence	21236201
2.	Survey of India	407398
3.	Central Govt. Offices	839030
4.	State Govt. Offices	144767
6.	Other Users	709593
	Total	23336989



Sl. No.	Name of Organisation	Value of Digital Data in (Rs.)
1.	Central Govt. offices	1197075
2.	State Govt. Offices	22700
3.	Other Users	3468450
	Total	4688225



Scrutiny & Verification of Maps of Departmental/Private Publishers and Central Agencies

Activities	Scrutiny Maps	Certification Maps	Release Maps	Total Maps	Amount Received (₹)
State Govt. Publication	77	136	-	213	210180/-
Central Govt. Publication	129	42	-	171	181036/-
IAF Maps	-	19	-	19	
Private Publication	3065	1051	1011	5127	4274781/-
	3271	1268	1011	5530	4665897/-

7. COLLABORATIVE SCIENTIFIC ACTIVITIES:

Following collaborative scientific activities in the field of Geodesy and Geophysics were continued:

- (1) Magnetic data has been supplied regularly to IIG, Mumbai and also supplied to World Data Centre whenever it required.
- (2) Supply of Mean Sea Level data of 18 Indian ports to International Permanent Service for Mean Sea Level (IPSMML), U.K. for various scientific studies by the International Geodetic Community.

8. RESEARCH AND DEVELOPMENT:

The main thrust of the research and developmental activities of the SoI during the period under report has been focused towards:

(1) 38th Indian Scientific Expedition to Antarctica:

Digitisation, Examination and preparation of compiled map for Schimacher Oasis on scale 1:10,000 with C.I. 1.5 meter has been completed.

(2) 39th Indian Scientific Expedition to Antarctica:

Detail Survey work on scale 1:10,000 with C.I. 1.5 meter for Schimacher Oasis has been carried out for 6.84 sq.km. area. 21 No. of control points have been established and carried out 7 days campaign mode GNSS observations to study plate motion study of Antarctica plate with Indian subcontinent.



Surveying work in Antarctica

- (3) Processing / analysis of GPS data of Antarctica with respect to Indian permanent station was carried out for crustal deformation, seismotectonic and plate motion studies with respect to Indian plate.
- (4) Backup and archival of data received from permanent GPS/GNSS stations.
- (5) Downloading of precise ephemeris of IGS stations from web sites has been continued.
- (6) Adjustment of Second Level Net in India (data compilation).
- (7) As a sequel to above programs, the following activities were initiated / completed.
- (8) Data acquisition with Global Positioning System in static relative mode to obtain transformation parameters between the Everest Spheroid and WGS-84.
- (9) Gravity data acquired for equal crustal movement studies across faults / thrust zones as well as for Geodetic and Geophysical studies for International Geodynamics projects is being restructured and formatted, so as to meet the requirements (of redesigned mathematical model).
- (10) Research & Development Programme in Sea level studies, Glaciology, Earthquake prediction etc.

9. CONFERENCES / SEMINARS / WORKSHOPS / MEETINGS:

- (1) **"1st International Conference on Unmanned Aerial System in Geomatics-2019 (UASG-2019)** was held in IIT Roorkee, Greater Noida Extension Campus, Greater Noida from 06-07 April, 2019. Shri D.N. Pathak, Director along with senior officers from the department participated in the conference.
- (2) Shri D.N. Pathak, Director, attended a meeting of Joint Secretary on April 24, 2019, in electronic Niketan, Ministry of Electronics & Information Technology, CGO Complex, New Delhi.
- (3) Sh. S. K. Sinha, DSG, attended the 5th Meeting Authoring Committee for Framing the Design and Standards for Application of Drone/UAV Technology in formulation of GIS based master plans as a chairman in Town and Country Planning Organization (TCPO), Vikas Bhawan, New Delhi on May 14, 2019.

- (4) Sh. S.V. Singh, Director, attended meeting regarding preparation of DEM by SoI in areas identified by SPMU, State Govt. at Jal Sampada Bhawan, Salt Lake city Kolkota on May 21, 2019.
- (5) Shri D.N. Pathak, Director, attended a meeting of NDMA for preparation of Flood Hazard Atlas on June 18, 2019, at Ops Room, NDMA Bhawan, A-1, Safdarjung Enclave, New Delhi.
- (6) Shri D.N. Pathak, Director, attended a meeting regarding ASSOCHAM's conference on emerging trends in Geospatial Technologies on June 25, 2019 at Hotel Imperial, New Delhi.
- (7) Shri. D.N. Pathak, Director, attended a meeting of NDMA for pilot project on Generation of Meso Level 1:10000 scale LHZ maps and inventory of Tapovan Vyasi corridor of Haridwar Badrinath route Uttarakhand held on July 18, 20219, at 3rd floor Ops room, NDMA, New Delhi.
- (8) Col K A Grewal, Director, visited New Delhi from July 30 to 31, 2019 to attend the meeting by Technical Advisory Group (TAG) members held at Northern Railway Kashmiri Gate Office.
- (9) Shri D.N. Pathak, Director, attended a meeting of Brainstroming session on Geo tagging of national assets on August 13, 2019, in NITIAayog, NITI Bhawan, New Delhi.
- (10) Sh. P.V. Rajasekhar, Director, attended IIS&M Committee Meeting and NIAS-DST Training Programme on "Science Technology is Innovation Policy" at Bengaluru from 13 August to 02 September, 2019.
- (11) **Esri India User Conference (UC) 2019** was held at The Leela Ambiance Gurugarm Hotel & Residences , Ambiance Island, Gurugam from 28-19 August, 2019. Shri. D.N. Pathak, Director and other senior officers from SoI represented the department in the event.
- (12) Col Sunil S Fatehpur, DSG, attended 15th Meeting of CGPB Committee – XI (Geoinformatics and Data Management) at Central HQrs., GSI, Kolkat on August 29, 2019.
- (13) Col Sunil S Fatehpur, DSG, attended Kick-off Meeting on Coastal Hazard & Risk Assessment (CHRA) held at IIT, Bombay on September 17, 2019.
- (14) Survey of India participated in the National Conference on the **Big Geospatial Data: Analytics, Modelling and Applications** from September 25-26, 2019 at Punjab Remote Sensing Centre (PAU Campus), Ludhiyana. Dr. U. N. Mishra, Deputy Surveyor General attended the conference as an Eminent Special Invitee. He Chaired the oral session on **Big Geospatial Data Analytics and UAV Data processing & Applications** and also delivered a lecture/ presentation on **Modern Concept and Latest Development in Land Surveying** on 26th Sept, 2019.
- (15) A Seminar on "Digital Technologies in surveying & mapping" was held at Institute of Engineers, Khairatabad, Hyderabad from October 15-16, 2019. Map sales counter and other publicity materials was set up on behalf of APGDC & TGDC.
- (16) Directorate of Survey (Air) & DGDC participated in the "6th Vibrant India 2019& Meri Dilli Utsav " Exhibition held at Dilli Haat, Pitampura, New Delhi from 18-10-2019 to 20-10-2019 organized by MNS Events & Exhibitions Pvt. Ltd, New Delhi.
- (17) Dr. S.K. Singh, Director, G&RB participated and deliver a lecture in the "Autumn school on Physical Geodesy and its application" at IIT Kanpur from October 23-24 2019.
- (18) **India International Science Festival (IISF) 2019**: Ministry of Science & Technology and Ministry of Earth Science in association with Vijnana Bharati jointly organized the 5th edition of India International

Science Festival (IISF) based on the theme “Risen India – Research, Innovation and science empowering the Nation” from November 5-8, 2019 at Science City, Kolkata

A team from Survey of India had participated in this 5th edition of IISF like past and informed the visitors about the history of Survey of India including work, ethics and glorious achievements of this great organization. At Survey of India stall the, journey of the department from 1767 to Present days was showcased by the help of modern survey instruments, films, maps, and flexes. The new political map of India with Union Territories of Jammu & Kashmir and Ladakh unveiled at IISF 2019 by hon'ble Minister of Science & Technology, Earth Science and Ministry of Health & Family Welfare Dr. Harsh Vardhan along with Governor of West Bengal Sri Jagdeep Dhankar which can be termed as another significant achievement of Survey of India in the recent times.



