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EDITORIAL

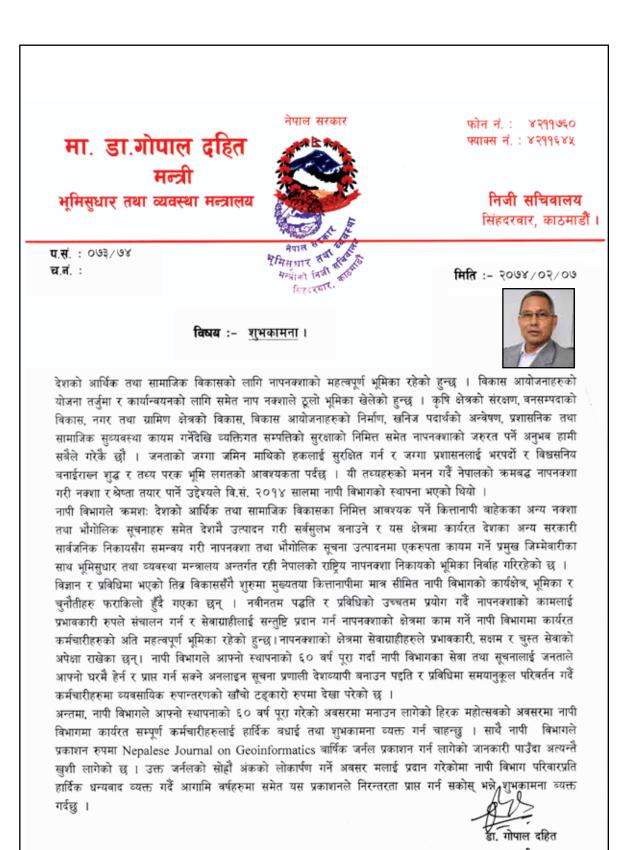
Nepalese Journal on Geoinformatics is an important asset as well as a means to propagate professional knowledge, skills and expertise. It has documentation on more than hundred topics including a wide spectrum of different aspects of surveying, mapping and geoinformation which can be easily accessed online or offline.

Realizing the necessity of knowledge and expertise sharing, Survey Department has been publishing its journal "Nepalese Journal on Geoinformatics" for last fifteen years. In last fifteen issues more than 100 articles in a variety of themes related to geoinformation have been published. I would like to express sincere thanks to all those incredible authors for their contributions and members of Advisory Councils and Editorial Boards of all those issues of the journal for their persistent efforts to publish the journal.

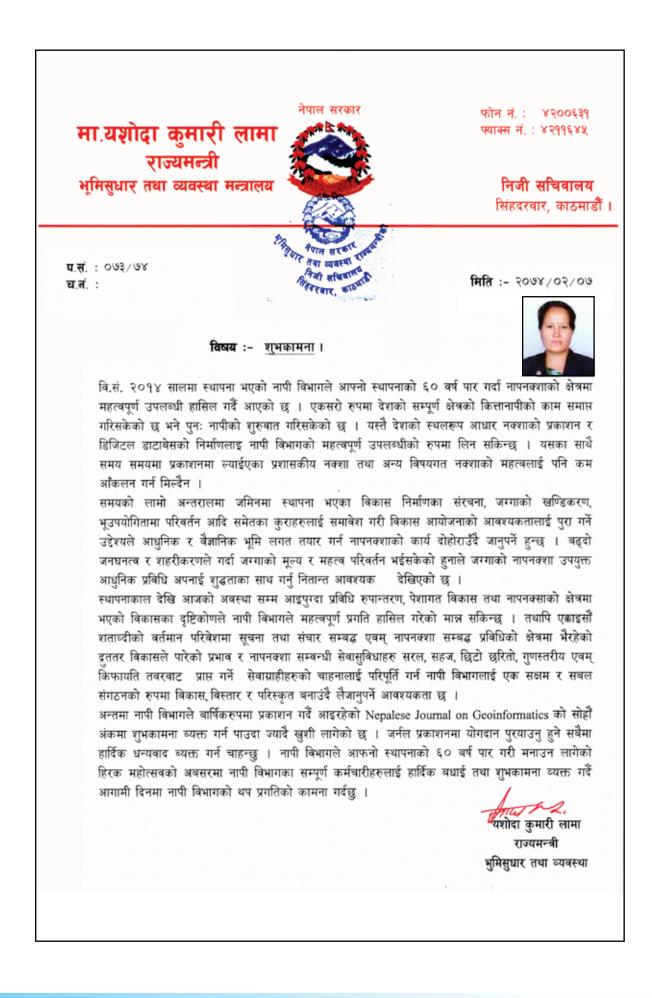
At this point, I am very much thankful to the Survey Department for entrusting me with the responsibility of the Editor-in-Chief for the sixteenth issue of the journal. Following the advice and suggestions of Advisory Council, we, the members of Editorial Board have been able to bring forth the sixteenth issue of the journal.

