Interview with Prof. Dr. Chandra Bahadur Joshi, Founder president and Life member of NEGAAS

Chandra Bahadur Joshi

Email: joshi.chandrab@gmail.com

Prof. Dr. Chandra Bahadur Joshi is the founder President of NEGAAS established in 1987. He completed BSc from Tribhuvan University Nepal, Master in Mechanical Engineering from Technical University of Berlin in 1975 and PhD in Hydropower from the Indian Institute of Technology, Delhi in 1992. During the year 1999-2000, he was a Fulbright Postdoctoral Scholar in Colorado State University, USA. He has specialized in the field of New and Renewable Energy through training and research in the USA, Germany, Italy, UK, The Netherlands, Thailand, China and India. He is decorated with several national and international awards. He has published several books as well as dozens of research and contemporary papers in national, regional and international journals, magazines and newspapers. Presently he is extensively involved in social services. On behalf of NEGAAS Journal Dr. Tribikram Bhattarai talked with him on his academic, professional and social experiences. The excerpt of the talk is as follows.

Prof. Joshi, Kathmandu and Nepal have changed a lot during your lifetime. Would you please tell us a little about your childhood and Kathmandu of that time?

Sure. I was born in a house standing alone in the middle of an agricultural field. There were only a few other houses nearby, all made of unburnt clay bricks. Our house was made of kiln-burnt bricks and was the only prominent one in the area. There were no roads, shops, or businesses in the area. We used small Dyangs (raised borders of fields) to get from one house to another.

When people got sick, they would go to a self-proclaimed compounder, who had no formal medical training. If his medicines didn't work, they would also to Vaidya (Ayurvedic practitioner) or a Jhankri (shaman).

We used to play in the open rice fields. During the rainy season, we had to play indoors. We used broken clay pots, small pieces of wood, stones, and pomelo as toys.

The only shop nearby was a nanglo shop , which sold basic necessities such as cigarettes, postakaris (small balls of boiled molasses and milk), coconuts, betel nuts, tilauris (sticks made of boiled molasses and white sesame), sun-dried fruit leather mixed with sugar, peppermints, candies, cheap chocolates, roasted soybeans, and roasted almonds.

Education was not very common in my area. I was only able to get an education because of a lucky coincidence. You can read more about my childhood in my book, "Nepalko Saharikaran Prakriyama Shankhamul Chhetra Hijo ra Aaja," published in 2019.

Kathmandu was a very neat, clean, and sparsely populated city when I was a child. There were very few vehicles on the streets, so children could play safely. There were no public transportation vehicles, three-wheelers, taxis, or even rickshaws. People would walk for hours to get to their offices, schools, and colleges.

Bir Hospital and Teku Hospital were the only two hospitals in Kathmandu. There were no stadiums, so there were no organized sports. The only marketplaces were New Road, Juddha Sadak, Indra Chowk, and Asan. Ratna Park, Public Theater ground, Parade ground, Military ground, and Dashrath National Stadium, Sahid Gate did not exist yet. There was only one parade ground, the Tudikhel which was one of the biggest in South Asia.

How was the educational situation of Nepal during your childhood compared to present time?

When I was a child, the educational situation in Nepal was very different from what it is today. There were only a few schools in the Kathmandu Valley, and most of them were very small. Private boarding schools did not exist, and teachers had very little training. They often taught their students in whatever way they saw fit, and some even used violence to discipline them. There was a kind of discipline among the students, but they were not involved in politics. As a result, there were no student unions. Part of the students from those schools would go to Tri-Chandra College, the only college that existed in the country to obtain higher education. University was not yet there.

Today, the educational situation in Nepal is much better. There are many more schools and colleges, and teachers are better trained. There is no longer any violence in schools, and students are involved in politics. There are now many student unions. The first University of Nepal, TribhuvanUniversity was established in 1959, and there are now several other universities in the country.

Would you please tell us in brief about your educational background before you started serving Tribhuvan University?

Before serving the university, I had already earned my bachelor's degree from Tribhuvan University and Master of Engineering from Technical University Berlin.

We know that you had received the opportunity to study in Germany under a scholarship. How did you get the scholarship? And where did you study in Germany?

I have written about my experience studying in Germany in an article titled "Twists and Turns: Journey to Germany" which was published in NEGAAS JOURNAL in 2021. In brief, I received a government scholarship to study at the Technical University of Berlin (then West Berlin). I applied for the scholarship through the Ministry of Education, and I was selected after a competitive process.

How were your impressions and feelings of Germany and German University when you entered there for the first time?

When I first saw the big German cities, their streets, houses, market areas, and people, I was overwhelmed. Everything was so new and different from what I was used to in Nepal. The buildings were taller, the streets were wider, and the people were dressed differently. I felt like I had stepped into another world.

My first visit to my university was also a shock. The campus was huge and modern, and it was nothing like the small college I had attended in Nepal. The classrooms were large and airy, and the students were free to come and go as they pleased. They would often bring drinks and snacks into class, and they would sometimes read the newspaper or take a nap during lectures. This was quite different from the strict discipline of my old school in Nepal.

My time in Germany was a transformative experience. It opened my eyes to new cultures and new ways of thinking. It also helped me to develop my independence and my self-confidence. I am grateful for the opportunity to have studied in Germany, and I will never forget my time there.

How many Nepalese had gone to Germany for studies in the university before you left for it?

I am not sure, but I think there were less than five Nepalese who went to Germany for studies before me. The two who came back home after their studies before I did are the late Dipl. Ing. Binaya Kushale and Dipl. Forester Santosh Shah, both life members of NEGAAS.

How have you felt when you started studying in Germany after getting experience of education in Nepal?

I was surprised and delighted by the freedom of learning in Germany. In Nepal, students were expected to follow a set curriculum and to learn in a very structured way. In Germany, students were given much more freedom to choose their own courses and to learn in their own way. This was a refreshing change, and it allowed me to explore my interests and to learn at my own pace.

I also enjoyed the friendly relations with the teachers in Germany. In Nepal, teachers were often seen as authority figures that were to be respected but not necessarily liked. In Germany, teachers were more like colleagues who were there to help students learn. This made it easier to ask questions and to get help when I needed it.

Overall, I had a very positive experience studying in Germany. The freedom of learning and the friendly relations with the teachers made it a very rewarding experience.

From where did you get the Doctorate degree?

I did my Ph. D. from the Institute of Technology Delhi and later Post Doctorate from Colorado State University, USA.

You completed your study in three different university education systems namely those of Nepal, Germany, and India. Would you please tell us how different they are?

The education system in Nepal is very traditional. Students are expected to attend all classes and to take notes on everything the teacher says. There is a lot of emphasis on memorization, and there are frequent tests and exams.

The education system in Germany is very different. Students are not required to attend classes, and their attendance is not tracked. The teachers come to class and deliver lectures, but it is up to the students to find the readings that cover the material. There are no in-between tests, and the only exams are at the end of the semester. The teachers are more like colleagues who are there to help students learn.

Teachers in the university where I did my Ph. D. in India were very competent. Each of them had to have at least Ph. D. degrees and not less than two years of experience to become eligible to be a teacher. I have no idea about other Indian universities. As far as the university education in Nepal is concerned, a lot of reforms has yet to be introduced to bring it to a standard level.

What were the main difficulties you faced during your stay in Germany?

I faced a few challenges while living in Germany. One of the biggest challenges was the food. I was not used to the German cuisine, and I found it to be very bland. I also missed the food from my home country.

Another challenge was racism. I experienced racism on a few occasions, and it made me feel unwelcome. I felt like I was not respected because of my skin color.

These challenges made me decide to move back to Nepal. I felt like I belonged in Nepal, and I wanted to contribute to my country and its people.

I am glad that I made the decision to move back to Nepal. I am now able to contribute to my country in a meaningful way. I am also able to enjoy the food from my home country.

Which aspects of German higher education you liked most and what you think our university education should learn from Germany?

Autonomous status of the university, competent teachers, non-interference from the party politics and freedom of learning are some of the aspects that I liked most in the German higher education system. Nepal still has to go a long way to have such an environment in the university education system.

Most of the Nepalese students being currently trained in Western countries do not return after completion of their studies. Such brain drain is a serious problem for developing countries like Nepal. But exceptionally you completed your formal education in Germany but still you came back and served here for long time. Did you ever consider staying in the glamorous environment of the West? What drove you to come back?

I was never fond of a glamorous life. I loved my country, and I loved my family. I had missed them both very much during my long stay of around ten years in Germany. I have never repented coming back to my country Nepal. I am very happy, happier than other four Nepalese of our group who stayed back in Germany.

You returned to Nepal after completing your study in Germany. Would you like to describe us how you felt as you landed in Nepal and started working here after spending long time in different cultural and working environment of Germany?

I felt very happy and relaxed when I landed in Nepal after a long time in Germany. I enjoyed every piece of work I was involved in Nepal. I tried to apply my knowledge as much as I could in every step of my life whether it was at home or in the workplace. When it did not work, I was not disappointed. I took it just as a lesson.

Please tell us more about how your German degree has helped you in your professional career in Nepal.

It gave me a kind of self-confidence and enabled me to deal with any challenge. Furthermore, it made me eligible to apply for a Ph. D. and got selected as the number one candidate.

With your own experience in both countries what would you suggest us to learn from engineering education of Germany?

Teachers should be knowledgeable and experienced in their field. Their lectures should not be limited to a few textbooks, but should also cover the practical applications of the subject matter. In fact, textbooks should not be prescribed at all. Instead, students should be encouraged to explore the subject matter on their own. They should also be given adequate opportunities to gain hands-on experience, and their work should be closely supervised. Finally, they should be required to write detailed reports on their work.

You served for long time in the engineering education in Nepal. Have you been able to apply some of your experience of Germany in the engineering education in Nepal?

The main objective of engineering education in Germany is to provide students with the knowledge and skills they need to work in the field, regardless of the situation. In Nepal, however, the main objective of teachers is to complete the syllabus as quickly as possible and to be popular with students. Students, on the other hand, are mainly focused on getting the best grades possible, even if it means cheating. They also want to complete the course as quickly as possible and get their degree.

In this environment, it is difficult to apply the knowledge and skills gained in Germany. The engineering education system in Nepal needs to be reviewed holistically in order to adopt the Western system of education. This would improve the quality of education and make students more competitive in the global job market.

Here are some specific suggestions for how the engineering education system in Nepal can be improved:

- *Teachers should be given more time to teach the material. They should also be given more freedom to design their own courses.*
- *Students should be given more opportunities to gain hands-on experience. They should also be encouraged to think critically and solve problems.*
- *The curriculum should be updated to reflect the latest advances in engineering.*
- *More research should be conducted in Nepal. This will help to develop new technologies and improve the quality of life for all Nepalis.*

I believe that these changes would make a significant difference in the engineering education system in Nepal. They would help to produce graduates who are well-qualified to work in the field and who can contribute to the development of their country.

Let me ask you something about social aspects. Which German food you liked most and which you disliked?

I know some people might find my answer hard to swallow, but I used to hate beef steaks and beef roulades. However, these became my favorite dishes later. Now, I can't even imagine offering meat to anyone, let alone eating it myself.

In the recent past German market has been internationalized and one can get almost any food ingredients there. Did you face any difficulty in getting/cooking proper Nepalese food in Germany when you were there?

At first, I couldn't cook the foods. I didn't know how to cook them or the ingredients weren't available. But over time, I learned how to cook those foods and the ingredients became more available. As a result, my cooking skills improved and the food I made became more delicious.

You might have found German's behaviors different from those of Nepalese. How different are they? Can you tell us what we Nepalese should learn from them? Is there anything you would like to convey to Germans as well?

My answer to your question may not be relevant today because it is based on my experience of Germany 45 years ago. At that time, some Germans were reluctant to talk to people from other countries, especially those who were not well-educated. However, I also met many Germans who were kind and welcoming. They were very punctual and hardworking, and they took great pride in their work. I believe that these qualities are one of the reasons why Germany has become such a prosperous country.

Nepalese, on the other hand, are generally very polite and respectful to foreigners. However, we sometimes lack punctuality and can be less than honest in our work. Many Nepalese are motivated by the desire to earn as much money as possible, even if it means working long hours or taking shortcuts.

I believe that both German and Nepali cultures have their strengths and weaknesses. It is important to learn from each other and to strive to be the best that we can be

You are the founder president of NEGAAS and seen its ups and downs. Will you please briefly tell us about its history.

NEGAAS is almost 40 years old. In the beginning, it had a very difficult time. It had very little money and was barely able to stay afloat. However, it was able to survive by organizing one or more events every year.

At one point, NEGAAS almost came to a halt. It was totally inactive and did not even hold an election for seven years. Its financial condition was in a miserable state. However, with a forced change in leadership and the cooperation of some life members, NEGAAS was able to revive itself.

Since then, NEGAAS has been making gradual progress. It is now a well-established organization. You can find more information about NEGAAS' history in the article "Three and a Half Decades of NEGAAS" published in the NEGAAS journal in 2021.

From your long-time working experience with NEGAAS what do you think in which aspect it should contribute more.

I am pleased to see that NEGAAS has been very active in recent years. However, I am concerned that our main objective has not always been the primary focus. I suggest that we take some time to review our mission statement and make sure that all of our upcoming activities are aligned with it.

Prof. Joshi, it was quite interesting to talk with you about your academic and social experiences of Germany and Nepal. This talk will be interesting to German alumni members and all readers of NEGAAS journal. I myself and from NEGAAS journal editorial team want to thank you for giving this opportunity to us. We all wish for your healthy and comfortable life also with German Gemutlichkeit.