Hon'ble Minister and Secretary, Science & Technology at India International Science Festival 2019

- (19) "2nd International Conference on Sustainable Water Management" was held at Pune, Maharashtra from 06-08 November, 2019. Sh. D. K. Singh, Director and Sh. Pavan Kumar, Deputy Superintending Surveyor represented/participated in the conference.
- (20) Shri D.N. Pathak, Director, DSA & DGDC, attended a meeting on Basic Exchange and Co-Operation Agreement (BECA) on November 15, 2019, 14:00hrs in Ministry of Defence, South Block, New Delhi.
- (21) International Conference on "Contemporary Issues of Climate Change, Conservation of Biodiversity and Natural Resources in Himalayan Environments" was held at Tehri, Uttarakhand from 14-16 November, 2019. Sh. Avinash Mishra, Deputy Superintending Surveyor and Sh. Sandeep Tomar, Officer Surveyor participated in the conference.
- (22) The 9th meeting of the Prime Minister's Science, Technologies and Innovation Council (PM-STIAC) was held on 19th of November, 2019 at India International Centre (IIC), New Delhi. Lt. Gen Girish Kumar V.S.M Surveyor General of India participated and delivers a speech on Geospatial Data Infrastructure and Strategy for India.
- (23) The Director, Megh. & Ar. Pradesh GDC along with officers & staff participated in the AGI Conference and Exhibition on “Role of Geospatial Technology in the Development of North East Region of India” on November 27-28, 2019 at North Eastern Hill University, Shillong & successfully exhibited the Survey of India Stall.

- (24) Dr. S.K.Singh, Director, G&RB delivered a presentation on topic “Application of Geodetic Techniques in Hydro Power Projects” at Vishwa Yuvak Kendra, Teen Murthi Marg, Chanyapuri, New Delhi on November 29, 2019.
- (25) **20th Edition of Geo Smart India 2019** was organized by Geospatial Media and Communications Pvt. Ltd. at Hyderabad International Convention Centre, Hyderabad from December 03- 05, 2019. Survey of India led by Lt. Gen Girish Kumar V.S.M Surveyor General of India, participated in the Exhibition and showcased its products and services including live SoI Public Portal, Nakshe Portal, Sahyog Mobile Applications etc.



Surveyor General of India at Geo Smart India 2019

- (26) Dr. S. K. Singh, Director, G&RB attended the first meeting of River Ganga Council Chaired by Hon'ble Prime Minister on December 14, 2019.
- (27) **39th INCA International Congress** was organized by Survey of India under the chairmanship of Sh. Naveen Tomar, Addl. S.G. with the focal theme on "NEW AGE CARTOGRAPHY AND GEOSPATIAL TECHNOLOGY IN DIGITAL INDIA" from December 18 to 20, 2019 at Dehradun. Vice Admiral Vinay Badhawar, AVSM, NM, Chief Hydrographer to the Govt. of India inaugurated 39th INCA International Congress by lighting the lamp, he was also invited as a chief guest. A large number of Geospatial Professionals, Professional Cartographers, Academician from universities / Colleges, Research Scientists / Scholars/ Associates / Students, Practicing Cartographers, Professionals from Government, Surveying Professionals form Governments / Private, Professionals from other Associated Scientific streams, GIS specialists working in the fields of Geospatial, Cartography, GIS applications, Remote Sensing, Geospatial companies etc attended, shared, learnt, presented papers /case studies in the congress. Companies and Industries dealing with Geo-Spatial products and services also participated and showcased their products in the INCA International Congress.

The event was focused on current state of the art technologies like UAV's/Drones, Web GIS, Web services, Mobile apps usage of very High resolution images/ videos from space. These technologies would be of great relevance in providing effective solutions by integration of technologies for e-governance, Smart cities, Corridor mapping, Revenue surveys/Mapping, Internal security etc.



- (28) **24th SUNDARBAN KRISTI MELA:** West Bengal & Sikkim GDC, Survey of India, participated in the 24th Sundarban Kristi Mela O Loko Sanskriti Utsab 2019 which was held from 20-12-2019 to 29-12-2019 at Kultali Mela Ground, South 24 Parganas, West Bengal. The event was patronised by Lokman Molla, President, Kultali Milon Tirtha Society and organized by Kultali Milan Tirtha Society. Apart from Survey of India, Eastern Railway and other notable 34 State and Central Government Organisations like NTPC, NHPC, Akashvani, Doordarshan, Kolkata Metro Railway Corporation etc. also participated in the event. Survey of India secured 3rd position among 34 Nos. Govt. organisations. A trophy was presented to SOI by the organiser.
- (29) The Survey of India pavilion attracted a lot of common people who were very much interested in New Political Map of India, Antique Maps, Educational Maps and uses of modern mapping technologies for development of the nation. The Survey of India team displayed the uses of SOI Apps. SAHYOG and NAKSHE Portal for downloading the SOI Maps. The history of Survey of India, glorious achievements of the organization was also informed to the visitors. The journey of our department from 1767 to the present days was displayed / conveyed with the help of modern survey instrument, films, maps and flexes.
- (30) Shri D.N. Pathak, Director, DSA & DGDC, attended a meeting to discuss on Goheritage sites in India and Legislation under the chairmanship of the Secretary, MoES on December 31, 2019, at Prithvi Bhawan, MoES, Lodhi Road, New Delhi
- (31) The Geo-Spatial Conclave 2020, a national policy making conference with a special focus on application of Geospatial Technology in water resource management was held at Dr. Triguna Sen Hall, Jadavpur University, Kolkata from January 13-14, 2020 the event was organised by South Asian Institute for Advanced Research and Development (SAIARD).

A team of Survey of India headed by Smt. Swarnima Bajpai, DSS joined the Conclave. She delivered a speech on behalf of Director, West Bengal & Sikkim GDC, Kolkata from this prestigious platform and significantly mentioned the application of Geospatial data in surveying and mapping technology at Survey of India.



Smt. Swarnima Bajpai, DSS delivering speech at Geo -Spatial Conclave 2020

- (32) Sh. S. K. Sinha, DSG, attended workshop on "The use of LIDAR Technique in Survey and Planning for preparing of Catchment Area Treatment Plan for the Soil Moisture and Water Conservation as well as ground water recharge "at Raipur, Chhattisgarh on January 28, 2020.
- (33) Shri D.N. Pathak, Director, attended a meeting of project Sanctioning & Monitoring Committee (PS & MC) under Digital India land Records Modernization programme (DILRAMP) on February 14, 2020, in Department of Land Resources, Committee Room, NBO Building Nirman Bhawan, New Delhi.
- (34) Directorate of Survey (Air) & DGDC participated in the "Rise in Uttar Pradesh 2020" Exhibition held at HRIT Group of Institution, Merta, Ghaziabad, Uttar Pradesh from 14-02-2020 to 16-02-2020 organized by Tarmeh Events, New Delhi.
- (35) The Ministry of Mines, Ministry of Earth Sciences and Indian National Sciences Academy hosted prestigious 36th International Geological Congress (36th ICG) during 2-8 March, 2020 at Delhi NCR. Sh. S.K. Sinha, Deputy Surveyor General led the SoI delegation along with senior officers from the department.