On behalf of all the members of the Editorial Board, I would like to express sincere thanks to all contributing authors, members of Advisory Council and all others who have contributed for the publication of this issue of the journal. Last but not the least, I feel privileged and honored to work as the Editor-in-Chief.

Suresh Man Shrestha Editor-in Chief Jesth, 2074



मन्त्री भूमिसुधार तथा व्यवस्था





Government of Nepal

Ministry of Land Reform & Management

......Section)

Singh Durbar, Kathmandu

Date:

Ref. No.

Sub:-



Message from the Secretary

I would like to congratulate Survey Department and its entire staff on the 60th Anniversary of its establishment, and express happiness on its untiring services to the nation in the field of surveying, mapping and other geospatial activities. I was overwhelmed with pleasure, when I came to learn that the Department annually publishes a journal named "Nepalese Journal on Geoinformatics" and its sixteenth edition is to get released. I feel honored to express my warm wishes in this edition of the journal.

Surveying and mapping activities being undertaken by the Department in the field of surveying, mapping and geospatial sector are much appreciable despite the technological hindrances and geographical diverseness of the country. Establishment of national geodetic control network, completion of cadastral survey, and production of topographical base map series of the whole country are the remarkable landmarks of the department. I remember the department's immediate response to the devastating Gorkha earthquake of 2072 B.S. by making required geospatial data freely available, carrying out deformation study to see the impacts of earthquake on geodetic control network, and making rehabilitations of geodetic control network and other efforts as needed at the time. I do believe that the Department will stand competently at the time of urgent need of such kind in the future as well.

I have an impression that the Department is striving to move ahead along with the advancement of technology to meet the need of the society. There is a need of ensuring the availability of the geospatial data of users' need and hard work is required to improve the system of service delivery from the district level offices. The Department also has to make necessary efforts to improve the level of trust from the general public. I am confident that the current management of the Department is fully aware of the things need to do for the better future and is to move ahead accordingly. In capacity of the secretary of its parental Ministry, I do assure the fullest support from the ministry to its every endeavor ahead.

In the occasion of diamond jubilee celebration of the department, I would like to convey my regards to all the enthusiastic, energetic and untiring hands who played key role in the development of department till now and I hope to see much more development in the coming days too.

Lastly, I wish to appreciate the efforts of Advisory Council and Editorial Board of this Journal to bring out with quality articles and information. I believe, this Journal will be successful to disseminate what it was meant for and wish for its long lasting continuity in the years ahead. Once again, my heartiest congratulations to the Survey Department and entire staff for the 60 years of continuous service to the nation and best wishes for the future.

Thank you.