Thank you again. Vielen Dank and Namaste.

Boundary Issue should be Resolved Diplomatically: With special analysis on Nepal India border issues

Buddhi Narayan Shrestha

Boundary is the line that separates one country, State, province, etc., from another; frontier line: the part or edge of a surface or area that forms its outer boundary. In other words, border is a real or artificial line that separates geographic areas. Boundary refers to an area surrounding an area. At the same time, a border outlines the area that a particular governing body controls. It can be viewed and treated more or less as a line of communication to be crossed back and forth as frequently as the socio-economic needs of the members of the affected local communities would require.[1]In other words, boundary and border is a synonymous terminology. However, according to the definition, boundary is the line which indicates the outermost territorial limits of State sovereignty. A border means an area which adjoins the boundary line with a variable depth between one nation (or a political division) and another.

On the other side, diplomacy is the application of intelligence and tact to the conduct of official relations between the government of independent states, extending sometimes also to their relations with vassal states; or, more briefly still, the conduct of business between states by peaceful means. At the same time, diplomacy is the management of international relations by negotiation, the method by which these relations are adjusted and managed by Ambassador and envoys, the business or art of the diplomatist, skill or address in the conduct of international intercourse and negotiations.[2]

When we think about border diplomacy, we tend to think of administrative boundaries and border management system in terms of territorial integrity. Those demarcating the boundary lines; often grown out of rivers, mountain ranges, peaks, narrow passes; govern our daily lives, and that's doubly, so if, we live in the frontier area, near to a neighbouring country or state. We know that some boundaries are in some level unnatural, having homogeneous topography. In the same way there might have some identical human behaviour, food habit and similar attire and language of both the frontier people. For example, driving around the Birganj town of Nepal and Raxaul of India makes this abundantly clear. Price of the daily consumable items and commodities may be not so different, as it can be difficult to tell which state you are in, India or Nepal, for the virgin visitors, and the small street of State Line Road does nothing to make it clearer, since there is no conspicuous and eye catching territorial demarcation on both the sides of the crossing point.

Diplomacy is highly related to the foreign policy of a country. In fact, Nepal's foreign policy uses to be shaky time and often especially when there are incidents between Nepal and India and Nepal and China. Similarly, it fluctuates in connection to the changing relation between China and India. The most important thing is that border diplomacy has not yet chalked down in Nepal's foreign policy in the context of nation's territorial integrity.

If I have to talk about the border diplomacy, it is the art and practice of conducting international boundaries negotiations between nations. It usually refers international relations through the intercession of professional diplomats and experts with regard to issues of peace-making culture

[1]Fatile, F. (2011), Management of Inter and Intra States Boundary Conflicts in Nigeria: An Empirical Approach. Pittsburgh, Pennsylvania: Dorrance Publishing Co., Inc: pp 19

[2]Diplomacy Volune-1 (2004). Edited by Jonsson, Christer and Langhorne, Richard, SAGE Publication, London: 25

through mutual understanding. In addition, border diplomacy is the employment of tact to gain strategic advantage or to find mutually acceptable solutions to a common problem in relation to the historical and authentic documents and materials which are acceptable for both sides in a congenial atmosphere. At the same time, border diplomacy is an enterprise which necessitates an untiring supply of talented individuals with facts, figures and past incidents to convey and convince neighbouring boundary and surveying experts, in one or the alternative way.

Nepal's border diplomacy consists of two facets of the same coin. One is the border demarcation diplomacy and the other face is border management diplomacy.

1. Diplomatic Aspect of Border Demarcation

According to border demarcation diplomacy, first, the border between two nations shall be demarcated in a joint working basis with equal footing. Strip maps and GIS data concerning border business should be prepared and established jointly, since border is common to both nations. Second, boundary demarcation problems shall be resolved on the basis of friendship, brotherliness, mutual respect, understanding and reciprocity. Third, border shall be demarcated on basis of old maps, documents, co-ordinates and reference materials. Fourth, if there are differences in some segments of the borderline, that shall be settled with the formation of joint technical level committee and high level joint commission with equal participation. Fifth, Track-II diplomacy should be adopted to find out the modality, ways and means to make study and research for the amicable settlement of the problems. Diplomats must prepare a solution paper on the basis of facts, figures and past incidents. They must keep in touch with the counterpart Track-II diplomats of the neighboring country to find out the solution, agreeable to both nations. Sixth, content of solution paper shall be discussed broadly on the political level and it should be passed by majority with some amendment and addition, if necessary. It shall be adopted as the 'National Border Diplomacy or Policy' of the nation. This guideline policy matter should be adopted and spoken by all political party leaders, bureaucrats and technocrats with the counterpart personnel. Seventh, Head of Government must talk to his counterpart of neighboring country, on the basis of national border diplomacy to negotiate and solve the border demarcation problems. Eighth, if there is no way out even on the level of Head of Government, the diplomatic tactics shall be taken to seek mediation diplomacy form the third country. Both the nations should be entrusted to the mediating country. Ninth, if the mediation diplomacy is not successful or entrusted, then the next step shall be to knock the door of the international institutions or organizations, such as United Nations Security Council (Cartographic/Infrastructure Division). If it doesn't work, as the tenth and the last step, the State may go to the International Court of Justice to seek judgment, on the issue of border business to protect the territorial integrity and to preserve the national sovereignty.

1.1 Nepal-India border demarcation diplomacy

It is said that 97 percent of Nepal-India border has been demarcated. 182 strip-maps have been prepared and 8,553 border pillars and markers have been established. However, there are problems in remaining 3 percent of the border line. It means nearly 38 kilometer of borderline in various spots has not yet demarcated, since there are 1,880 kilometer long border between Nepal and India. Within the spotted span of 38 kilometer, there are encroachments, disputes, claims and counter-claims in more than 71 places, having 60,662 hectares in area. The largest chunk of encroachment is the Lipulek-Kalapani-Limpiyadhura in Darchula district and its area is nearly 37,000 hectare. The second disputed/encroached area is Susta, as 14,500 hectare in Nawalparasi district. Besides, there are disputes, claims and counter-claims in other 69 places having 9,162 hectare of land. The smallest piece of encroachment is 240 square meter (Nearly half a Ropani) of land, located at Phatak of Suryodaya municipality ward-3 Pashupatinagar area in Ilam district.[3]These 3 percent (38 km) of unsettled spots should be handled as per the norms of border demarcation diplomacy, as stated in above mentioned serial number one. High level Joint Commission, consisting of Track-II diplomats and intellectuals, should be formed to settle the outstanding issues.

[3]Shrestha, Buddhi Narayan (2019 Second Edition), Simanako Gyan, Phoenix Books, Kathmandu:131

1.2 Nepal-China border demarcation diplomacy

Boundary Protocol between Nepal and China should be renewed with an interval of near about ten years interval, since the demarcation was completed and first Protocol was signed on 20 January 1963.In course of the renewal of previous Protocol, border line shall be supervised and monitored jointly and report should be prepared. At the same time, damaged and missing border pillars and markers shall be repaired and established accordingly. Side by side, new strip-maps should be prepared digitally on the basis of previous maps, adopting new technology, such as Global Positioning System (GPS) observations and establishment of Geoinformatics System (GS) data. Most important item is, India-Nepal-China Tri-junction Points (Zero Marker) must be established on both ends of the border line with equal co-operation of both India and China.

2. Diplomatic Aspect of Border Management

Border management diplomacy of Nepal should be adopted on the basis of dynamic equilibrium on both China and India. There is a quotation of the Late King Prithvi Narayan Shah the Great 'Nepal is a yam between two boulders.'[4]But the situation has been changed and it has to be re-visualized in the changing context of not only Nepal, but also changing situation of China and India as well. Now it will not be exaggerated to say that 'Nepal should be a bridge on two boulders.'

2.1 Nepal-China border management diplomacy

Nepal and China have a regulated border management system. However, Tibetans sneak illegally to Nepal. So border management should be strengthened from both the sides. In this aspect, border out-post and immigration check-post shall be established close to the border crossing points as far as possible, not to allow anti-China activity from the Nepali soil. Presently, these posts have been located ten to twenty kilometer far from the border line. For example, Lamabagar Police post at Dolakha district has been established 22 kilometer south of the border crossing-point. In fact, it should be established at Lapche Gaun. There should have a policy to increase the number of border observation post (BOP) of Armed Police Force shall be adopted, so that illegal Tibetan infiltration will be checked. It is relevant that Nepali timber, Himalayan herbs like expensive Yarsagamba of Nepal, Red Sandalwood brought from India should be checked, not to export illegally to Tibetan Autonomous Region of China, by densification and establishing BOPs close to border crossing-points.

2.2 Nepal-India border management diplomacy

At present, there is an open border system between Nepal and India. But it has not worked well in the matter of security concern of both the countries. So it should be converted into regulated system in mutual co-operation with the perspective of security issue for both nations. Policy shall be taken to regulate the border in a phase wise basis. To start to be regulated the open border, number of Armed Police Force and BOPs should be increased in the first phase. BOP should be established close to the border line, but not far from No-man's Land (Dasgaja Area). Presently, some of these posts have been located 2 to 4 kilometer towards Nepal side. In the second phase, identity card (ID Card) system should be introduced for the travelers, who cross the international border. But the frontier inhabitants, who are the residents with 5 kilometer of the border, should be permitted to cross the border many times a day. In the third phase, barbed-wire fencing should be erected on the border. But there must be 376 exit/entry crossing-points, since the length of the border line is 1,880 kilometer. It is high time to regulate Nepal-India border to obstruct cross-border terrorism, criminal activities, smuggling of counter-fit Indian currency notes. Regulated system, in the land route, may be initiated with the joint decision; as the regulated system was implemented in air-route with a joint decision, after the hijacking of Indian aircraft from Nepal in December 1999.

[4]Acharya, Baburam (BS 2061 Third Edition), Dibya-Upadesh, ShreeKrishna Acharya, Kathmandu:45

3. Border Issues to resolve diplomatically

Nepal must be very clear on the border diplomacy and boundary strategies to resolve the long outstanding chronic issues. The border diplomacy relating to Nepal-India boundary may be as follows:

1. Nepal must nourish, insist and present to India that Nepal and India are the countries which have equal rights and status in the arena of international forum, no matter how big or small the countries are.
2. Attempt should be made to make them understand the problems in the higher level of the state.
3. It has to convince India and obtain confidence from them.
4. Nepal should be enabled to create a congenial atmosphere and environment for India for a 'face saving device' in the international arena to realize the border problems, for example, the issue of Lipulek-Kalapani-Limpiyadhura.
5. Lobbying must be made through the Nepal Embassies and Diplomatic Missions abroad to exert pressure through friendly countries of the world.
6. Matured and experienced diplomatic medium should be conducted to convince India.
7. Track-II intellectuals should be mobilized to talk to their Indian counter-parts to resolve the outstanding complex border issues.
8. Root of the problems must be identified through the consultations with the concerned experts.
9. It must be identified the ways and means to solve the problems with alternative measures, which will be agreeable for both the nations.
10. After that stage, there must be dialogues and discussions among the political leaders in a manner of cordiality.
11. At the end of rigorous inter-actions, political leaders must reach into a consensus point and that will be adopted as the national border diplomacy by all.
12. If the border problems with the neighbour are not resolved mutually, problems should be briefed to the friendly countries of the world unofficially in a side line during international meetings.
13. Global pressure should be exerted to the southern neighbour of Nepal to solve the issues, through the friendly countries directly or indirectly that could pay attention by India.
14. If none of these measures work, Nepal must seek mediation through the third country.
15. If the mediation is not accepted by the India, Nepal must be ready to knock the door of the international organizations such as the United Nations (Security Council) and International Court of Justice (ICJ) for the protection of territorial integrity and sovereignty of the nation.[5]

4. Border Strategy

In connection to the complex issues like Kalapani border encroachment, what will be the border strategy to be adopted by Nepal, if India pleads as follows :

1) If India pleads that Kalapani belongs to them, what will be the strategy of Nepal ?
2) If India says that the then King Mahendra has given the area of Kalapani to India, how Nepal encounters to India?
3) In case India reiterates, China has never said that Kalapani belongs to Nepal; in this situation, what will be the answer from Nepal ?
4) If India produces a proposal: Let us make the Kalapani area as a Buffer Zone (No-man's land), what logic should be presented to India from Nepal ?
5) Alternatively, if India proposes: Let us deploy military battalions jointly at Kalapani area. What Nepal should do? Whether Nepal's answer will be 'yes' or 'no' ?
6) In the mean time, if India wanted to take the Kalapani area in a lease for one hundred years, what will be the strategy of Nepal ?
7) Ultimately, if India proposes for the mediation from third country to resolve the Kalapani issue, which country will be acceptable for Nepal and on what ground?

[5]Shrestha, Buddhi Narayan (2022), International Boundaries of Nepal, Nirala Publications, New Delhi:157

8) Finally, if India warns Nepal : If Nepal pushes the Lipulek-Kalapani-Limpiyadhura issue in the international arena, Nepal must face the worst end result. What will be the strategy of Nepal?

Nepal government must be ever ready to answer all these queries, which may be raised by India during dialogue, discussion and negotiation. Nepal must make theoretical and practical home work in an efficient manner.

5. Last item

Study shall be made to know the feeling and intention of the people of both frontiers, on the alternatives of the existing border management regime. Policy should be formulated according to their wish and need. If there are some chaos and irritants on the border, the frontier people will be the first and direct sufferer.