10. TECHNICAL PAPERS:

1. Sh. Neeraj Gurjar, Deputy Director, presented a paper on "Generation of High Resolution DEM and GIS ready database for part of River Ganga for National Mission for Clean Ganga" at 39th INCA International Congress, Dehradun from 18 – 20 December, 2019.



Sh. Neeraj Gurjar, DD at INCA International Congress, Dehradun

2. Col Sunil Fatepuri, Director presented a paper titled "Enterprise Production Mapping in Survey of India" at 39th INCA International Congress which was organised by SoI at Dehradun from 18 – 20 December, 2019.
3. Sh. R.K. Meena, Director and Smt. Sweta Gupta, Deputy Superintending Surveyor jointly presented a paper on the topic "Assessment of DEM Accuracy Generated from Stereo Imaginary Case Study of Dehradun" at 39th INCA International Congress, Dehradun wef 18-20 December, 2019.

4. Col Pawan Pandey, Director & Sh. Pardeep Singh, Deputy Director, jointly presented a on the theme "A study for creating vey high resolution & durable record of property holdings by mapping rural habitations using unmanned aerial vehicle" at 39th INCA International Congress, organised by SoI at Dehradun from 18 – 20 December,2019.
5. Dr. M. Stalin, Director presented a paper in 39th INCA International Congress which was organised by SoI at Dehradun from 18 – 20 December,2019 on the topic "Challenges in Large Scale Mapping of Karnataka by UAV imagery & its accuracy assesment".
6. Smt. Swarnima Bajpai, Deputy Superintending Surveyor presented a paper on the topic "Investigating relationship between drought and ENSO in Bundelkhand region of India" in the 39th INCA International Congress, Dehradun from 18- 20 December,2019.

11. FOREIGN VISITS / STUDY TOURS / DEPUTATION:

- (1) Dr. S.K. Singh, Director, and Sh. Pardeep Singh, Deputy Director, attended FIG working week 2019 and UN-GGIM-AP WGI Joint Session and Presenting a paper titled "Continuously operating Reference Station (CORS) GNSS Network, Challenges and Benefits in Indian context" during 22nd to 26th April, 2019 at Hanoi, Vietnam.



Sh. Pardeep Singh, DD at FIG Working Week, 2019 at Hanoi, Vietnam

- (2) Lt Gen Girish Kumar VSM, Surveyor General of India and Shri Pankaj Mishra, Deputy Director participated in the First session of the New United Nations Group of Experts on Geographical Names (UN-GEGN) in New York (USA) from April 29 to May 03, 2019.
- (3) Lt Gen Girish Kumar VSM, Surveyor General of India and Shri S.V. Singh, Director participated in the **United Nations Global Geo-Spatial Information Management for Asia and Pacific (UNGGIM-AP) Executive Board Meeting** and program for the expert consultation and review of the Implementation Guide of the Integrated Geospatial Information Framework in Kuala Lumpur, Malaysia from June 18-21, 2019.



UNGGIM-AP Executive Board Meeting, Kuala Lumpur, Malaysia

- (4) The 29th International Cartographic Conference (ICC), 2019 was held at Tokyo from July 15-20, 2019. Nearly 950 delegates from over 75 countries took part in the Conference. The Indian delegation was represented officers of DST & Survey of India. There were nearly 150 Technical sessions during the 4 days in which over 500 Technical Presentations were made. The Technical Sessions of the Conference covered 43 diverse themes. The themes covered a broad range of subjects covering Transition from Conventional Mapping to Modern and Contemporary Mappings.



Col Sunil Fatepuri at ICC 2019 Tokyo

- (5) Lt Gen Girish Kumar VSM, Surveyor General of India, visited Seoul, Republic of Korea on July 23, 2019 to attend the meeting with Mr Bae Kidong, DG of National Museum of Korea, Mr Im Hon-Ryang, Vice President of National Geographic Information Institute (NGII), Mr Sohn Yoo – Joon, DG of Spatial Information in Ministry of Land, Infrastructure and Transport (MoLIT) regarding modernization /upgradation of Survey of India Museum in Dehradun.
- (6) Sh. D. N. Pathak, Director, visited Washington DC, USA from March 02-03, 2020 to participated for discussion on Basic Exchange and Cooperation Agreement (BECA).

12. IMPORTANT ACTIVITIES DURING THE PERIOD:

1. Two days NMCG workshop and User Interactive Meet was organised on the theme “**Geospatial Technology: An Aid to Ganga Rejuvenation**” during June 27 -28, 2019 at the Gambhir Singh Auditorium, Survey of India, Hathibarkala, Dehradun. This workshop was attended by about 100 delegates from different departments involved in NMCG project.



NMCG workshop, Dehradun

2. The g2g portal was developed and launched for giving authorised access to all government agencies. Credentials have been generated for 106 government users during 2019.
3. The portal offers free download of SOI maps by Indian Citizens based on Aadhar authentication. 365414 SOI Maps have been downloaded from manchitra portal by Indian citizens till 13 Jan, 2020.

13. VISIT TO SOI OFFICES:

A) Indian Institute of Surveying & Mapping:

- i. 25 students & 03 faculty members of Water Technology Centre, College of Agriculture, Hyderabad.
- ii. 50 girls students and 04 faculty members of Koadada Institute of Technology & Science for Women, Suryapet, Telagana.
- iii. 40 students and 01 faculty member of School of Planning & Architecture, Hyderabad.
- iv. 60 students and 04 faculty member of JNTUH College of Engineering, Sangareddy.
- v. 186 students and 03 faculty members of Department of Civil Engineering, Anurag Group of Institutions, Hyderabad.
- vi. 25students and 04 faculty members of Savitribai Phule Pune University, Pune.
- vii. 25students and 02 staff members of Civil Engineering Department, NIT, Warangal.



viii. 02 Officers from National Institute of Hydrography, Goa.

B) National Survey Museum (G &RB):

- i. Lt. Col. D. Paul with 11 officers of G.T.O.-12 course C/o D.I.G.I.T., C.M.E. Pune.
- ii. Shri Rajiv Ranjan Mishra, Director General, Namami Mission for Clean Ganga (NMCG).
- iii. Ms Meenakshi, Assistant Professor, DIET Rishikesh, Shyampur.
- iv. Dr. Bachan Lal, Assistant Professor, G.P.G. college, Uttarkashi.
- v. Mr. Hasan Reza, Asstt. Director and Mr. T. Hussain, Dy. Director, National Archives, New Delhi.
- vi. 80 trainees officers alongwith two faculty members, IIRS, Dehradun.
- vii. Prof. Prabhat Kumar Singh and Dr. Prithvish Nag alongwith 04 other members, IIT, BHU, Varanasi.
- viii. 40 students alongwith 03 faculty members, Institute of Architecture & Planning, Nirma University, Ahmedabad.
- ix. Indo-Nepali delegation of 24 members.
- x. Mr. Vijayendra Kumar, IAS Secretary, Revenue, Govt. of Haryana alongwith other 04 members.
- xi. Dr.M.L.Meena alongwith 05 staff and 59 students of Banaras Hindu University, Varanasi.
- xii. Lt Cdr HMRLK Herath, Sri Lanka, Cdr Ahtshamul Khan, Bangladesh, Lt Cdr M Kamrul Hasan, Bangladesh.
- xiii. Lt. Feri Gultom, Indonesia, Lt. Kyaw Zay Ya, Myanmar, Lt. Cdr Kt Avyoko, Lt Victor B Oller III, Phillipines, Lt Cao Hoang Truong, Vietnam.
- xiv. Prof. Venkata Raghotham, Director, Human Resource Department, Pudduchery.
- xv. M.P. Bhardwaj, Consultant DST alongwith 05 members, Audit Party from DST.
- xvi. Dr. Akhil alongwith 18 students, Kannur University, Kerala.
- xvii. Mr. Riaz Zaid Dean, Fiji.
- xviii. Sh. Sanjeev Chopra alongwith 190 members of L.B.S. Academy, Mussoorie.
- xix. Dr. Albert Horo alongwith 30 members of Regional Institute of Education, NCERT, Ajmeer.
- xx. Sh. Mauli Shree Mishra, Conservation Architect & Researches INTACH, Delhi Research.