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Krishna Prasad Devkota Secretary Ministry of Land Reform and Management

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Nepalese Journal on Geoinformatics -16, 2074

FOREWORDS

It gives me immense pleasure to present the Sixteenth issue of the "Nepalese Journal Geoinformatics" the on on Sixtieth Anniversary of Survey Department, the National Mapping Organization of Nepal. Let me take this opportunity to congratulate entire staff of the Department for their hard work. I would also like to extend sincere appreciation and due respect to all the former colleagues of the Department who have completed their service, for their invaluable and lifetime contribution in the past sixty years in bringing the department to this level.



The Department was established

with the objective of carrying out cadastral survey for preparing the land records (cadaster) including the first registration of land property throughout the country. In the first few years of its establishment, the Department carried out cadastral surveys in some part of Kathmandu Valley and terai region but none of the records were used. Promulgation of Land (Surveying and Mapping) Act in 2019 B.S.¹ was the first legal instrument that laid foundation for cadastral surveys. The importance of systematic cadastral survey was only realized after the implementation of land reform program in 2021 B.S. This was because area based land records were essential to implement the issue of land ceiling, as one of the main objectives of the then land reform program was to impose land ceilings on land holding. The systematic cadastral survey commenced soon after the implementation of land reform program attained nationwide coverage in 2055 B,S,, leaving few village blocks and areas having political boundary disputes.

In order to strengthen the capacity of its technical staff, the Department established Survey Training Center in 2025 B.S, currently known as Land Management Training Center, which attained a departmental status in 2057 B.S. The center has been conducting various trainings in order to build capacity of the human resources available to us. Additionally, it

¹ B.S.: Bikram Sambat; 56 years 8 months and 16 days ahead of A.D.

has also been running academic courses in association with Kathmandu University.

Over the years, the department has been making efforts in incremental basis to expand its sphere of activities and to improve the quality of services it provides. Establishment of Geodetic Survey Division in 2028 B.S. was an important footstep in this line. The Division carried out geodetic survey and astronomical observation. Nationwide network of horizontal control points, levelling network, gravity survey, among others are the major achievements to the date.

Establishment of Topographical Survey Division in 2030 B.S. was the other major footstep in extending the scope of the Department. Nationwide coverage of topographic map series, production of various kinds of administrative, land resources and thematic maps are the major achievements to the date. At the same time, the Division is actively involved in the technical activities related to international boundaries.

In order to enhance the efficiency and effectiveness of the cadastral survey, the Department established Cadastral Survey Division in 2039 B.S. and afterwards cadastral survey is being carried out under the supervision of this Division.

With the growing application of geospatial data, in recent years, various organizations are producing maps and geospatial data of their need. In this context, it is essential to ensure non duplication of government resources and efforts for the similar kind of geo-products, and also there is a need to develop norms and standards for the same. In this context, the Department has established National Geographic Information Infrastructure Division very recently, in 2073 B.S. This Division aims to coordinate the activities related to national spatial data infrastructure. It will soon bring a modality for data sharing among the public and private organization, develop norms and standards for geospatial data production, formulate geospatial data policy, launch clearinghouse and publish metadata of different geo-products produced from partner organizations, among others. Before the establishment of this division, related services were provided through then National Geographic Information Infrastructure Project since 2059 B.S. Digitalization of the topographic base map series, production of orthophoto maps of urban areas, production of generalized data of smaller scale from the topographic base data, and production of Population and Socio Economic Atlas based on the national census of 2058 and 2068 are some of the major achievements of the project. These all products are available for the users.

The Department is constantly working on improving its service delivery and satisfying the geo-data users by promptly addressing their needs. Preparation of administrative boundary as per federal structure, reducing the price of topographic data, offering free of charge data (administrative boundary layer and data of the resolution 1:1,000,000 mapping scale) are some of the recent efforts in this line. The Department has some dream projects planned for the days to come. Measurement of the height of the Mt. Everest, establishment of Continuously Operating Reference Stations (CORS) throughout the country, updating of topographic map series, developing high resolution Digital Terrain Model (DTM), developing online system of service delivery, and modernizing cadastral surveying practices are some of them. As an immediate step towards materializing these projects, the Department has begun its efforts to explore the necessary funding and other technical assistance.