Policy of integrated border development project (including physical, economic and social development) in the frontier area should be formulated and implemented. Border area is a sensitive element of the nation. If there are some muddle and disturbances in border area, inhabitants of both the frontiers will be suffered directly in the very first stroke. Ultimately, it will affect the whole country. On the whole shrewd, intelligent, tactful and smart border diplomacy should be initiated to maintain the territorial integrity and sovereignty of the nation.On the background of all these factors, boundary issue should be settled through dialogue, discussion, respect each other, reciprocity, mutual understanding/negotiation diplomatically in a win-win situation, once for all, so that there will be no grudge in future.

Introduction of Author

Mr Budhi Narayan Shrestha is a well-known border researcher of Nepal. After receiving a Master in Geography degree from Tribhuvan University he joined the Land Survey Department of the Government of Nepal and he also served as Director of the Department. During his Government duty he completed various land survey related degrees and training. He also got training in Germany on Land Information Systems. During Government service he also led delegations of Nepal-India Joint Technical Level Boundary Committee and Nepal-China Boundary Committee. After retirement he concentrated in research on Nepal India border issues and also in other international Border conflicts. He travelled extensively in Nepal and abroad. He has been in 68 out of 77 districts of Nepal and in 39 countries. After extensive study in International border issues in various libraries of Nepal and abroad he has published fifteen well known books mostly on international border issues. He is also awarded with Madan Puraskar, a prestigious Book award of Nepal given to books published in Nepali language. One of his books 'International Boundaries of Nepal' has been recently published in eight different languages. He is decorated with various awards and medals in his professional career. He is a border activist and has published more than 500 popular articles, given more than 600 interviews and guest lecturers in relation to border issues and conflicts. He is a life member of Nepal German Academic Association.

Electricity Regulation in Nepal

Dr. Ram Prasad Dhital

Chairperson @ Electricity Regulatory Commission

President @ Nepal German Academy Association (NEGAAS, 2022-2024)

Background

Regulation of utilities started in the 19th century and these days, independent regulation of electric utility is considered essential for as certain in transparency and accountability in the sector. It aims to balance the divergent interest of consumers and investors ensuring that electricity infrastructure investors are rewarded with adequate return on their investment, which is often subject to high operational risks, while consumers are guaranteed with reliable, safe and quality electricity. However, the concept of independent regulation is relatively new in the South Asian region. Power sector reform began in the early 1990s, but it wasn't until the late 1990s that the region witnessed the establishment of independent sector regulators. These regulatory reforms are still ongoing with varying degrees of success. Based on the respective legislations enacting the regulators, the power and function of each regulator varies from country to country; however, a few principles are at the heart of every regulator. Promotion of competition and protection of consumer interest is the fundamental principle that every regulator strives to achieve.

The need for an independent body for regulating the electricity utilities of Nepal was realized long ago; however, it wasn't until the Electricity Regulatory Commission "Commission" came into operation in mid-2019. The Electricity Regulatory Commission Act (2017) provided the legal framework for the establishment of ERC and the ERC Rules (2018) established the foundation for the Commission to operate. The Commission holds a broad range of responsibilities including technical management, tariff determination for generation, distribution/retail and transmission, regulation of power purchase, assurance of competition and safeguarding consumer interest. Additionally, it is entrusted with ensuring organizational good governance, enhancing the organizational capacity of licensees, providing necessary suggestions and recommendations to the Government with respect to the electricity sector and resolving disputes among licensees, stakeholders and common people. It's worth noting that, unlike other regulators, ERC Nepal does not possess licensing authority.

Nepal Electricity Authority Act (1984) provides sole authority to Nepal Electricity Authority (NEA) for the generation, transmission, and distribution of electricity along with consumer tariff determination. However, Electricity Act (1992) and Regulation (1993) allow for the inclusion of private sectors in electricity generation, but NEA still remains the primary player in power purchase and construction and operation transmission and distribution networks. The Act and the Regulation also provide a legal basis for the establishment of the Electricity Tariff Fixation Commission for the determination of consumer tariffs. As NEA is the sole player for power purchase along with a monopoly in transmission and distribution, consumers cannot choose their distribution utility, limiting their options and potentially impacting service quality. Even for generation licensees, the single buyer system may pose risks as they have no bargaining power in setting terms and

conditions of sales, which are determined solely based on the buyer's requirements. Apart from technical challenges, power producers' ability to maintain good governance is crucial for investor confidence and overall sector development. In these contexts, the role of the newly established regulatory commission becomes essential in mitigating the challenges and risks associated with the lack of competition in electricity services.

To make the electricity sector more competitive, well-governed, transparent and aligned to internationally accepted technical and operational standards, the Commission is required to take some definite steps. The Commission should implement certain foundational principles in the implementation of its regulatory role. After implementation of the basic principles (a) consumers get quality and safe electricity service, (b) electricity licensee get a fair return on equity (c) consumers' rights be protected, (d) technological and non-technological parts of the electricity business be developed as per international standards, (e) tariffs be determined transparently based on cost and incentives, (f) sector be more competitive, (g) internal control system in the generation, transmission and distribution of electricity be established for good-governance, (h) disputes be resolved in accordance with national and international mechanisms.

While implementing the basic principles, the Commission may adopt different models of regulation. For example, there may be a controlled model where standards are defined by law and the regulator prescribes a penalty for every non-compliance which is deemed relevant in a centralized system of governance. Likewise, there is the self-regulation model where the licensees make their own regulation strategy or standard and maintain the same. Such a model is relevant in a more open governance system. The next model is the regulation based on the carrot and stick approach with provisions of penalty for non-compliance and incentives for conformity. Certainly, the choice of a regulatory model plays a crucial role in how the foundational principles are implemented and enforced in the electricity sector. Each model has its own advantages and challenges. Based on the governance mechanism and political context, “Regulation Based on Carrot and Stick Approach” or “Performance Based Regulatory Approach” would be appropriate for Nepal's electricity sector. This model combines both elements of enforcement and incentives to encourage compliance with standards and regulations. It involves penalties for non-compliance and rewards for conformity. The key features of this model are:

Penalties for Non-Compliance

- Establish a benchmark including a clear set of standards, rules, and regulations for the electricity sector, ensuring they are aligned with international best practices
- Define penalties (financial and operational) clearly for non-compliance with these standards.
- Proportionate penalties based on the severity of the violation

Incentives for Conformity

- Provide incentives (financial and operational) to electricity licensees for meeting or exceeding regulatory standards.
- Acknowledge and reward licensees that demonstrate innovation, efficiency improvements, and customer satisfaction.
- Establish a transparent mechanism to assess and reward licensees

Regular Monitoring and Evaluation

- Develop a robust monitoring and evaluation system to track the compliance and performance of licensees.
- Carry out regular audits and assessments to ensure that licensees adhere to established standards and regulations.
- Enhance the decision-making process by using data-driven insights to identify trends, areas of improvement, and potential issues

Public Awareness and Engagement

- Create awareness among consumers, stakeholders, and the general public about the regulatory framework and the importance of compliance.
- Foster a culture of accountability and transparency by keeping stakeholders informed about regulatory developments and outcomes.

Flexibility and Adaptation

- Periodically review and update regulatory standards to reflect technological advancements, changing market conditions, and international benchmarks.
- Maintain flexibility to adjust penalties and incentives based on the evolving needs of the sector.

By adopting this approach, the electricity sector in Nepal can strike a balance between enforcement and motivation, promoting compliance with international standards while encouraging innovation and growth. This approach should also help in building a transparent and competitive sector that benefits both consumers and investors including other stakeholders.

Challenges of Electricity Regulations in Nepal

The Commission was conceptualized to make Nepal's electricity market more competitive, determine tariffs more transparently, ensure reach of new and old operators in the electricity system, make safe and reliable supply of electricity and ensure consumers are getting standard services as per paid tariff. This, in itself, is a demanding endeavor. The Commission is faced with some other challenges owing to the dynamic nature of the sector and country's need.

Firstly, there is a challenge in facilitating the process of improving people's access to grid electricity while there is also a need to ensure that accessed electricity is of quality, safe and reliable. It is necessary to ensure proper utilization of available natural resources to guarantee Nepal becomes self-dependent in electricity generation. All these needs are urgent and properly addressing these incur significant capital expenditure. The Commission is required to ensure that these urgent needs are addressed without a significant surge in electricity prices.

There is a growing need to incorporate established and emerging practices of international markets into the Nepali electricity sector. The private sector has, for quite some time, sought a more dynamic sector with open access to electrical networks, active power trading licensees and reduced cross-subsidies. The Commission is also expected to take immediate steps to facilitate such practices. The Commission is also anticipated to accommodate the latest trends such as renewable energy integration, incorporation of distributed generation, grid scale battery storages, smart grid, etc. This is especially important in countries like Nepal where the Commission ensures a level playing field in electricity markets between distributed generations (DGs) and large-scale power generation. It also helps improve network and market access to distributed generation and electricity supply from the vast renewable energy resources in the country.

There is also a growing need to formulate regulatory instruments to ensure increased sectorial governance and growth of organizational capacity. The Commission, being a regulator, addressing the immediate needs and expectations of various stakeholders poses a great challenge. It is noteworthy that the sector has come of ages without any active regulatory intervention. Hence, it is needed that the Commission tread very carefully as any serious missteps could potentially lead to extreme situations of regulatory shock or regulatory capture.

Opportunity for Electricity Sector Regulation in Nepal

Although electricity sector regulation is challenging and if done properly, holds many opportunities. Firstly, Nepal's electricity sector is on the verge of transformation and the Commission could be vital to make the process more sustainable and beneficial. Nepal is soon expected to transition from the state of year-round deficiency to a seasonal surplus to a complete self-dependence in generation. The Commission may need to use

regulatory tools such as tariffs and other instruments to ensure that the entire nation equitably gets benefits in such a scenario. Furthermore, the Commission also has an opportunity to use tools to bring about increased domestic consumption of electricity, which will be a giant leap for a nation whose per capita electricity consumption is still below 400 units per year.

The Government has targeted to provide access to electricity for all by 2024. The Commission has an inescapable role in facilitating this process in not just accomplishing its target but also in motivating it to do so.

To ensure the reliability of supply and increased prospects of cross-border sale of Nepal's hydroelectricity, Nepal needs to open up to cross-border transmission line interconnection and electricity trade. The Commission has an opportunity to work in tandem with the Government and the utility to guarantee technical and legal prerequisites are timely put in place to ensure success in this regard. Apart from that, the Commission also has an opportunity to frame regulatory instruments to allow open access, reduce cross-subsidy among different consumer groups as well as maintain good governance of the licensees which will make the sector more competitive and safeguard consumer interest. However, many of such benefits will not be instantly achieved and shall only take shape on the long run.

Journey to Maturity

As the Commission slowly journeys towards maturity, it should move forward in a phased manner to save itself from extreme circumstances of regulatory capture or shock. It is found out that such an approach is accepted by most regulatory bodies of the region in the initial phases. The operation of the Commission can be divided into the following three stages.

The first stage is expected to be of around four to five years where current practices are unified and progressed. The Commission will also work towards strengthening its organizational structure. In this way, the primary stakeholders will accept decisions as they are done in a more guided manner through regulatory instruments. During this period, all the stakeholders must be informed about the Commission's presence, jurisdiction, prospective work plan, etc. In the second stage, new regulatory instruments are to be implemented with necessary consultation with stakeholders. At this stage of around two years, the Commission shall be established as an independent regulatory body. In the third stage, the Commission shall implement necessary instruments for the purpose of improving the electricity market and implementing competition. Similarly, the Commission shall attain the capacity to deliver suggestions to the government after strengthening capacity and resources.

By developing itself through these three stages, the Commission shall use modern technology, sectorial experts, and its structural mechanisms to discuss the current problems in the sector such as interest rates, refinancing, debt period, etc. For sustainable resolution, the Commission must coordinate with other regulatory agencies like Nepal Rastra Bank, the Securities Board of Nepal and the Insurance Board of Nepal.

Lastly, there is consensus that the nation is expected to reap greater benefits if the challenges along with the opportunities are correctly addressed and managed. The need of the hour is to upkeep recent developments in the power sector to increase the certainty of the market for Nepal's electricity, to increase professionalism among IPPs, to draft and implement regulatory instruments, to enable distribution utilities to provide reliable, accessible, standard and safe electricity services, and to foster coordination and cooperation between all the stakeholders involved in the development of the power sector.

Practicalities of Peace and Prosperity Buddhist Teachings and Modern Concepts

Sushma Bajracharya

PhD Scholar, Lumbini Buddhist University

Abstract

War and violence have become everyday reality on this planet. Many approaches and concepts have been developed and tested in order to maintain peace and stability in the world. Most of those approaches have not been very effective, as they tend to focus mainly on external aspects and not on inner peace. Without inner peace, there cannot be outer peace. Inner peace building as taught by the Buddha is the missing link that will make peace building efforts more effective. Based on review of literature, both Pali and others, this article highlights, how through leaning on Buddha's teachings those approaches could contribute more effectively and sustainably to World peace and prosperity.

Peace in its holistic meaning embraces well-being, happiness and harmony of all sentient beings. It is the goal as well as the very nature of every being. Thus peace embraces prosperity as well. Buddhist teaching envisions peace as art of living, it is the path as well as the goal and it is essentially an inner state of mind that spreads outwards to the family, society, community, and nation and to the whole world.