14. CULTURAL AND EDUCATIONAL ACTIVITIES:

(i) Swachh Bharat Abhiyan:

As a part of Swachh Bharat Abhiyan, different programmes on cleanliness were conducted in Survey of India office premises to propagate the Swachhta message among the officers staff and of the department. Officers and Staff disposed garbage of their surroundings, cleaned their desks, racks, computers files etc. Slogan and Banner were placed at the entrance and prominent places of the Office building. Awareness was created among Officers & Staff to maintain the Office premises surroundings clean.



Sol workers in cleanliness drive

(ii) International Yoga day:

For the past four years, the International Day of Yoga is celebrated annually on June 21 to raise global awareness about the benefits of the ancient Indian practice. This year too also, 5th International Yoga Day was celebrated in the office premises by the officers and staff by doing yoga.



Sol officers and staff doing yoga on International Yoga Day

(iii) Independence Day:

Independence Day is one of the most important National festival of India and it is celebrated on 15th of August every year. The Office buildings of SoI spread all over India including Surveyor General's Office, the head quarter of the department were decorated with lights, tri colour flags and balloons which gives the feelings of Nationalism. Surveyor General of India hoisted the Indian National Flag at Surveyor General's Office, Dehradun. National Anthem Jan Gan Man and patriotic songs were song by the people presented in the occasion.



Surveyor General of India and other officers addressing the personnel on the occasion of Independence Day

(iv) Hindi Pakhwada:

Hindi Pakhwada was observed from 14.09.2019 to 30.09.2019 at various offices in Survey of India, located in different cities of the country. To encourage the officers and staff to work more and more in our “Rajbhasha Hindi” weeks a long programme of various activities viz. Hindi essay writing, Good hand writing, Noting – drafting, General knowledge, Poem and quiz competitions etc were organised.



Hindi function organized in the office of the Surveyor General of India, Dehradun and other offices of Sol

(v) Republic Day:

Republic day, The national festival of India was celebrated on 26th January, 2020 in SoI offices in all over the country with great national spirit. The main programme was organized in Surveyor General's Office, Dehradun. Lt Gen Girish Kumar VSM, Surveyor General of India unfolded the national flag and addressed officers and staff of SoI. Various cultural activities had been performed by the School children on this occasion.



Surveyor General of India and other officers hoisting the National Flag on the occasion of Republic Day

(vi) National Science Day:

As part of the country wide celebration National Science Day (NSD) 2020 was celebrated on February 28, 2020 in Survey of India on the theme : “WOMEN IN SCIENCE” .The celebration included an exhibition highlighting techniques for Map making, Digital mapping and Modern Survey methods etc. Many visitors and School children visited the exhibition and showed keen interest in the various exhibits and audiovisual displays about the history and the achievements of the Department. The visitors appreciated the role of Survey of India in the developmental activities of the nation.



Students from various schools inquiring about survey equipments from offices of Sol on the occasion of National Science Day

15. USE OF HINDI IN OFFICIAL WORK:

In accordance with the Official Language Rules, 1976, 15 Geo-Spatial Data Centres/Directorate/Printing groups including Headquarter of Survey of India are located in Region 'A' while 6 Geo-Spatial Data Centre in Region 'B' and 20 Geo-Spatial Data Centres/Training Institutes/Printing groups are in Region 'C'. The position regarding the use of Hindi in the Department for the year 2019-2020 remained as under

a) Correspondence:

During the year 2019-20 intensive measures were taken for transacting the official work of the union in Hindi by the various offices of the department. 3,684 documents were issued bilingually under section 3(3) of the Official Languages Act, 1963. Letters received in Hindi were replied to in Hindi. Region wise position regarding correspondence in Hindi remained as under

b) Hindi workshop/seminar/conference:

With a view to acquaint with the Official Language orders / rules and the target laid down in the Annual Programme Hindi workshops were organized in Surveyor General's Office, Dehradun, Specialized Zone, Dehradun, Eastern Printing Group, Kolkata, Southern Printing Group, Hyderabad, Central Zone, Jabalpur, North East Zone, Shilong, Northern Zone, Chandigarh, Indian Institute of Surveying and Mapping, Hyderabad, Eastern Zone, Kolkata, Southern Zone, Bangaluru, Andhra Pradesh and Telangana GDC, Hyderabad. 286 officers/employees received training in these workshops.

c) Incentive scheme:

During the year 2019-2020 incentive schemes for noting and drafting for doing Official work in Hindi, Hindi typing and Hindi stenography remained continued.

d) Inspection:

During the year inspection regarding the use of Hindi the Department of Science and Technology on dated 29.08.2019 and 30.08.2019 was carried out located at Indian Institute of Surveying and mapping, Hyderabad.

e) Hindi day/fortnight/function:

During the year Hindi day/Hindi fortnight/Hindi functions were organized in the month of September in various offices of the Department. To encourage the use of Hindi various competitions pertaining to Hindi were organized on this occasion and the winners were awarded. Chal Vijayanti Running Shield was given to the LAP Section for doing maximum work in Hindi in Surveyor General's Office, Dehradun. On the occasion of Prize distribution Ceremony Hindi quiz competition was also organized besides recitation of poems in Hindi.

f) Publication of in-house magazine in Hindi:

The following offices published in-house magazines in Hindi during the period under report