The Department also has a role in regularizing the surveying and mapping activities in the country, as provisioned in the Land (Surveying and Mapping) Act, 2019. According to the act, all the maps and geographic information produced by different organizations should be based on the specification approved or issued by the Department. Permission from the Department is mandatory for carrying out

the surveying and mapping activities in the country by any organization other than the Department. Additionally, the Department issues licenses to the Survey Professionals in the country. Efforts are underway to amend the legal provisions to issue licenses of different categories. The Department, being the leading organization in the field of surveying and mapping, is also constantly working on the professional development in the country. Affiliation with various international professional organizations has given international recognition to the Department.

On the special occasion of the sixtieth anniversary, I would like to acknowledge the contributions of all the current and former staff to bring the Department to this level. Without their hard work, strong determination and wonderful contributions, I would not have been able to boast about our achievements so far. Let me use this proud moment to extend special respect to the former head of the department: Colonel Mr. Tilak Bahadur Rayamajhi, Mr. Netra Bahadur Thapa, Major Mr. Kulbir Singh, S.P. Mr. Tek Bahadur Rayamajhi, Mr. J.R.G Harrop, Mr. Arjun Bahadur Basnet, Mr. Bekhalal Shrestha, Mr. Buddhi Narayan Shrestha, Mr. Ram Naresh Singh, Mr. Punya Prasad Oli, Mr. Narayan Bhattarai, Mr. Baburam Acharya, Mr. Toya Nath Baral, Mr. Raja Ram Chhatkuli, Mr. Rabin Kaji Sharma, Mr.Krishna Raj B.C., Mr. Nagendra Jha, Mr. Madhusudan Adhikari for their dynamic leadership over the past sixty years. I do assure that I will follow the footprints laid out by my predecessors and work harder to bring the Department even at higher level.

Lastly, let me express my heartiest appreciation to all the fellow colleagues, the members of Advisory Council, and entire team of the Editorial Board for their invaluable contribution to make the publication of this issue possible. Special thanks are due to Deputy Director General Mr. Suresh Man Shrestha, the Editor-in-Chief, and Chief Survey Officer Mr. Ram Kumar Sapkota, member of the Editorial Board, for their tireless efforts in bringing this issue in the stipulated time. More importantly, I would like to extend sincere gratitude to all the authors for their resourceful professional contribution. I would expect such kind of support and professional contribution in the upcoming issues too. Please, consider this issue as a souvenir on the sixtieth anniversary.

Enjoy reading!!

Thank You!!

Jesth 14, 2074 (May 28, 2017) Kathmandu, Nepal Ganesh Prasad Bhatta Director General, Surevy Department

I am glad that Survey Department is going to celebrate its Diamond Jubilee Celebration. Survey Department, as the central organization of Nepal Government for Surveying, Mapping and Geo-informatics activities, is marching ahead for the last sixty years starting initially from the Chain Survey to the present days Satellite Survey. It has achieved so many tangible results that mapping activities are expanding day by day in Nepal. I wish it could travel much more ahead in the days to come. In connection to the modern days activities, it will expand its digital dimension to meet the requirements of the reliable and accurate digital maps and data to be used for the



purpose of economic development of Nepal, especially for hydro-power generation, construction of roads and irrigation channels, rural development and formulation of smart cities etc. As everybody knows, all the related activities could not be performed only by the government organizations to meet the growing demand of the nation. In this context, I believe Survey Department will groom the private sector surveying mapping agencies and professionals which will help to meet the need of maps and charts of the nation for overall development purposes.

It is my great honour to express best wishes to the Survey Department for making the Diamond Jubilee Celebration successful. May the department flourish with the new and energetic leadership to provide mapping services on time to the nation. I wish a very successful commemoration of the event of the department.