This paper has two major objectives:

1. It makes an attempt to demonstrate that the modern concepts of peace as being practiced today can be more effective in achieving lasting peace, if the peace is built upon the practices of inner peace as taught by the blessed one.
2. To discuss that each one of us can play an important role in research and development of peace building approaches based on Buddhist teachings and make significant contributions in peace in our country as well as the world over.

Key Words:

Peace Building; theories of peace, conflict and violence; transformation of conflict, Buddhist teachings on dependent origination

Introduction

Violence and war have become everyday reality of the world. Many nations' economy flourishes on arms trade, which has become one of the world's largest industries. According to Stockholm International Peace Research Institute (SIPRI), world's top ten arms producing countries traded arms worth 13,392 billion dollars in 2020. As wars are manifestations of human minds, peace cannot even be imagined without the transformations of those minds. The Buddha had taught this very particular aspect of transforming one's own mind continuously for 45 years after his enlightenment. He instructed all his disciples to do the same as the following verse from Dutiyā Mārapāsa Sutta, Saṃyutta Nikāya, IV (I).5[1] suggests:

Caratha bhikkhave cārikaṃ;
bahujana-hitāya bahujana-sukhāya,
lokānukampāya,
atthāya hitāya sukhāya
devamanussānaṃ.

Go your ways, oh monks, for the benefit and happiness (with peace and prosperity) of many, out of compassion for the world; for the good, benefit, and happiness of gods and men.

Defining Peace and prosperity

Peace is defined and understood in various ways depending on time and context. It is subjective and may bear different meanings to different people. For example, to a mother, whose child is sick, peace would mean that her child gets proper treatment and gets healed. Similarly, if one has severe toothache, the person may think, peace is having no toothache. For those living in the midst of a war, end of war would mean peace. These are all conditionalities of "absence of peace". This shows that people get aware of peace only in its absence. Another example is: people start talking about peace, when there is violence or war. Generally, the understanding is PEACE is "absence of violence". Merriam Webster Dictionary defines peace as a state of tranquility or quiet: such as; a) freedom from civil disturbance; b) a state of security or order within a community provided for by law or custom[2].Both the definitions embrace the PEACE in the context of the "absence of violence".

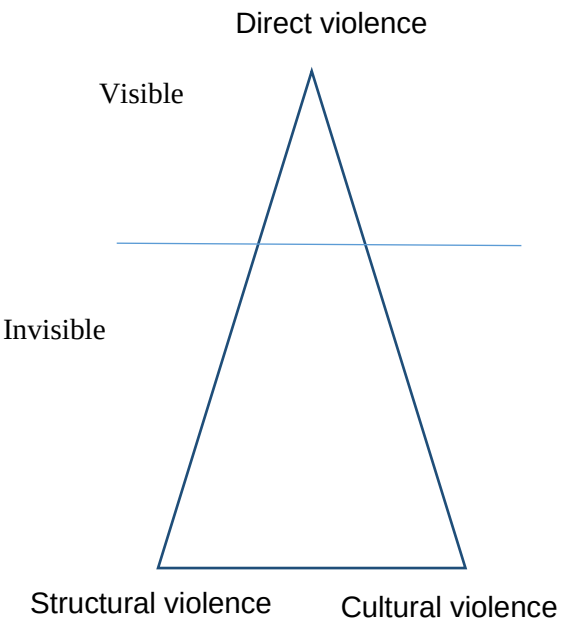
Merriam Webster Dictionary defines prosperity as the condition of being successful or thriving; *especially*: economic well-being. Prosperity is defined mainly in terms of money. Holistically, prosperity must essentially embrace happiness, harmony, physical and mental well being. That is possible only in the context of peace. Johan Galtung[3], a world renowned peace educationist and peace maker defines peace as "capacity to transform conflict positively or constructively. He further argues that peace can be learned and practiced. Lord Buddha has shown us the way of learning and practicing peace.

Theories of conflict, violence and peace

[1]https://www.vridhamma.org/node/2488
[2] Wikipedia
[3]*Anerev85 (2010-02-24), English: Johan Galtung's conflict triangle (German), retrieved 2022-06-04*

According to Theresa Der-lan Yeh[4], Buddhists believe that the Buddha (meaning "the awakened") awakened to the laws of the universe, which are said to be operating eternally, whether the Buddha discovered them or not. The most fundamental among these laws is the law of karma, or, in Buddhist terminology, dependent origination, which explains the genuine condition of things that exist in the universe. In its simplest straightforward form, dependent origination claims that anything (including sentient and insentient beings) can only exist in relation to everything else; if the causes of its existence disappear, then it ceases to exist. Nothing can exist on its own and everything is dependent on other things. Further she opines that this Buddhist way of looking at the world surprisingly in accordance with peace studies and processes. Johan Galtung, a Norwegian peace studies pioneer, in his dynamic, complex peace theory, proposes that the world is "precisely a process based on diversity in symbiotic (mutually influential) interaction." In this world of multi-leveled plurality, according to Galtung, peace is not a stable, end state but a more interactive process of a series of changing and balancing acts, an on-going dialectic between our actions and the world.

Johan Galtung[5], suggests three factors as the cause of any conflict: Attitude, Behaviour and the Contradicting context. He describes it as a triangle widely known as ABC triangle of conflict, which will be explained later. Similarly, defines three aspects of violence: Direct, Structural and Cultural as shown below:



Direct violence is when the violence become visible as people physically beaten, killed, injured and so on, that can be seen. Structural violence is the violence that is resulted from any systematic and structural unequal treatment by state authorities or discriminatory law, e.g. of individuals based on class, creed, gender, religion, language, ethnicity, geographical region and so on. When any kind of discriminatory act is generally accepted by the culture, it becomes cultural violence, e.g. if a culture accepts child marriage, or polygamy or beating wives or husbands, various forms of labour exploitation, sexual harassment or any other kind of discriminatory acts against any individuals or groups.

As shown in the diagramme, accumulated different types of invisible cultural as well as social violence leads to direct violence that is visible.

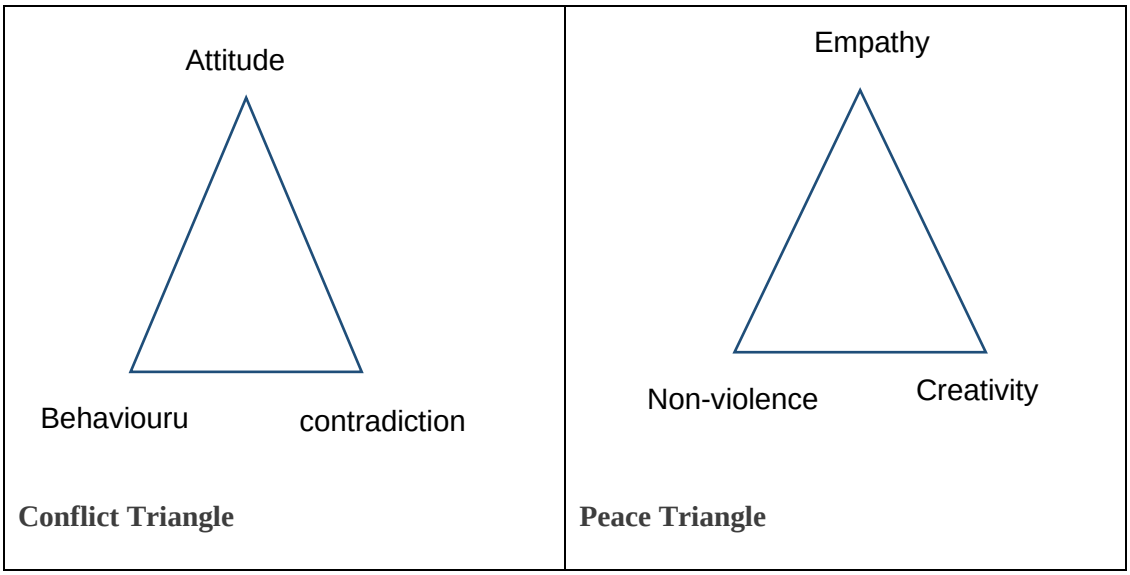
[4] *International Journal of Peace Studies, Volume 11, Number 1, Spring/Summer 2006* /The way to peace the Buddhist perspective

[5] Galtung, Johan. 1996. Peace by peaceful Means. SAGE Publications Ltd 6 Bonhill Street London EC2A 4PU

Approaches to peace and prosperity: comparing modern theories with Buddhist Teaching

As mentioned earlier, Galtung defines peace as capacity to cope with conflict and violence in a creative and constructive manner leading towards positive transformation. As shown in the above diagram, Galtung suggests that the ABC triangle of conflict can be transformed into peace triangle by transforming Attitude into Empathy, transforming behaviour into non-violent behaviour and contradiction into creativity.

Buddhist teachings provide many practices that lead towards those aspects. For example, it teaches us practice of the four immeasurable (catubrahmavihāra: Compassion, Loving Kindness, Appreciative Joy and Equanimity. True empathy comes from ardent practice of those four qualities. Similarly, The Buddha has given us five precepts, which when practiced properly, helps in cultivation of non-violent and wholesome behaviour. Buddhist texts provide enough examples for creative interventions of peace in various situations; individual, social, national and international levels.



Dr. Scilla Elworthy[6] explains her model of breaking the cycle of violence: As a result of atrocity or violence people get shock and terror, followed by fear/pain, followed by grief, then anger, then bitterness, then revenge, retaliation and atrocity repeats in cycle. She further iterates that in order to break the cycle, one must intervene at the level of anger, as it is generally expressed. She emphasizes on importance of presence of mind in doing so and also stresses that the difficult thing to do is to have presence of mind. See the diagram below:

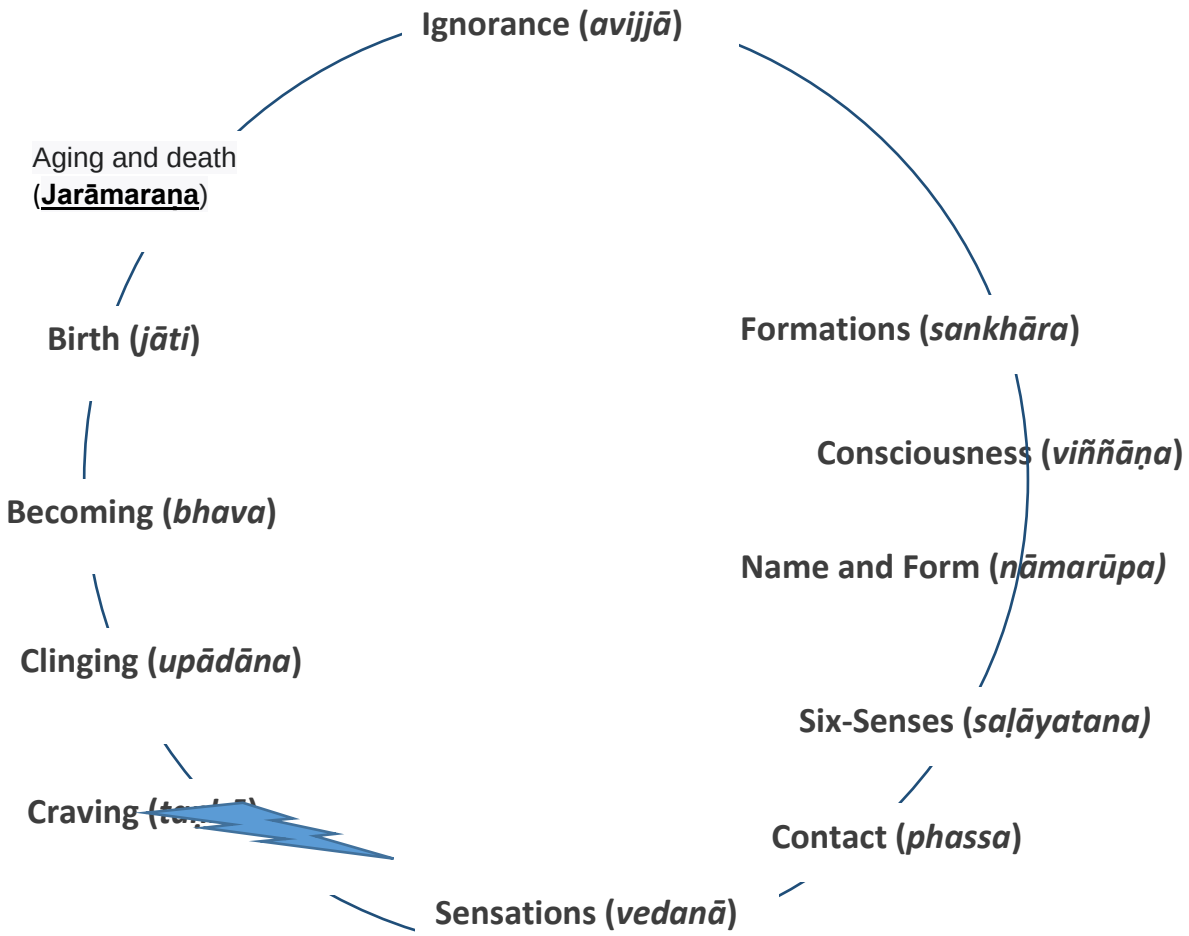
[6] https://www.globalacademy.media/scilla-elworthy-how-to-break-cycles-of-violence/

	
Cycle of violence	Breaking theviolence cycle

However, she also does mention that one has to be very mindful and it is difficult to be and mentions about importance of meditation.