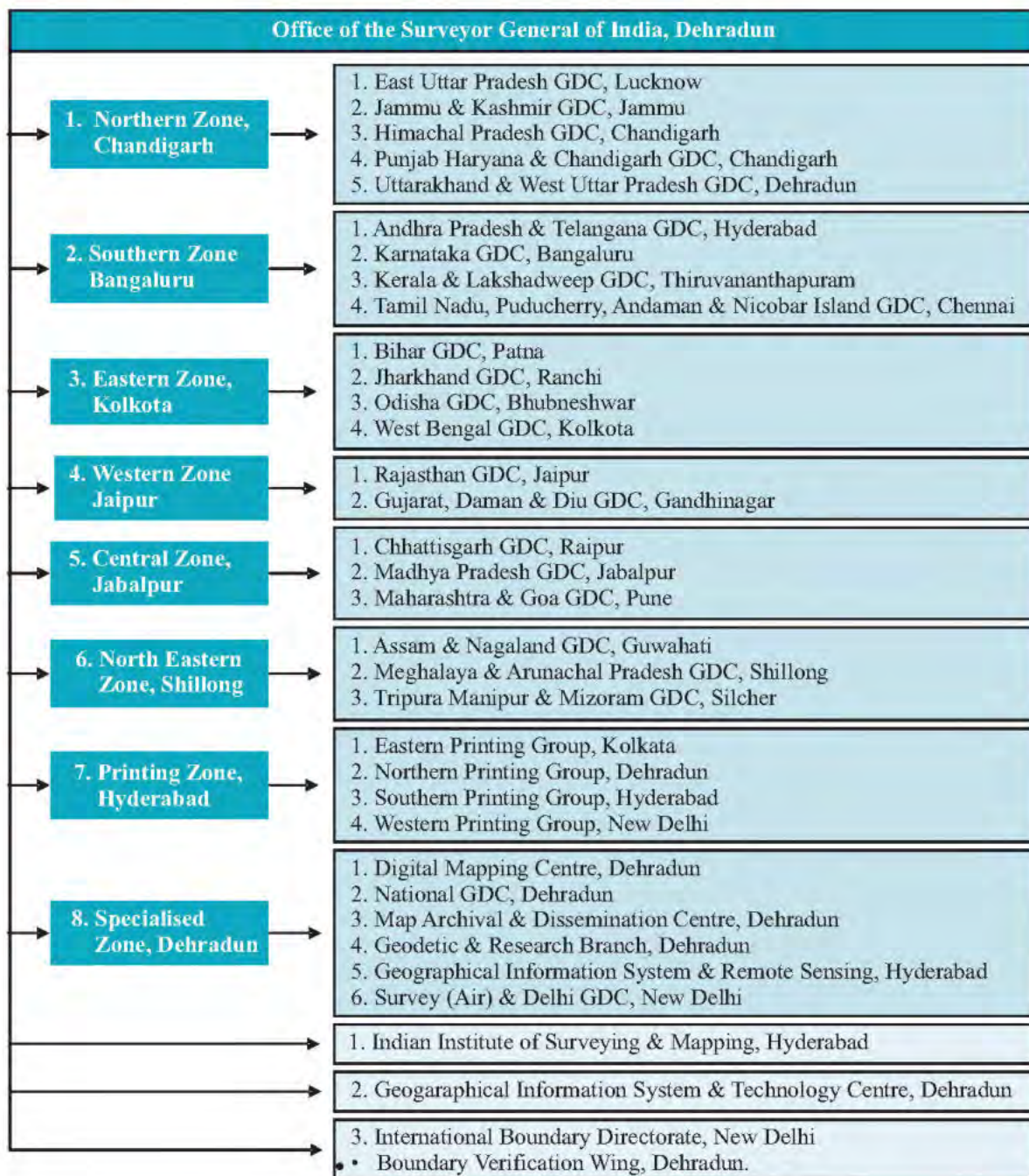
Sl. No.	Name of Office	Magazine Name
1.	Surveyor General's Office, Dehradun	Sarvekshan Darpan
2.	Town Official Language Implementation Committee, DDun	Doonvani
3.	Geodetic & Research Branch, Dehradun	Jhalak
4.	National GDC, Dehradun	Ujau
5.	Andhra Pradesh & Telangana GDC, Hyderabad	Kalakal
6.	GIS & Directorate Remote Sensing, Hyderabad	Pushpanjali
7.	Madhya Pradesh GDC, Jabalpur	Dharohar
8.	Indian Institute of Surveying and Mapping, Hyderabad	Pratibimb
9.	West Bengal & Sikkim GDC, Kolkata	Sarvekshan Pariver

j) Meetings:

During the year 2019-2020 quarterly meetings of the Official Language Implementation Committee were held in almost all the Geo-Spatial Data Centres / Directorate etc. of the Department located in Region 'A', 'B' and 'C'. In these meetings discussions were held to achieve the targets given in the Annual Programme issued by the Govt. for transacting the Official work of the union in Hindi.

During the year half yearly meetings of the Town Official Language Implementation Committee (Office-1), Dehradun were held in the chairmanship of Surveyor General of India.

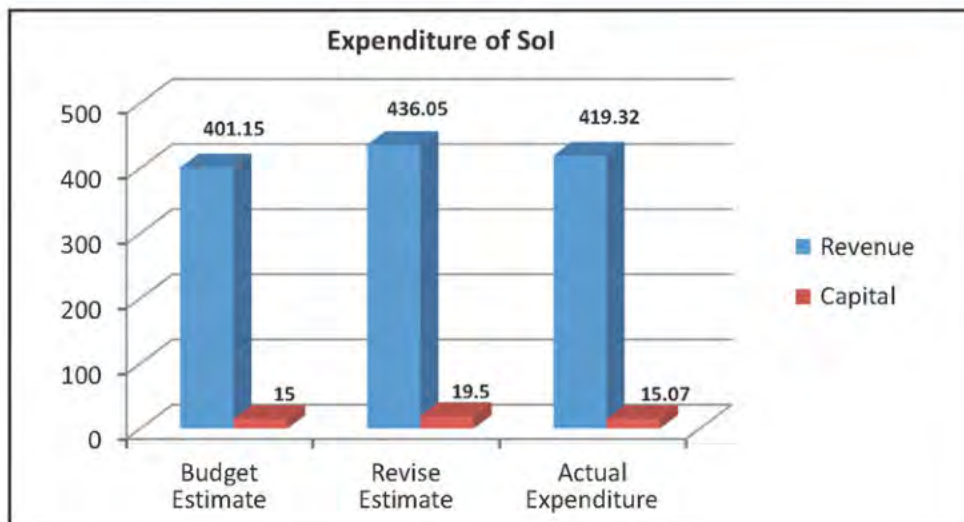
16. ORGANOGRAM OF SURVEY OF INDIA



17. EXPENDITURE OCCURRED DURING THE PERIOD:

Expenditure of Survey of India

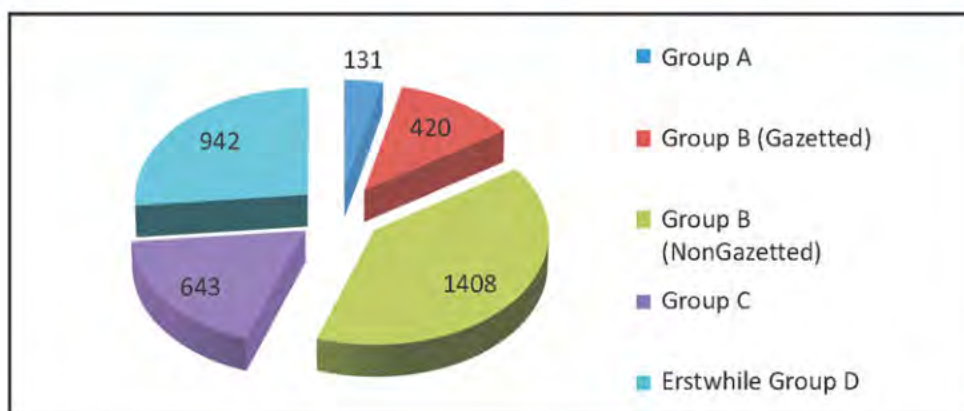
Expenditure Type (In Crores)	Financial Year 2018-19	
	Revenue	Capital
Budget Estimate	401.15	15.0
Revise Estimate	436.05	19.5
Actual Expenditure	419.32	15.07