Buddhi Narayan Shrestha (2044-2049) Former Director General, Survey Department Winner of Madan Puraskar

It is my great pleasure to make feeling on the Sixtieth anniversary of Survey Department. As long as the status of Nepal, it's matter of course and satisfaction, Survey Department is much more advancing towards Geomagnetic and conversional digital technology.

So, I take this opportunity and would like to congratulate to Director General and his personnel for their achievements and sustainability of Survey Department. Thanks!!!



Ram Naresh Singh (2049-2051) Former Director General, Survey Department

Brown woolen clad Indian plane tabler in hills and survey signals in tarai are my memories of childhood. As a consultant surveyor, DGPS survey, LiDAR survey or total station survey of small areas, surveying in cliff, cross section survey etc are normal surveying practice now. Surveying and Mapping is the foundation and basic infrastructure of national development and nation building. It includes astronomy and geodetic survey, cadastral survey and land administration, topographical and land resources survey and mapping. Survey Department has significant contribution in generation of topographical map series, resource maps, Geodetic Network,



Nationwide Cadastral Coverage and NSDI Initiatives. However, various revolutions, and earthquakes and crustal dynamic disturbed our past development efforts of surveying and mapping and present politicians have less priority on it. Meanwhile Constitution of Nepal devolves the cadastral survey in Municipal level.

I wish young surveyors who are educated and diligent will contribute new development of survey technology and assist in expediting the sustainable national development enhancing the high morality of the geomatic profession.

Punya Prasad Oli (2052-2054) Former Director General, Survey Department

I am grateful to extend my best wishes to Survey Department and the staff on its Diamond Jubilee. This is the only National Mapping Agency of Nepal that carries out the official surveying providing the most accurate and up-to-date geographic data, relied on by government, business and individuals. I feel proud to be the Director General of the Department for six years as I have associated with the Department for 30 years in my professional career. During the journey of sixty years, the Department has evolved as the leading organization of surveying, mapping and geospatial data production in the country. Nationwide coverage of



cadastral survey, topographic map series, geodetic control network, land resources maps, and various kinds of other mapping products are some of the milestone achievements of the department. These products and services offered by the department are significantly contributing in overall development and governance of the country.

On the celebration of sixtieth anniversary, I would like to unite all concerned to promote Geomatics as a synergism of various disciplines so that it becomes a part of the information management and reliable decision making process. Lastly, I express happiness over Department's achievements to the date and wish all the success in its future endeavor.

Happy Anniversary!!

Babu Ram Acharya (2055-2061)

Former Director General of Survey Department and Ex Secretary of the Government of Nepal

The sixty years of Survey Department has been a period of great upheavals in the science and technology of surveying and mapping. It was even a greater pleasure to personally witness these upheavals as an insider during the last 42 years of career in the profession. I, as a survey and mapping professional, feel proud on this diamond jubilee celebration that the evolution of geospatial science and a growth of survey department as a cadastral survey office to a national mapping agency is great achievement during the sixty years of its birth. Survey department is still in transition phase from conventional mapping to modern mapping techniques. There is a mismatch between the technology, people's demand, capacity and state priorities.



I wish survey department will try to make best possible balance during the year of Diamond jubilee celebration.

Toya Nath Baral (2061-2064) Former Director General, Survey Department

Congratulations to all the staff of Survey Department for celebration of its Diamond Jubilee. It is my great pleasure to be a part of sixtieth year programme of the department. In the journey of sixty years of department, it has achieved so many tangible results. Analyzing the previous achievements, the department should felt pride that it has laid down some bricks in the process of nation building. As our trend is such that we do not highlight the positive results rather we criticize about the negative aspects only. So, it is the right time to spread message regarding the achievements so far made by the department. Recently, the leadership of the



department is in the hand of young generation surveyor. Therefore, there is expectation that the department will move ahead with new dimension and new approach to support development activities of Nepal.