Buddha's teaching on dependent origination[7]clearly mentions, how the anger can be observed at sensation level through insight meditation (see the sketch below). Insight meditation (Vipassana) teaches exactly how various emotions of hatred, anger, greed and grievances can be uprooted through observation of sensations (Vedanā) arising at the body level. By deeper contemplation on the true dhamma, one can cultivate the quality of equanimity by understanding precisely the universal law of suffering, non-selfness and impermanence, and cultivate peace of mind. People dwelling in inner peace will essentially spread peace outwards and will not cause war or violence: outer world is the essentially a reflection of the outer world.

[7]DN 15 PTS: D ii 55; Maha-nidana Sutta: The Great Causes Discourse



Conclusion

Anger, hatred, greed and grievances are the main root causes of conflict or violence that threatens peace at individual, community, national and international level. Many present day approaches to peace building have broadly recognized this. However, they have not been able to shed light on practical aspects of removing those factors. Buddhist texts provide enough resources on practicing cultivation of empathy at experiential level. The dependent origination as taught by the Buddha clearly mentions that observing the sensations and understanding the true nature of suffering, non-selfness and impermanence, one can cultivate complete peace of mind. The Buddha not only mentions about observation of the sensations, He even clearly teaches the method of Vipassana to uproot all the defilements like hatred, greed, grievances and anger from our minds. This leads to the true inner peace and equanimity. As we have discussed earlier, everything that happens is the manifestation of our minds. Equanimous minds will manifest in unconditional loving kindness for all beings. As outer world is the reflection of inner world, the person in inner peace will spread peace outwards. Where there is true peace, prosperity naturally follows.

Tipitaka, the Buddha's word teaching is full of practical teachings on peace and prosperity at individual as well as for all the beings in the universe. To prevent harm and suffering caused by disputes and conflicts among people, the Buddha teaches the six principles of cordiality (Pali: *cha dhamma saraniya*)

that would "create love and respect and conduce to cohesion, to non-dispute, to concord, and to unity"[8]The Satta Aparihāniya Dhamma[9]gives seven sets of "must do" things in order to maintain peace, prosperity and order in a nation or in a society and also for the sake of nation's security as well as welfare. According to the Kutadanta Sutta,[10] a peaceful society must develop both in terms of material development and spiritual development. In terms of material development, it suggests to apply the dhamma in the fields of economy, politics, and society. With regard to spiritual development, it teaches to practice three basic principles: Dana-Sila-Bhavana (generosity, moral conduct and meditation).

Whole life of the Buddha was PEACE and for 45 years, he taught peace, love, kindness, compassion, loving kindness and equanimity. He not only taught the theory and concepts, but He actually taught how to practice and live peace. Through determined practice of the true dhamma (which is nothing else than the true law of nature) as taught by the Buddha, one will not only attain peace and prosperity in this world, but one can actualize the highest level of peace and prosperity: the nirvana, the complete liberation. Following verses from the Dhammapada explains the importance of equanimity and encourage us to rise above the feeling of hatred, victory and defeat; only then the true peace and prosperity can be acquired.

Na hi verena verāni, sammantīdha kudācanaṃ;[11]
Averena ca sammanti, esa dhammo sanātano.

Never does hatred cease by hating in return; Only through love can hatred come to an end, this is the law eternal(The Dhammapada).

There is ample teaching in the Buddhist scriptures as to how practically one can overcome the defilements like hatred, greed and grievances through practice of Vipassana meditation and cultivation of equanimity, compassion and loving kindness.

Thus if the modern peace building approaches are based on the foundation of inner peace as taught by the Buddha, they can contribute more to the lasting peace and prosperity at all levels. Theravada Buddhist Academy can certainly play an important role in research and development of concepts and approaches to peace building aiming at lasting peace, internally as well as externally.

Bhavatu Sabba Maṃgalaṃ

May All Beings Be Happy

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- https://www.awakin.org/v2/read/view.php?tid=2175: oppressor and oppressed must be liberated: Nelson Mandela

Author's Introduction

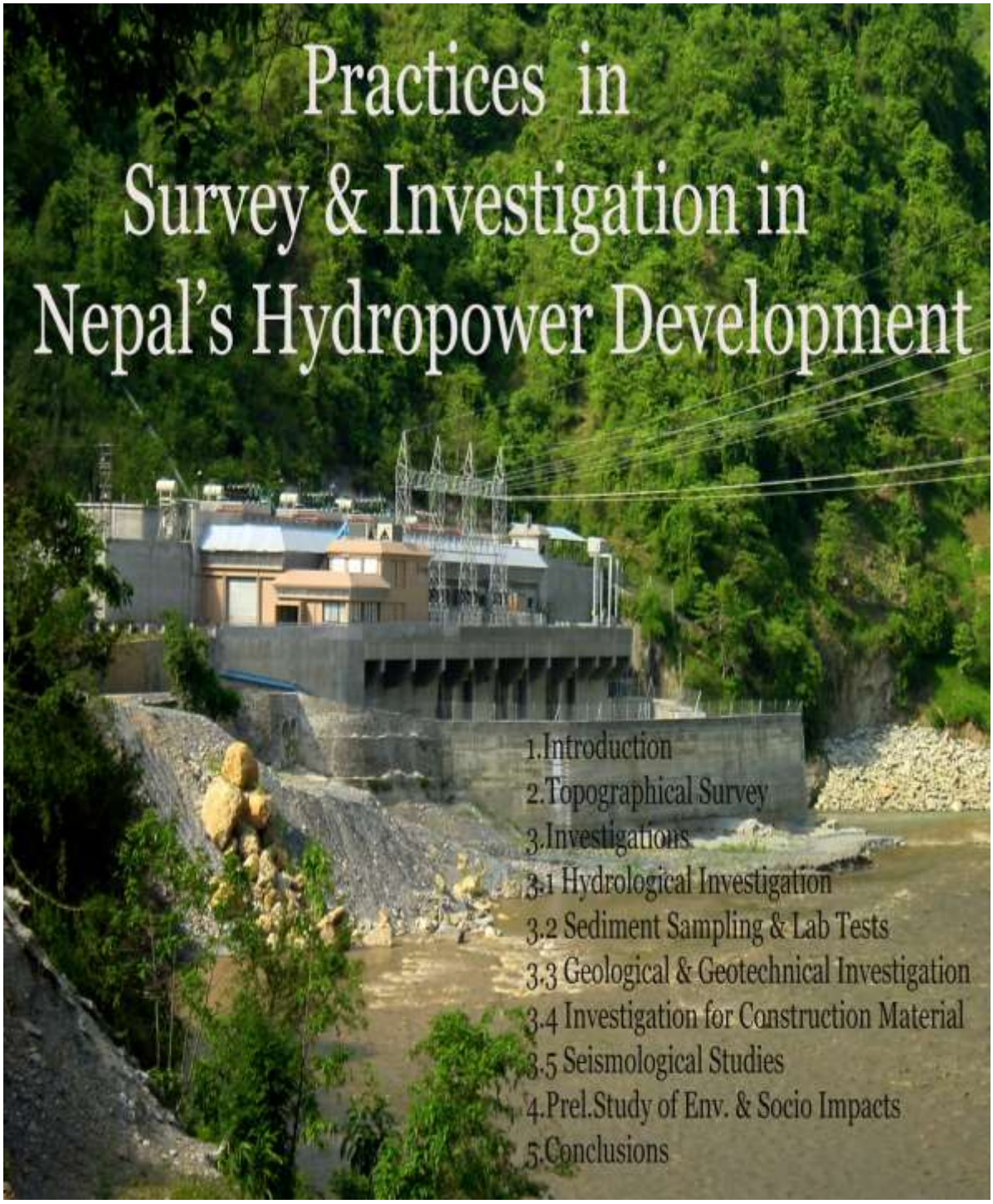
Currently a PhD scholar at Lumbini Buddhist University, holds three master's degrees:

1. *Masters in Agricultural Sciences from the University of Hohenheim, Germany*
2. *Masters in Thervada Buddhism from Lumbini Buddhist University.*
3. *Masters in Pali Buddhist Studies (Pali language) from the Lumbini Buddhist University.*

She is the recipient of Aishwarya Vidhya Padak and Tika Laxmi Padak, Gold medals for best woman student in the Board Exam of Diploma in Botany, Tribhuvan University, a recipient of Nepal Vidhya Bhusan for Topping the Lumbini Buddhist University's Master's Degree in Theravada Buddhism and had also received the DAAD Scholarship for higher studies in Germany.

She is a freelance consultant providing trainings and workshops that range from Governance, Leadership, Gender Equality, Peace Building and Conflict Management to systems like Research Based Management (RBM) and Result Based Framework.

In the course of her trainings, talk programs and workshops she has travelled and worked extensively in a number of countries, which include Nepal, Sri Lanka and East Timor, Thailand, China, Indonesia, Cambodia, Laos, India, Bangladesh. She has been continuously working as a freelance consultant for a number of NGOs and INGOs in Nepal. She is the president of LUMANTI, an NGO, working in the field of shelter and housing.


Practices in
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Practices in Survey and Investigation in Nepal's Hydropower Development

Narendra Bhupal Malla

1. Introduction

Survey and investigation are the works that will be undertaken at the very beginning of a hydropower project development. Preliminary report on the project identification can be prepared by using the available topo sheets but for detail design and bill of quantities, the field investigation and the detailed survey sheets are necessary and important. The survey sheets can be prepared in the required scale with more detailing. The project begins with the planning and mobilization of the survey team and the field visit of the Geologist team. The extent of the work and the program may vary with the stage and size of the project. For the feasibility study of a project field survey of the area for the major structures as powerhouse, headworks structures, waterways are to be done and sheets are to be prepared in required scale. Similarly, the preparation of geological mapping of the project area is the first thing to be done in Geology. Once the survey sheets and geological mapping are completed, preliminary design of the project can be started. Design, construction and cost estimation are very dependent on the quality of survey work and geological mapping.

Extent of the field survey and field investigation has been classified according to the capacity and the phase of the project to achieve an economy and timely completion to start the design.

Guidelines for study of hydropower projects 2018 have defined the scope of works for survey and investigation according to the phases of study and the capacity of the projects. The **Phases of study** of a hydropower project has been defined as below:

1. Reconnaissance Study
2. Pre-Feasibility Study
3. Techno-Economic Feasibility
4. Detail Project Report
5. Project Construction

According to the **Capacity (**according to **MW) the hydropower** projects are classified as follows:

1. Projects of Cap. less than 10 MW
2. Projects of Cap. between 10 MW and 50 MW
3. Projects of Cap. between 50 MW and100 MW
4. Projects of Cap. greater than 100 MW

According to the **Operation type** the plants are divided as below:

1. Run-off-the-River Plant (RoR)
2. Run off the River with Peaking (PRoR)
3. Reservoir Plant (Storage)

According to **usable Head** the projects are classified to:

1. Low head plant for head less than 50 meters
2. Medium head plant for head between 50 m. and 300 m
3. High head plant for head above 300 m.

2. Topographical Survey and Production of Topo Sheets

The survey means the recording the elevations of the terrain and plots them exactly in the scale to represent the terrain with contour lines connecting the points with the same elevations in the sheets.

2.1 Methods of Topo Survey

Theodolites, Tachymeters, Total station are widely used instruments for making survey sheets. **LIDAR Mapping** is widely used for the projects in which the survey sheets are to be produced for big areas and with great precision. Nowadays **DRONE Survey** is becoming more popular for survey purposes.

Survey work and production of survey sheets are particularly important in hydropower development project because the design of all project structures and the quantity calculations are entirely based on them. For any incorrectness in the mapping the quantity variations and the problems in the construction in the field will arise automatically and create problems in the project execution.

2.2 Processing Survey Data and Production of Topo-Sheets

It is the next important and basic work in Engineering of a hydropower project development. Earlier days the calculation and production of survey sheets were produced manually which takes a long time and may still contain different type of errors and inaccuracies. The mistakes or inaccuracies in topo sheets have great impact on the **Design of structures and Bill of Quantities**. Bill of Quantities is prepared based on the topo sheets. Nowadays different **Computer Programs** are available which is used to process the survey data and produce the sheets in the required Scale.

It is utmost important to conduct the Topographical Survey of the area and produce the sheets with great accuracy and detailing in required Scale.

As per **Guidelines of DoED** (Department of Electricity Development) the survey consists of the following activities for a project of 100 MW or more in feasibility study.

- Establishment of additional control points or benchmarks and determination of the coordinates of at least two benchmarks by DGPS, triangulation or any appropriate methods to tie with triangulation points of the national grid established by the Department of Survey.

- Completion the traverse survey by using coordinates of the two known benchmarks and conducts detailed topographical survey of headworks, waterways (strip survey), forebay/surge tank/surge shaft, adit portal(s), powerhouse, tailrace, and switchyard area and prepares a map with 1 m contour interval.

- The point density of detailed survey should be sufficient to cover all ground features. The survey should cover at least impounding area upstream of the dams/weir and adequate area downstream of the tailrace. The survey should cover at least 20 m in elevation above the maximum flood mark or full supply level on both the banks and at least two of the most promising alternatives should be covered in the topographical survey.

- Generation contour lines and features using aerial or satellite images or any suitable methods for inaccessible areas such as steep cliffs. The maps generated by this method should be 1:2000 scale or larger. If there is a hydropower project upstream within the backwater reach, conduct river cross section survey up to the tailrace outlet of the upstream hydropower plant.

- The topographical survey should cover quarry sites; spoil tip areas, camp sites and access roads (strip survey) inside the project area including necessary river crossings. River cross section survey should be conducted at intake and tailrace sites covering at least 500 m upstream and downstream. The interval should be 20 to 50 m or closer depending upon river morphology. The survey should be extended beyond high flood marks. The flood marks and existing water levels should be indicated in the cross sections. If there are any tributaries/gullies that could affect the project components, tributaries' cross section survey should cover the stretch within the project area. If there are major river confluences in the vicinity of the headworks and/or tailrace, the topographical survey should cover at least 500 m upstream and downstream from the confluence point in the adjacent river(s) and the main river.