18. MAN POWER RESOURCES:

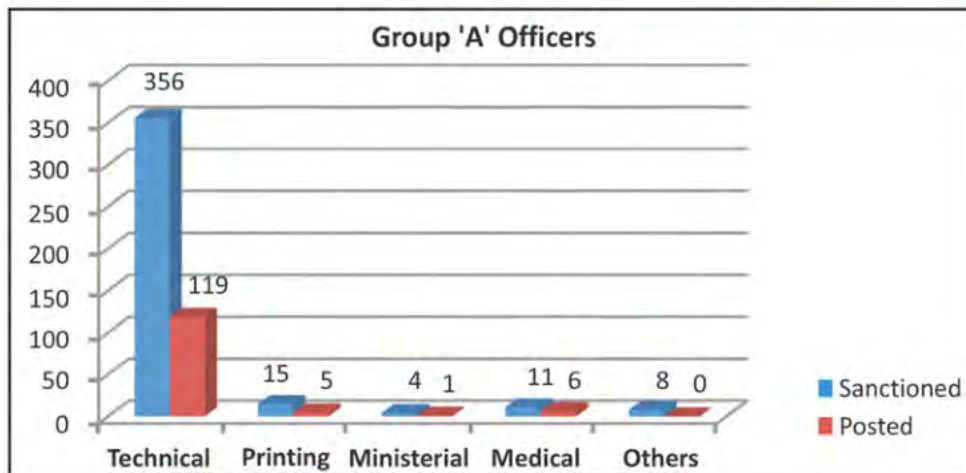
Strength as on 31.03.2020

Service Groups	Sanctioned	Posted
Group 'A'	394	131
Group 'B' (Gazetted)	611	420
Group 'B' (Non - Gazetted)	1897	1408
Group 'C'	3834	643
Group 'C' (Erstwhile Gp. 'D')	4454	942
Total	11190	3544

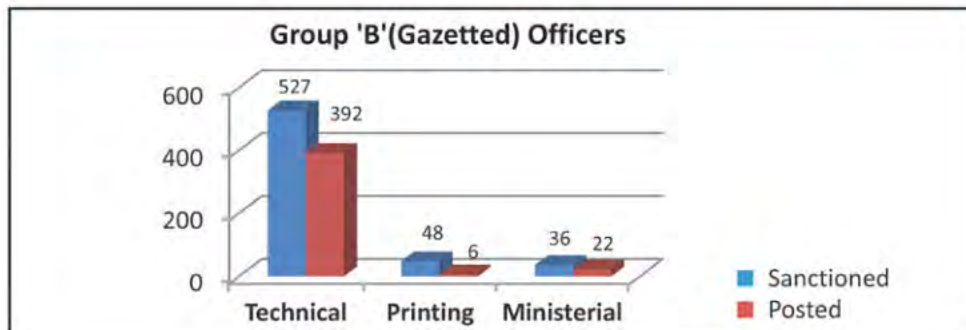


Group 'A' Officers

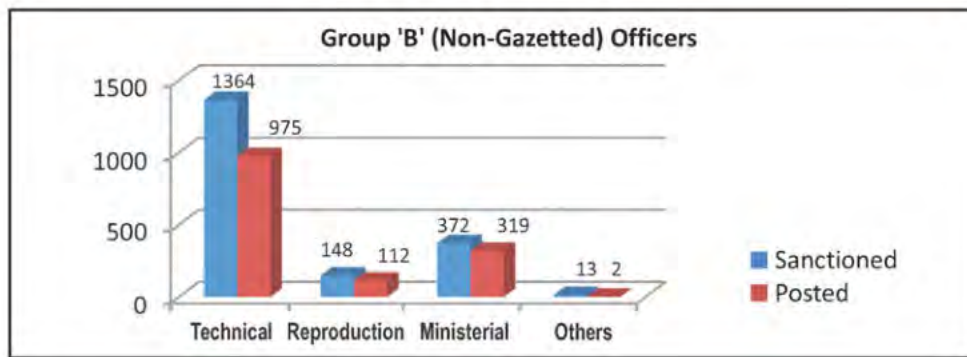
	Sanctioned	Posted
Technical	356	119
Printing	15	5
Ministerial	4	1
Medical	11	6
Others	8	0
Total	394	131

**Group 'B' (Gazetted) Officers**

	Sanctioned	Posted
Technical	527	392
Printing	48	6
Ministerial	36	22
Total	611	420

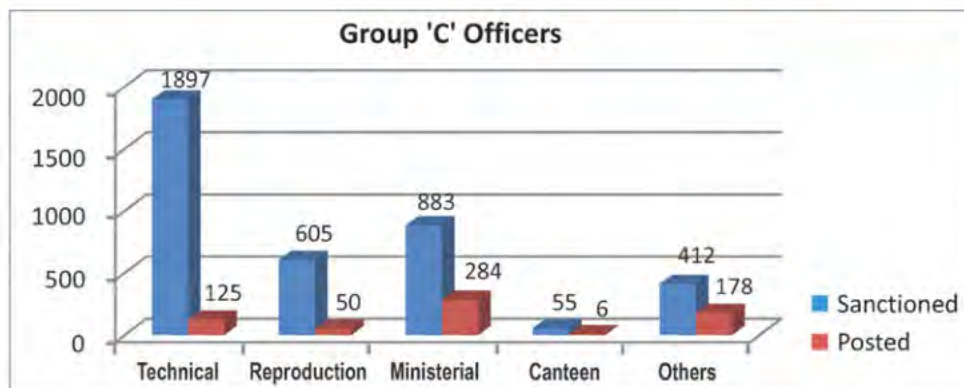
**Group 'B' (Non-Gazetted) Officers**

	Sanctioned	Posted
Technical	1364	975
Reproduction	148	112
Ministerial	372	319
Others	13	2
Total	1897	1408



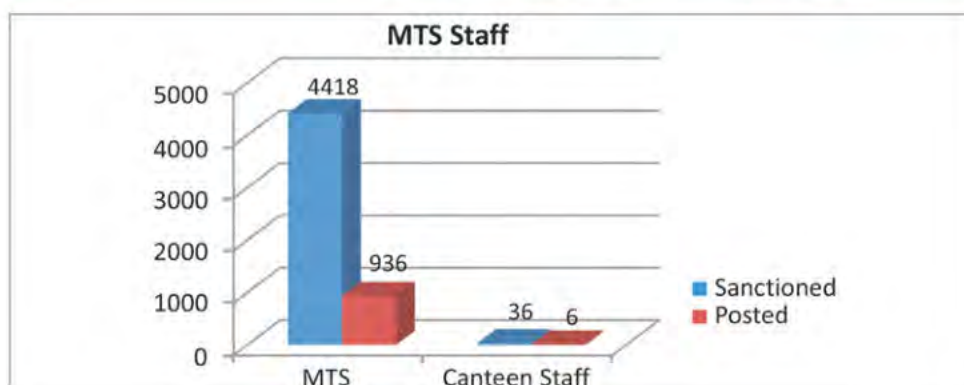
Group 'C' Officers

	Sanctioned	Posted
Technical	1897	125
Reproduction	605	50
Ministerial	883	284
Canteen	55	6
Others	412	178
Total	3834	643



MTS Erstwhile Group 'D'

	Sanctioned	Posted
MT Staff	4418	936
Canteen Staff	36	6
Total	4454	942



19. ACADEMIC AND CAPACITY BUILDING:

Indian Institute of Surveying & Mapping (IISM), Hyderabad is a premier institution providing training & capacity building in the field of Surveying, Mapping, Photogrammetry & GIS. Besides training to officers and staff of Survey of India, IISM also imparts training to other Government Organisations, Private Individuals and Scholars from various Afro-Asian countries.

The details of training imparted to departmental officers of various levels and outsiders are given on Appendices 'A', 'B' and 'C'.