Finally, I believe that the department will launch new programmes which will benefits to the staff, stakeholders and the country. I also wish for the success of the tenure of Mr. Ganesh Prasad Bhatta, the incumbent Director General of Survey Department.

Rabin Kaji Sharma(2065-2066) Former Director General, Survey Department

It gives me immense pleasure to greet my colleagues at the Survey Department and the Surveying and Mapping community in Nepal on the Diamond Jubilee celebrations of Survey Department this year. Having joined Survey Department when it was still young and full of enthusiasm and witnessed through its growth to maturity and wisdom it is such a beautiful feeling to share. I did share a review how Survey Department developed from a cadastral survey office to a National Mapping Organization and to a hub of National Spatial Data Infrastructure in its Golden Jubilee ten years back. I have seen more development in the ten years then



after. Survey Department has made its strong technical and academic presence in the country as well in the international arena. With the state restructuring envisaged in the Constitution of Nepal, Survey Department is in a state of challenge as well an opportunity to restructure itself better.

With the experience and collective wisdom the Department has garnered, I earnestly hope that the current leadership and colleagues at Survey Department would be successful in taking forward the Department and the profession to greater heights. My best wishes and warmest greetings on the occasion of the Diamond Jubilee!!

Raja Ram Chhatkuli (2066-2068) Former Director General, Survey Department

It is indeed a matter of great joy and pride for me that Survey Department, where I spent almost all of my professional life, is celebrating its Sixtieth i.e. Diamond Jubilee Anniversary. I am attached with this institution professionally and emotionally as well. Casting a glance over the years that have gone by, I cannot but thank my seniors for their devotion and contribution to make the Institution as we have it today. I honestly would like to thank all those visionaries who dreamt, the pioneers who expanded the vision with launching new projects, all those who worked so hard all through the past sixty years for the development of Survey Department



and the future leaders and members who will continue to nurture and develop the Department into a vibrant future. When I look backwards, I very much cheerfully and respectfully recall all my senior and contemporary colleagues who excellently contributed for the foundation of Survey Department in building the basic infrastructure in the field of surveying, mapping and geo-spatial information. With this basic geo-spatial infrastructure and evolving new generation of geomatics professionals, I can confidently say that the Department will continue to maintain its excellence in its services to serve our nation as excellently as in those past days.

I extend my congratulations, felicitations and good wishes to Survey Department and all survey and geo-informatics professionals on this milestone of the history of the Department - Diamond Jubilee Celebration.

Krishna Raj B.C (2068-2069, 2072-2073)

Former Director General, Survey Department Joint Secretary, Government of Nepal

Its my immense pleasure to express some words in the sixteenth issue of Nepalese Journal on Geoinformatics on the special occasion of 60th anniversary -Diamond Jubilee of Survey Department. Survey Department, being the National Mapping Organization of the country, has been serving in the nation building with the generation of wide spectrum of Geo-information Products. Those products undoubtedly play a prominent role in the planning, policy making and infrastructure development of the country. I would like to congratulate all the Geo-spatial Professionals on this diamond Jubilee of Survey Department and i believe department will formulate new



plans and programs for generation of large scale databases and other user demand spatial data in the days to come.

Finally i wish for the grand success of the young and dynamic leadership of the department.

Nagendra Jha (2069-2071) Former Director General, Survey Department

Happy Birthday to Survey Department and a big congratulation on 60 years of contribution in the field of surveying and mapping. It is indeed a matter of great joy and pride that the department has achieved several milestones in surveying and mapping within this time period. Every milestone in the history of any institution is an occasion for looking back and looking forward. Looking back with gratitude for all that has been achieved and looking forward to accomplishment of challenging tasks ahead with the use of advance tools and techniques in Geo-spatial technologies.



On this auspicious occasion, I wish the department continues to get better with time and I look forward to the future with zeal and commitment.

Madhusudan Adhikari (2071-2072) Former Director General, Survey Department Secretary, Government of Nepal