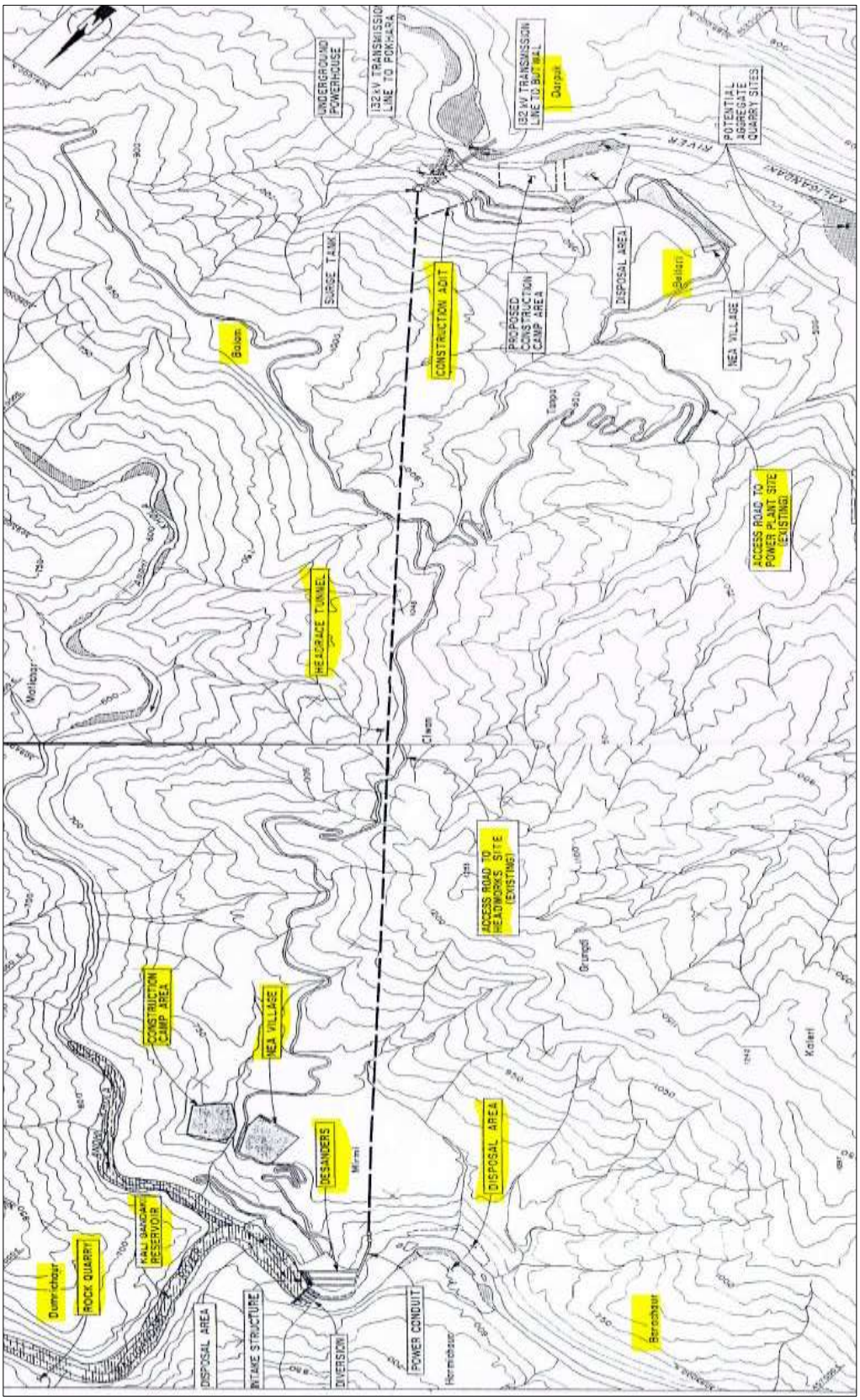


Fig.1- Topo Sheet showing the major structures of KG'A" Hydro Plant in Plan.

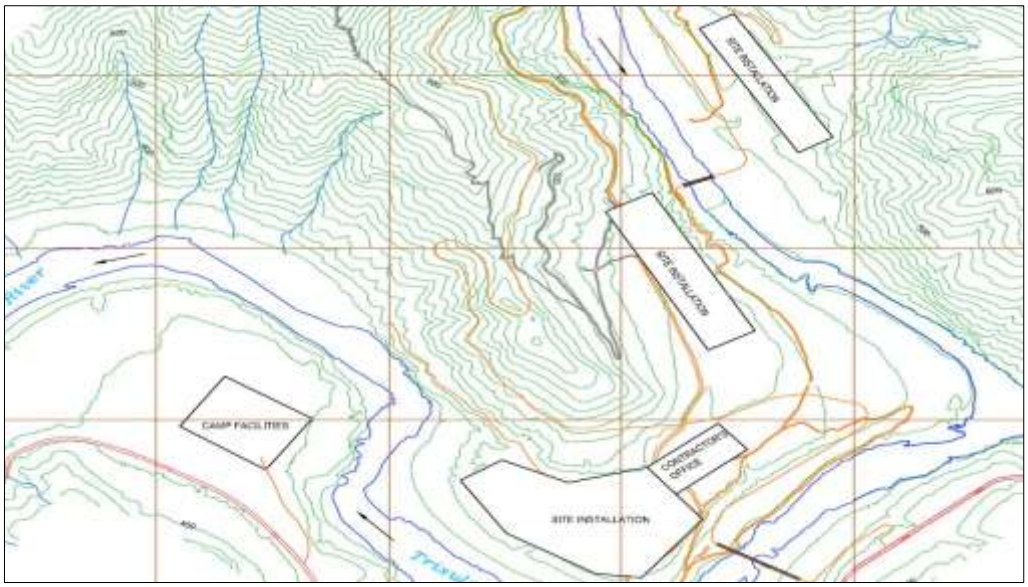


Fig.2- Topo Sheet showing the Locations of Project Infra-Structures in plan.

- Walkover survey of transmission route(s) and construction power route(s) using 1:25,000 or 1:50,000 scale topographic maps to verify suitability of the route(s) with marking the walkover points with GPS and plot these in the topographic map. For power canal/conduit, the width of strip survey should be decided considering the topography of the alignment, size of the conduit, access, and safety requirements.
- Survey of dam site area should extend up to an elevation covering top of dam plus head over crest during deign flood with sufficient free board. Reservoir area survey should cover up to an elevation of FSL with adequate free board. Locate and map river boulders larger than 2 m. For tunneling, 100 m to 400 m wide strip along the tunnel alignment in a scale of 1:2000 to 1:5000 should be considered. Similarly, conduct an additional detailing for portals and low overburden area.
- Preparation of map for project infra-structure with access road(s) 1:1000 scale with 1 m contour interval or any other required scale and details about the cross sections along bridge/culverts along the road alignment in appropriate scales. The general layout may be plotted in a smaller scale or any other required scale.
- For headworks, waterways, forebay/surge shaft/surge tank, adit portal(s), powerhouse, tailrace and switchyard areas, the contour interval should be 1m and the scale of map may vary from 1:100 to 1:2000 depending upon the size of the area.

3. Investigation

Investigation is the procedure of obtaining the information on the subject matter by applying the standard and in practice recommended methods. The development of any hydropower scheme needs information about the river flow, geological and geotechnical features of the project area as well as the environmental-social effects.

3.1 Hydrological Investigation

Hydrology is the most important feature that always ascertains the future of the scheme whether it is feasible. Hydrological investigation consists of collection data about the precipitation from Dept. of Hydrology and Metrology and stream flow measured in the field to calculate the river flow for design purposes of the hydro project. The hydrological computations give the flow discharge and floods in the stream and gives flow Duration curve to find the percent of flow for electricity development. Collection of rainfall data and measurement of the flow in the river are the major works under hydrological investigation. There are different methods in practice for the measurement of river flow. The main work in hydrological investigation consists of:

- Rainfall data: Collection of rainfall data from Department of Hydrology and Metrology (DHM)
- Strean flow data: from DHM.
- Measurement of river flow using standard methods
- Computation of flow discharges, flood frequency and flow duration curve.

a) Hydrological and Meteorological Data

Hydro-meteorological data from the hydrometric and meteorological stations located in or around the river basin has to be obtained from the DHM, GoN. In addition, another possibility is to obtain the hydro-meteorological data from hydropower or irrigation projects studied in the river basin under consideration from the Nepal Electricity Authority, DoED, Water and Energy Commission, Department of Irrigation by following the official request procedure. Hydro-meteorological data may also be available at hydropower projects under operation in the river basin.

b) Measurement of Stream Flow

Area-Velocity Method is the most popular method widely used for the measurement of discharge in the river at any location and time.

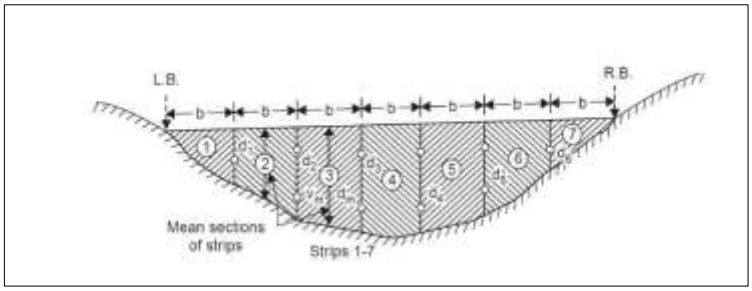


Fig. 3- Showing the Area Calculation Method

Q=A.V, A= Area in m2

Q=River Flow (m3/sec.) V=Flow Velocity (m./sec.)

It needs to measure the water depth at the location. In general staff Gauzes are fixed at the riverbanks where the water level has to be read clearly at any time. The X-Section profile at the location is made already by the Survey which gives the flow area if the water level is known.

Current Meter is widely used to measure the flow velocity of the stream at the station.

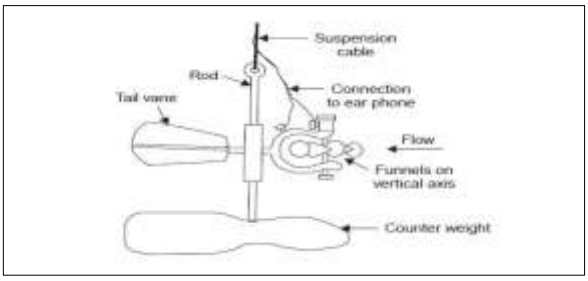


Fig.4- Current meter

Fig.5- Installation of Staff Gauze on the riverbank.

Nowadays methods using **Camera based flow measurement** are done for many projects**.** They are suitable for remote located projects which are very difficult to access for staff gauze reading installed at different locations of the stream. Another advantage is that it is free from the human error in reading the gauze.

The other popular method is **SWAT** (**Soil and Water Assessment Tool**). This is a basin-scale model integrated with GIS technology which helps improve the accuracy of simulated result of water discharge from rainfall and physical properties of the basin. In this integration, GIS supplies input data and creates graphical user interface for SWAT, while SWAT operates input data to simulate different physical processes in the basin.

In all the stages of hydropower development including the construction and operation times the recording of the flows in the river has to be continued. Staff gauze reading is done in most of the

plants. Nowadays the water levels at distinct locations are read by using the computer program like SCADA in the control room of the plant.

c)Field Visits:

Field visits must be done very frequently to see **the marks on the Riverbanks of high flood levels** at the proposed headworks site. The marks have to be transferred to the drawings to compute the floods. Information on upstream and downstream water uses and water rights shall also be collected during such visits.

3.1.1. Processing of Hydrological data

The hydrological data of the stream collected by applying different methods is processed by the senior hydrologist to create the following features of the stream.

- Diversion Flood
- Stage Discharge Curve
- Rating Curves at distinct locations
- Design Floods
- Flood Frequency

Below are given some examples of required outputs of hydrological data processing.

RETURN PERIOD (year)	DISCHARGE AT DAMSITE (cms)	DISCHARGE AT TAILRACE (cms)
2	2260	3800
5	2880	4980
10	3310	5790
20	3740	6600
50	4320	7680
100	4770	8510
200	5240	9370
500	5880	10600
1,000	6400	11500
10,000	8260	14800

Fig.6- Flood Frequency Cal

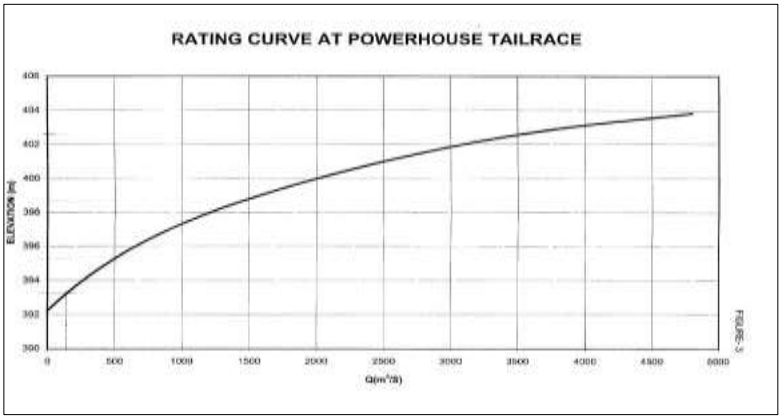
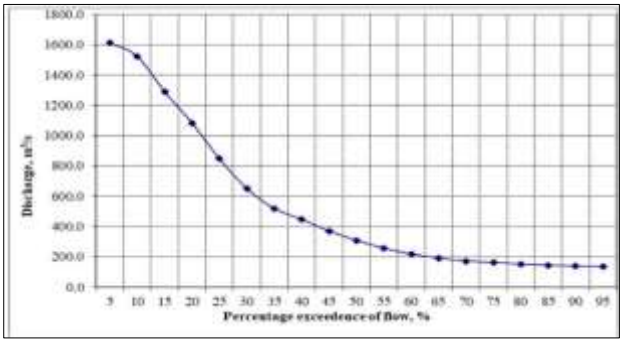


Fig.7- Rating Curve (Typical)

The stream flow data generation is a serious part of entire business. It affects the energy generation of the plant.