23 Basic / Scheduled courses were conducted during the year under report. 174 trainees underwent such courses as per details on Appendix 'A' & 'C'.

407 Officers nominated by various scientific / professional organizations and 13 students participated in 25 special courses listed on Appendix 'B'.

04 Foreign nationals sponsored by the Survey Department, Nepal were among those attended the special courses during the year under report.

Special efforts were made to conduct short term courses for dissemination of new technologies and creation of map awareness amongst public in general and scientific community in particular. 04 such courses were conducted as shown on Appendix 'C'. 22 trainees attended such courses.

Regular/ Scheduled Courses

APPENDIX "A"

Sl. No.	Course No.	Nomenclature	Deptl.	Extra Deptl.	Foreign	Others	Total
1	125.07	Office Procedure – Overview	05	--	--	--	05
2	150.86#	Surveying Technician	09	--	--	--	09
3	150.87#	Surveying Technician	21	--	--	--	21
4	150.88	Surveying Technician	25	--	--	--	25
5	170.07	Use of Total Station and GPS for beginners	--	09	--	--	09
6	170.08	"Use of Total Station and GPS for beginners.	--	--	--	09	09
7	315.17	Cadastral Survey & Land Information System	--	08	--	--	08
8	440.28	Digital Cartography & GIS Applications	--	02	--	--	02
9	440.29	Digital Cartography & GIS Applications	--	02	--	--	02
10	465.08	GIS Applications	--	02	--	--	02
11	480.48	Digital Photogrammetry & Remote Sensing	--	04	--	01	05
12	480.49	Digital Photogrammetry & Remote Sensing	--	04	--	--	04
13	485.07	Digital Photogrammetry & Remote sensing	--	02	--	--	02
14	495.24	Refresher Course for Officer Surveyors	17	--	--	--	17
15	500.77#	Surveying Engineer	04	--	--	--	04
16	500.78#	Surveying Engineer	02	--	--	--	02
17	500.79	Surveying Engineer	14	--	--	--	14
18	690.39	Control and Detail Survey by GPS and Total Station	02	--	--	05	07
19	690.40	Control and Detail Survey by GPS and Total Station	--	01	--	04	05
TOTAL			99	34	--	19	152

Courses continuing from previous year

APPENDIX “B”

Special Courses For Specific Users

Sl. No.	Course No.	Nomenclature	Departl.	Extra Departl.	Foreign	Others	Total
1	Spl. #	Digital Photogrammetry & Remote Sensing for NATMO	--	11	--	--	11
2	Spl.	“Advanced GNSS Processing using Bernese Software” for Nepal Officials	--	--	04	--	04
3	Spl.	One day Training to IAS Probationers of 2018 batch	--	08	--	--	08
4	Spl.	Training on “UAV/ Drone” by the Vendor	16	--	--	--	16
5	Spl.	Training on “Digital Level” by the Vendor	20	--	--	--	20
6	Spl.	“GIS in Disaster Risk management” Batch – 1 from NDMA Sponsors.	--	24	--	--	24
7	Spl.	Training on “Geodesy”	--	18	--	--	18
8	Spl.	“GIS Modules” for National Mission for Clean Ganga project sponsors.	--	10	--	--	10
9	Spl.	“Advanced Survey Technology” SSLR, Karnataka Sponsors	--	30	--	--	30
10	Spl.	“GIS & Remote Sensing” for NHP sponsors	--	04	--	--	04
11	Spl.	“Usefulness and Capability of Remote Sensing & GIS” for NHP sponsors.	--	02	--	--	02
12	Spl.	Training on “Lager Range finder” by the vendor.	23	--	--	--	23
13	Spl.	Training on “E- procurement”	29	--	--	--	29
14	Spl.	Training on “GEM”	32	--	--	--	32
15	Spl.	Training on “E-Office”	47	--	--	--	47
16	Spl.	“Use of Geo-spatial cloud –based platform for development of data services and registers” from NSDI sponsors.	--	10	--	--	10
17	Spl.	“GIS in Disaster Risk Management” from NDMA sponsors.	--	10	--	--	10
18	Spl.	“GIS in Disaster Risk Management” from NDMA sponsors.	02	19	--	--	21
19	Spl.	“GIS Modules” from NMCG for execute Level Officers.	--	04	--	--	04
20	Spl.	On- job- Training/Industrial training on Geo- Informatics Assistant “from NCVT, Hyderabad.	--	--	--	13	13
21	Spl.	Basics of’ GIS Technology and Cartography” for SSB Officials	--	30	--	--	30
22	Spl.	Vendors Training on “Drone Data Processing Software PiX4D	14	--	--	--	14
23	Spl.	“DGPS & Total Station”	--	20	--	--	20
24	Spl.	Vendors Training on “Drone Data Processing Software PiX4D	16	--	--	--	16
25	Spl.	Basics on Surveying, Projection / datum, GIS and Data Processing	--	04	--	--	04
TOTAL			199	204	04	13	420

Courses continuing from previous year

APPENDIX “C”

Short Term Awareness Courses

Sl. No.	Course No.	Nomenclature	Departl.	Extra Departl.	Foreign	Others	Total
1	785.06	“Modern Survey Instruments & Techniques”	--	10	--	--	10
2	790.13	GPS and Total Station – Concepts & Applications	--	02	--	--	02
3	795.11	Digital Photogrammetry and Remote Sensing for policy makers	--	02	--	--	02
4	800.15	Datum, Co-ordinates system and Map Projection – Concept for Advanced Map user	--	08	--	--	08
TOTAL			--	22	--	--	22

20. REPRESENTATION OF SC/ST & OBCs:

SC/ST/OBC REPORT - I

Annual statement showing the representation of SC's, ST's and OBC's as on 01-01-2020 and number of appointments made during the preceding calendar year- 2019

Ministry / Department / attached / subordinate office: **Survey of India, Dehradun (Subordinate office) D/o Science & Technology**

Groups	Representation of SCs/STs/OBCs (As on 01-01-2020)				Number of appointments made during the calendar year 2019										
					By Direct Recruitment				By Promotion			By Deputation /Absorption			
	Total no of Empls	SCs	STs	OBCs	Total	SCs	STs	OBCs	Total	SCs	STs	Total	SCs	STs	OBCs
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Group A	131	10	7	15	0	0	0	0	0	0	0	0	0	0	0
Group B	437	83	40	36	0	0	0	0	0	0	0	0	0	0	0
Group C (Excluding Sweepers)	3043	738	173	281	13	5	0	2	24	5	1	0	0	0	0
Group C (Sweepers)	41	34	1	2	0	0	0	0	0	0	0	0	0	0	0
Total	3652	865	221	334	13	5	0	2	24	5	1	0	0	0	0

SC/ST/OBC REPORT – II

Annual statement showing the representation of SC's, ST's and OBC's in various group 'A' services as on 01.01.2020 and number of appointments made in the service in various grade in the preceding calendar year - 2019

Ministry / Department / Attached / Subordinate Office: **Survey of India**

Level in Pay Matrix	Representation of SCs/STs/OBCs (As on 01-01-2020)				Number of appointments made during the calendar year 2019										
					By Direct Recruitment				By Promotion			By Other Method			
	Total no of Empls	SCs	STs	OBCs	Total	SCs	STs	OBCs	Total	SCs	STs	Total	SCs	STs	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
PB-3 5400	51	5	2	11	6	1	0	3	0	0	0	0	0	0	
PB-3 6600	17	3	1	1	0	0	0	0	0	0	0	0	0	0	
PB-3 7600	9	0	0	0	0	0	0	0	0	0	0	0	0	0	
PB-4 8700	48	1	2	3	0	0	0	0	0	0	0	0	0	0	
PB-4 8900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PB-4 10000	6	1	2	0	0	0	0	0	0	0	0	0	0	0	
HAG & above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	131	10	7	15	6	1	0	3	0	0	0	0	0	0	