The calculation of water levels for different conditions is done by running the Computer Program **HEC-RAS.** The required data will be collected by conducting the **Bathometric survey** on the stream. The results of HEC-RAS Analysis will be as shown below:

Fig.8-Typical Flow Duration shown.

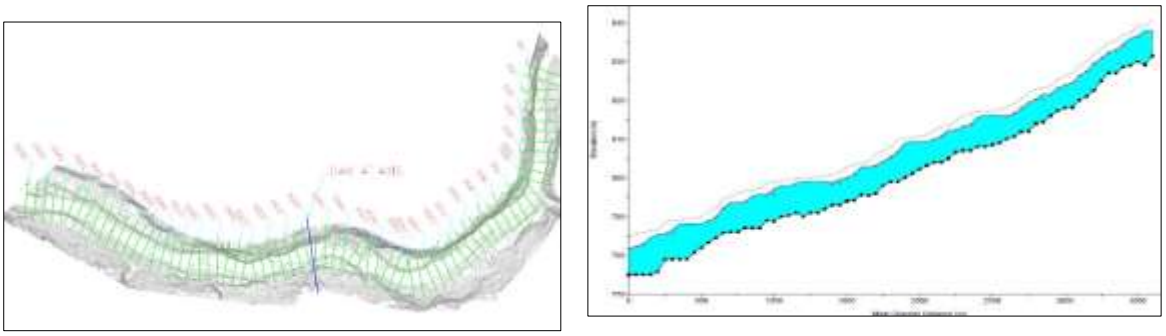


Fig.9- HEC-RAS Results

d) Impacts of Global warming

The study of the impacts of global warming on the planned hydropower project is based on the data of the stream flow measured in various times as well as the temperature. The study needs data over a certain period. The related experts predicted that in coming days the rainfall of extremely high intensity occur in a very short period and in unusual time. In Monsoon the floods may come with still greater magnitude for fleeting time and in dry season the flow may still decrease further. Similarly, the flow will bring more sediment. These all will have serious impact on the hydropower plant whether is in the construction stage or in operation.

e) Study on Glacier Lake Outburst Flood Potential

The study about the glaciers and glacial lakes outburst floods (GLOF) is very necessary to find out their impacts on the structures of the project headworks. As there is not any fixed procedure, the study is based on aerial photographs and satellite images of the catchment area and other historically recorded similar events. The prime concern is to maintain the safety of the headworks structures as well as the area and living the people there in all conditions. Potentially hazardous or unstable glacial lakes shall be identified through regular baseline monitoring of the lakes using remote sensing or geographical information systems. The information thus collected may be verified with the inventory of glacial lakes in Nepal, including those with GLOF potential, prepared by the DHM and the International Center for Integrated Mountain Development (ICIMOD).

The site visit of the concerned experts in the areas with glaciers and glacial lakes will contribute to understand their condition and will find the ways to consider their impacts in design, construction and operation. The site visit is important and necessary in the studies about GLOFs. In many projects it is found out that a greater part of the catchment area with glacial lakes lies on Tibet.

It is high time that innovative technologies are to be used in the study of glaciers and glacial lakes and their impacts on the hydropower plants.

3.2 Sediment Sampling and Lab Tests

Particularly for the storage power plants the sediment deposition is tremendously important and affects the viability of the project. Water stored in the reservoir is used for the electricity generation for required time and duration irrespective of the river flow. The reservoir volume taken by the sediment deposits cannot be simply used for electricity generation and is regarded as dead storage.

Flushing of sediment deposits and by-pass system of sediment deposits are done in some countries in reservoir plants to limit the dead storage volume, but it is not yet done in our country.

The usable live storage is the important part in the reservoir project. Only the volume of water in the usable live storage is used for electricity generation in the require hours if the plant is designed to operate for peak hours. In Monsoon most of the rivers in the country bring tremendous amount of sediment with, part of which come to the reservoir and settle there. Deposition of sediments reduce the reservoir volume which affects the usable water for electricity generation. It is very necessary to investigate and study the sedimentation process in detail using the proper methods for reservoir as well as PRoR projects in Nepal.

The method of sample collection is important for obtaining the right information about the sediments in the river. The samples are delivered to the lab for the tests on composition of the sediment.

- Collection of data about the sediments of other rivers and make a comparative study for the planned project using references.
- Collection of sediment samples during the Monsoon time by applying the right method.
- Lab tests for the mineralogic composition.

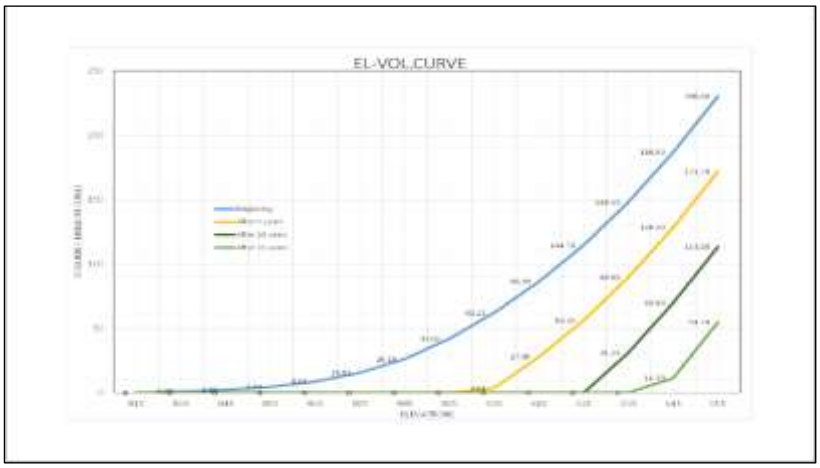


Fig.10-Sedimentation deposition Study (Typical)

3.3 Geological and Geotechnical Investigation

Design and construction of the project structures depend on the geological as well as geotechnical conditions of the project area. All investigation works in the field are conducted to obtain the maximum information about the geological and geotechnical conditions needed for design development.

Field visits, geological mapping, Seismic Refraction Test, Electrical Resistance Tomography, Core Drilling, Lab tests are the main methods used in geological investigation to be used depending on the stage of project study.

1. Geologist team's field visits
2. Geotechnical Mapping
3. Seismic Refraction Test (SRT)
4. Electrical Resistivity Tomogramy (ERT)

5. Drilling with Core Recovery
6. Test Tunnel
7. Load Test in the tunnel
8. Lab tests on samples

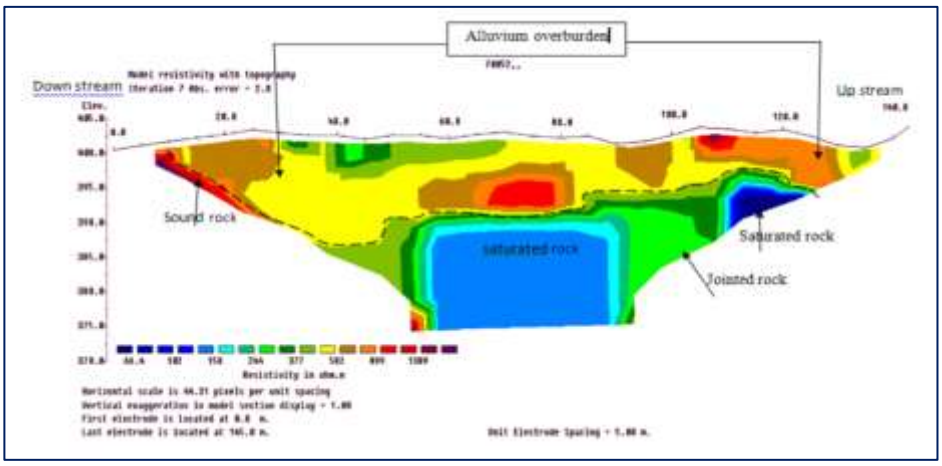


Fig.11 shows the ground profile from ERT.

Fig.12- Test tunnel in a hydropower project

3.3.1 Engineering Geological Survey

a) Surface investigations:

After ascertaining the regional geology of the area, the site-specific geological mapping is taken up by intensive surface traverses of the project area and with the aid of aerial photographs and satellite imagery, for coverage of inaccessible area comprehensively. Observations and measurements of the items such as nomenclature and classification of rock, stratigraphy and geological structure, properties of the ground are recorded and the data that is necessary for knowledge of the general geological condition is gathered.

With the field visit of the Geologist team maps are produced which show the varied materials consisting of the ground including the rock types. Soil types, slides and slide prone area, any rock outcrop and unstable areas and geological sections at the required locations showing the materials

existing in the section. Design of structures are based on the geological maps and sections prepared with the field visit.

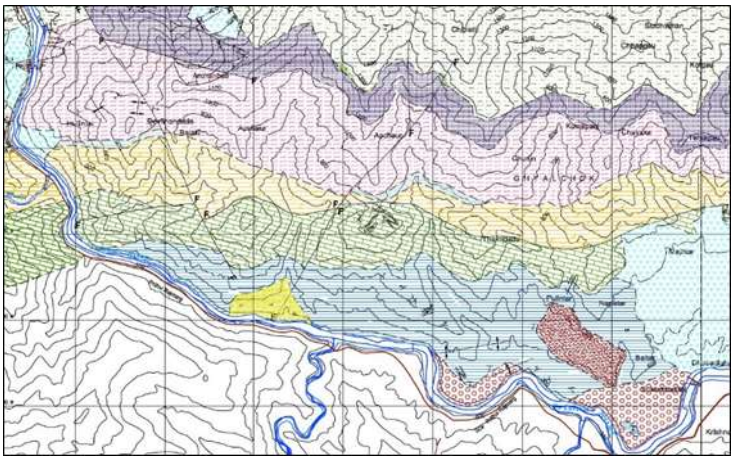


Fig.13- Geological Map (Typical Plan)

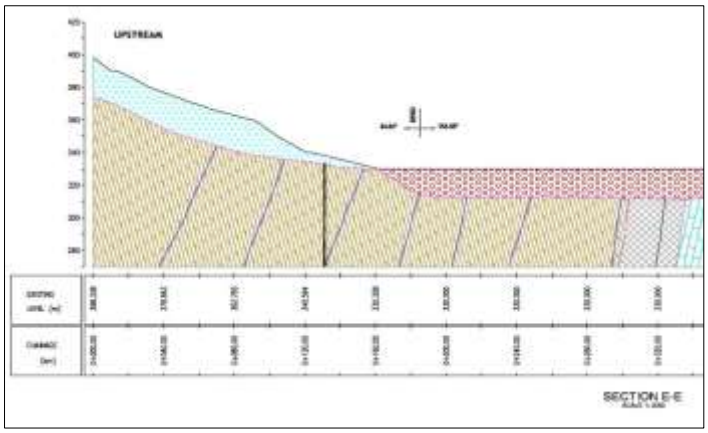


Fig.14.Typical Geological Section

b) Sub surface investigations

The direct tools include exploratory pits, trenches, drill holes, drifts, which provide detailed information of the ground under survey.

Test pits and trenches are best suited for shallow exploration on moderately steep slopes. Rotary drilling is the most extensive and common technique employed for detailed exploration to know the seismicity of the area and demarcation of the active faults in and around the project area, depending upon the sensitivity and magnitude of the project.

Drilling with hard core recovery is widely used method particularly for underground structures like tunnel, underground powerhouse, surge shaft.

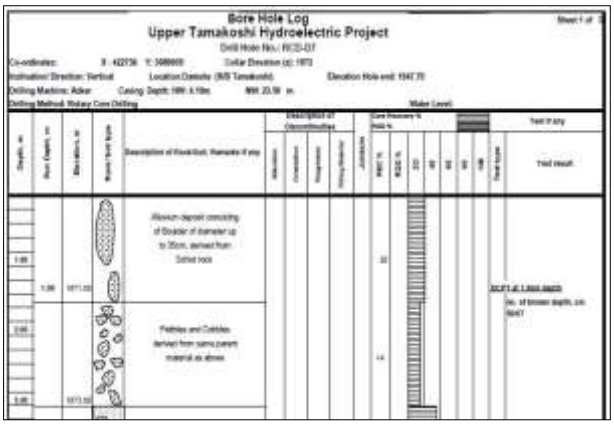


Fig.15- Drilling on the riverbank and typical Log Table for drill cores.

c) Laboratory Testing

It is conducted to evaluate the engineering properties. The tests which have to be conducted in the laboratory are as follows:

- Determination of deformability of rock materials in uniaxial compression
- Triaxial compression tests
- Determination of tensile strength
- Determination of Direct Shear Strength
- Rheologic properties of rocks

d) Field Testing

- Rock stress determination using flat jack, over coring and hydro fracturing.
- Resistivity imaging and resistivity sounding.
- Micro Earthquake (MEQ) studies.
- Vibration monitoring studies.
- Inclinometer studies.