21. SC/ST/OBC&PERSONS WITH DISABILITIES:

PWD REPORT - I

Annual statement showing the representation of the persons with disability in services (As on 01-01-2020)

Ministry / Department: **Ministry of Science & Technology**

Attached / Subordinate Office: **Survey of India**

GROUP	Number of Employees				
	Total	In Identified Posts	VH	HH	OH
1	2	3	4	5	6
Group A	131	0	0	0	0
Group B	437	0	0	0	5
Group C	3043	0	0	0	28
Group D	41	0	0	0	0
Total	3652	0	0	0	33

- Note:** (i) VH Stands for Visually Handicapped (persons suffering from blindness or low vision)
(ii) HH Stands for Hearing Handicapped (persons suffering from hearing impairment)
(iii) OH stands for Orthopaedically Handicapped (persons suffering from locomotordisabilityorcerebral palsy)

PWD REPORT – II

Annual statement showing the representation of the persons with disabilities in services (As on 01.01.2020)

Ministry / Department/ Attached / Subordinate Office: **Ministry of Science & Technology**

Attached / Subordinate Office: **Survey of India**

Groups	Representation of of VH/HH/OH (As on 01-01-2020)				Number of appointments made during the calendar year 2019											
					By Direct Recruitment				By Promotion				By Deputation			
	Total	VH	OH	HH	Total	VH	OH	HH	Total	VH	HH	OH	Total	VH	HH	OH
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
GROUP A	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GROUP B	437	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
GROUP C (Excluding Sweepers)	3043	0	28	2	0	0	0	0	0	0	0	0	0	0	0	0
GROUP C (Sweepers)	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3652	0	33	2	0	0	0	0	0	0	0	0	0	0	0	0

- Note:** (I) VH Stands for Visually Handicapped (persons suffering from blindness or low vision)
(II) HH Stands for Hearing Handicapped (persons suffering from hearing impairment)
(III) OH stands for Orthopaedically Handicapped (persons suffering from locomotordisability or cerebral palsy)

आईआईएसएम, हैदराबाद से तस्वीरें Pictures from IISM, Hyderabad



आईएसएस परिवीक्षाधीन अधिकारियों का प्रशिक्षण
Training to IAS Probationers



नेटमो अधिकारियों को प्रशिक्षण
Training to NATMO officials



नेपाल के अधिकारियों के लिए अग्रिम जीएनएसएस का प्रशिक्षण
Advanced GNSS training for Nepal officials



एन एच पी प्रशिक्षण
NHP training



एनएसडीआई अधिकारियों को प्रशिक्षण
Training to NSDI officials



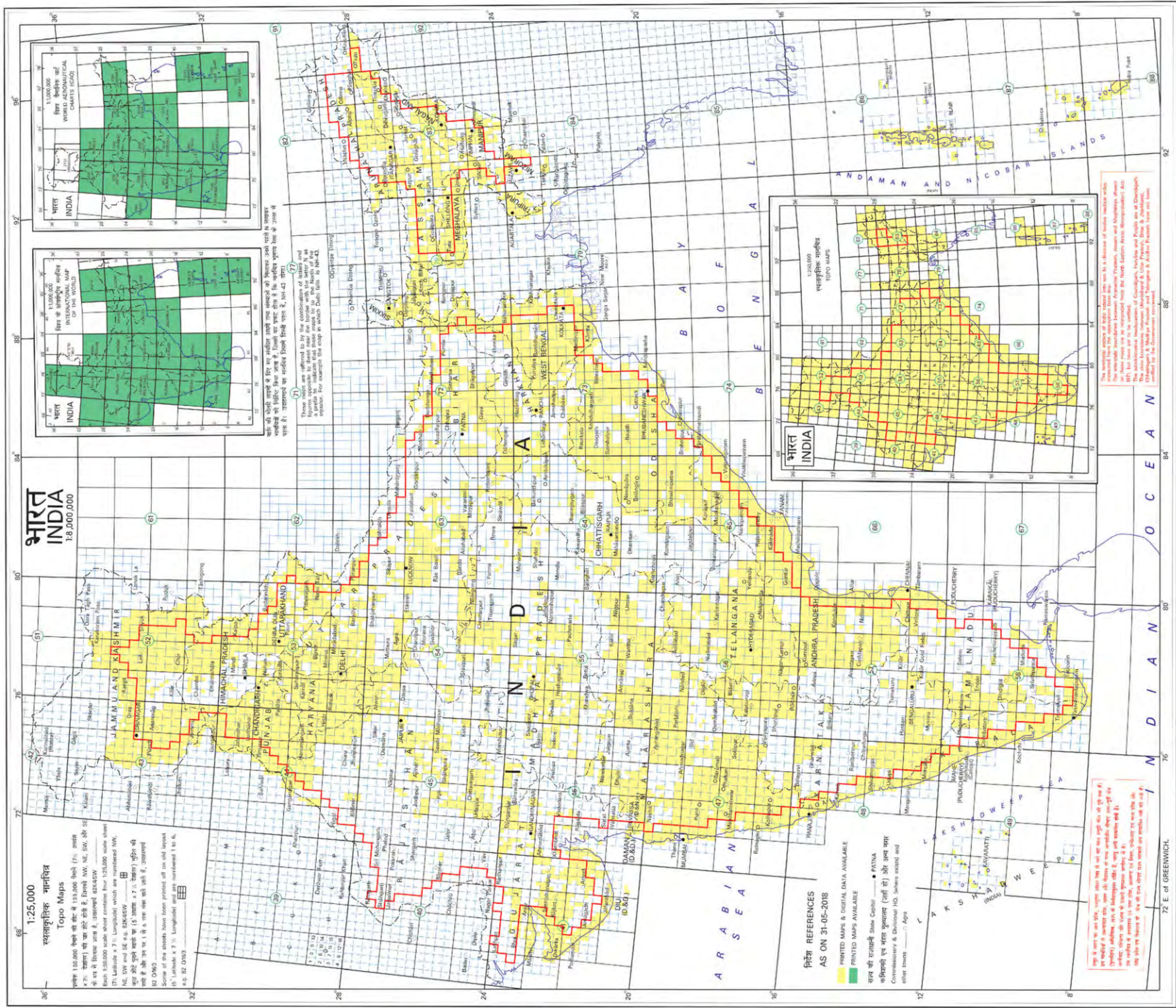
आपदा जोखिम प्रबन्धन में जीआईएस
GIS in Disaster Risk Management

1:25,000, 1:250,000 पैमानों पर स्थलाकृतिक मानचित्रों (प्रक्षेप - पोलिकोनिक, आधार - एक्स्ट स्फीरॉइड) और 1:1 मिलियन पैमाने

पर विश्व के अन्तर्राष्ट्रीय मानचित्र तथा विश्व वैमानिक चार्ट (अन्तर्राष्ट्रीय सिविल विमानन संगठन) के प्रकाशन की स्थिति

STATUS OF 1:25,000, 1:250,000 TOPO MAPS

(PROJECTION - POLYCONIC, DATUM - EVEREST) AND 1:1 M, IMW & WAC (ICAO) CHARTS





SURVEY OF INDIA

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