Fig.16- shows the in-situ-Load Test in Tunnel.

3.4 Investigation for Construction Material

It is always necessary to make proper studies about the availability of the material as sand, aggregates and quarry site for aggregate production for their use in the construction work. The project will be expensive if the required construction material is not available in the project area and has to be brought from the far areas. The main work consists of the following:

- Identification and investigation of construction material sources and quarry sites for the construction materials such as impervious soils, stones, boulders, sand, and gravel as required with making excavation test pits or trenches (min. 1.5 m. * 1.5 m) and log the nature of soil at

borrow locations including photographs and collect samples for laboratory analysis. Collection of rock block/boulders samples from each quarry site for laboratory tests.

- Laboratory tests: gradation and classification, unconfined compression, absorption and specific gravity, uniaxial compressive strength, point load, Los Angeles abrasion test, sulphate soundness, slake durability test, compaction test, alkali aggregate reaction, swelling test (if necessary), aggregate crushing value, mica, and clay content.
- Estimation of available quantities at each borrow area to meet the requirement of the construction and show in the plan layout map with source areas in appropriate scale.

3.5 Seismological Studies

The Parameters for the seismic design of the structures in the hydropower project needs the study of Geology and the Geotectonic with the seismicity of the project area. The parameters are affected by the geological features as the fault in the area and the factor of safety that have to be maintained in different earthquakes like Operating Basis Earthquake, Safety Evaluation Earthquake or Maximum Design Earthquake. Normally the study should contain the following:

- Study of tectonic settings related to the project area using available literature and regional maps with review and update of the previous study and interpretation of aerial images and remote sensing studies should be critically reviewed to define the tectonic features of the project area including the neo-tectonics and active and dormant faults identified in the field visit in the project area and surrounding regions need to be assessed in terms of length of faults, their distance from the project area, return period and reoccurrence nature. Information on paleo-seismicity for earthquakes that occurred in past useful to support the instrumental and historical major seismic data should be established.
- Earthquake catalogue, especially for those historical and instrumentally recorded earthquakes, should be identified for earthquakes of magnitude 4.0 M and above. For every significant earthquake event, the location, distance, magnitude and intensity should be shown in a map in a suitable scale.
- The greatest earthquake likely to affect the construction during the lifetime or the maximum earthquake anticipated to occur in a particular period should be addressed. Attenuation law for the greatest ground motion at the site in terms of intensity or acceleration should be established in consideration of the known controlling earthquake.
- The probability of exceeding different level of intensity or acceleration of the ground in the site during a particular period of time should be expressed. Empirical laws may be applied as necessary to determine the Peak Ground Acceleration (PGA) for Maximum Design Earthquake (MDE) and Operating Basis Earthquake (OBE). Moreover, carry out Probabilistic and deterministic seismic hazard analysis to estimate the Peak Ground Acceleration (PGA) for Maximum Design Earthquake (MDE) and Operating Basis Earthquake (OBE) especially for high dams.
- Risk assessment in consideration of ground movement, dislocation and rock shattering of fault, ground creep, landslide, and rock fall due to earthquake should be considered.

4. Preliminary Study on Environment and Social Impacts

After the main project structures like dam, intake, tunnel, powerhouse, tailrace, access road and project offices with quarter are put on the maps, their impacts are to be studied. The study is done in distinct stages. The major activities for study of socio-economic impacts of the planned project may be classified as follows:

- Field visit of environmental team
- Organization of the public hearing with participation of maximum stake holder groups
- Inform about the project and all its impacts.
- Information about the land acquisition and the displacement of families
- Information about the plan of the rehabilitation and other socio-economic benefits to the displaced families from the project side
- Discussion about the impacts on natural resources

A) Environment Problems and Mitigation Programs

a. Survey on project affected people in different ways

b. Loss of Resources

- Loss of Land and other assets
- Loss of residential and built-up structures
- Loss of natural resources and annual production

c. Fishery and Aquatic Ecology:

d. Mitigation Costs

- Forest and Watershed Management.
- Watershed management including wildlife.

1. According to the Rules and Regulations, Government of Nepal it is mandatory and legally binding to prepare the report on the Environmental and Social Impacts Assessment (ESIA) study of the planned hydropower development and has to be approved by the Dept. of Environment, Ministry of Environment.
2. For projects of capacity less than or equal to 50 MW Initial Environment Examination (IEE) has to be conducted as per the procedure mentioned in guidelines. Environment Impact Assessment (EIA) has to be carried out for projects of capacity bigger than 50 MW according to the guidelines. The activities are planned and executed depending on the stage of the study of the project.

B) Scoping Document and Terms of Reference Review and Approval Process

- Publication of a 15-day Notice in a national daily by the proponent to
  a) inform concerned local organizations and individuals about the proposal in brief.
  b) define the local levels that be affected by the proposal implementation; and
  c) solicit their concerns and suggestions on the proposal.
- Preparation of the scoping document (SD) after field study and consultations/interactions with stakeholders and preparation of the terms of reference (TOR) based on the scoping document by the proponent/consultants.
- Submission of the SD and TOR by the proponent to the concerned Ministry.
- SD and TOR forwarded to Ministry of Forest and Environment (MOFE) by the concerned Ministry along with its comments/ suggestions or recommendations for approval. Formation of the EIA Report Suggestion Committee (RSC), chaired by Joint Secretary of MOFE.
- Review SD and TOR by the committee members; send a letter to the proponent for revision of SD and TOR as per suggestions of RSC; and submission of revised SD and TOR to MOFE by proponent.

- Internal decision process in MOFE regarding conditional/unconditional approval/disapproval or requirement for resubmission with modifications.
- Notification to the concerned Ministry about the conditional/unconditional Approval/disapproval.

5. Conclusion

Detail design, Bill of Quantities and the project cost calculation are based on the topo sheets and results of investigation in different areas. The possible variations in quantity and costing can be controlled by working on maps and data produced with greater accuracies. Particularly the surface works of the project is influenced by the topo sheets. The stream flow data used in the project development has enormous influence on the energy generation. It is noted that in dry season in the past the several small hydro plants needed to be shut down as the flow in the stream had gone exceptionally low which was not enough to run the unit.

In the development of a hydro power plant in Nepal the works done in the investigations for Geology and Hydrology are of immense importance to achieve right result in construction and operation. The problems encountered in the tunneling or other underground or surface works associated with the Geology may have great implications on the cost as well as the schedule. The problems may be in most cases controlled or better managed if the geotechnical conditions were already known. The uncertainties associated with the underground works can be reduced only by the proper investigation done in the feasibility or any other time. It is important that the hydro construction is completed in schedule and start the commercial generation as stipulated time.

Confirmation of the availability of discharge for the power generation is extremely important, otherwise the power plant had to be shut down if the available flow may not be adequate to run the unit. It may happen in dry season in which the flow in the river will be minimum in the year. In the period November to February the river will have low flow and in the period June to August it will be high. This is the case with the RoR plants which are affected by the seasonal variations. The electricity generation in RoR Plants is proportion to the flow in the river. In Monsoon the generation will be maximum. In dry season it is about 30 percent of their Capacities. The Hydrology represents a serious part of the whole business with hydropower plant.

The study of Environmental and Social Impact Assessment will be conducted in various stages. A separate team does it. The project report will be final only when it incorporates all the issues relating with Socio-Environment. ESIA Study will be conducted according to the guidelines of Government of Nepal. Field visit and Report preparation is very important in ESIA study.

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Fecal Sludge Management (FSM): An Intervention for Citywide Inclusive Sanitation (CWIS) in Nepal

Dr. Ganga Datta Nepal
Email: ganganepal@daad-alumni.de

Abstract

Nepal has made significant achievements in providing access to basic sanitation (toilets), culminating in the country declaring Open Defecation Free (ODF) status in September 2019. As the Multiple Indicator Cluster Survey 2019 indicates, about 89 percent of the population relies on on-site sanitation systems (septic tanks, holding tanks, and pit latrines). The sector is behind in terms of addressing the challenges of emptying onsite containment systems and ensuring that the growing amounts of fecal sludge is safely managed during transport, treatment, and disposal and/or reuse. The target of Government of Nepal's Sustainable Development Goal (SDG) 6.2 is to increase households connected to sewer systems and proper FSM from 30 percent in 2015 to 90 percent by 2030.

This includes both centralized and decentralized sewerage disposal and recognize that FSM will be the main approach to safely managed sanitation for on-site sanitation. However, there are no FSM targets for SDG 6.3, and key sector policy, strategy, budgets, and enabling documents. But FSM is visibly in federal plans, policies, and budgets and assesses the status of the service chain elements. Nepal has limited practical experience of FSM implementation to date. The FSM in Nepal mainly focus on urban centers and municipalities. Nepal produces between 2,000 to 3,000 m^3 of fecal sludge each day in urban areas (Source: USAID WASH-FIN 2021). With growing urbanization and limited programs for sewered sanitation and dependency on FSM systems to empty on-site containments, FSM is expected to grow in Nepal. While 89 percent of homes rely on on-site sanitation, FSM is in beginning stage of development in Nepal, with unregulated and haphazard disposal of untreated liquid waste, which is posing to the public health risk and ultimately livelihoods, and the environment threat.

Key Words: Sustainable, Environment, Sanitation, Sludge and Containment

1.0 Background

Nepal has made significant achievement in providing access to basic sanitation, as country declared Open Defecation Free (ODF) status in September 2019. Fecal Sludge Management (FSM) means the waste contained on-site is collected, transported, and treated. In Nepal's growing Municipalities, FSM service is limited, which is poorly run, and unregulated, also haphazard disposal of it into water bodies and land, which results significant risk to public health and the environment. To regularize FSM Nepal has prepared an Institutional and Regulatory Framework for Fecal Sludge Management in Urban Areas,[1] but in practice majority of 753 local level governments have to invest for the viable sanitation solutions. The Framework is for the clarifying the role of local government for planning and regulation.

[1] Institutional and Regulatory Framework for Fecal Sludge Management in Urban Areas of Nepal. (2017).

To cope the challenge: government started to emerge it from the federal support including the framework to start the interventions right from local level. At the policy level, FSM is implicit, and is usually in the context of wastewater management, which is related, but distinct technically and operationally. While municipalities are responsible for local sanitation services, including FSM, but the institutional, technical, management and finance capacity to plan and manage FSM services is the key barrier. From the lack of interconnected policies, regulation, standards, and associated guidelines on FSM has only discouraged action from municipalities to initiate, prioritize and invest in FSM. Urban sanitation is largely delivered by informal and unregulated private actors. They are not able to meet the demand of growing cities, and the financial and technical challenges on on-site containments. The FSM market is expected to grow toward the scope and potentiality of FSM business.

1.1 Sanitation Target and Sustainable Development Goal (SDG)

The government target for SDG 6.2 is to increase households with toilets connected to sewer systems/proper FSM to 90 percent (2030) from 30 percent (2015). "Proper FSM" is not defined however, and there is no specific SDG target for treatment of domestic wastewater; however, it targets a reduction in the proportion of untreated industrial wastewater to ten percent (2030) from 99 percent (2015). Table 3 extracts the SDG targets from the road map at inception (blanks indicate targets were not established).

Table 1: Ensure availability of sustainable management of Sanitation for all

	Target and Indicators	2015	2019	2022	2025	2030
Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations						
6.2.1	Proportion of population using safely managed sanitation services, including a handwashing facility with soap and water					
1	Households using improved sanitation facilities, which are not shared (%)	60	69.3	78.7	85.7	95
2	Proportion of population using latrine (%)	67.6	75.7	83.8	90	98
3	Sanitation coverage (%)	82	86.5	89.9	93.3	99
4	Urban households with toilets connected to sewer systems/proper FSM (%)	30	46	62	74	90
Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse						
6.3.1	Proportion of wastewater safely treated					
1	Proportion of untreated industrial wastewater (%)	99	75.3	57.5	39.7	10
6.3.2	Proportion of bodies of water with good ambient water quality	NA	NA	NA	NA	NA

Source: Nepal's Sustainable Development Goals; Status and Road Map (2016-2030) (Government of Nepal, National Planning Commission, 2017).

2.0 Opportunities for Fecal Sludge Management (FSM)

Decentralization devolution under federalism have placed the local level are the key actor for the water supply and sanitation service provision. FSM is well suited for this as it is a locally driven process requiring significantly reaching out to the respective communities and the private sector. However, the lack of clear policies, dedicated funding sources, and local capacity to act in a new service area has created uncertainty from municipalities. The Institutional and Regulatory Framework for Fecal Sludge Management in Urban Areas has clarified the role of local government and aid planning and regulation. But in practice, the majority of Nepal's 753 municipalities have yet to invest for the viable sanitation solutions. The few systems that have been implemented till date are in very limited scale and mostly non-functioned, either due to operating below capacity, technology requiring high upfront or ongoing O&M costs that are not funded, and/or inadequate capabilities to design, operate, and maintain systems. This is unfortunate as there are strong indications that with proper planning and service/business models, FSM can be less expensive and quicker to implement than sewered systems.

As a public good, market creation for FSM services requires visible public sector funding and committed leadership for the service chain to function optimally. Public funding of FSM has been poor to date, hindering expansion and growth. Public sanitation investments gravitate towards sewered infrastructure, reaching small proportions of urban areas, primarily wealthier populations. Beyond sewered areas, households are forced to cover the costs of on-site sanitation and FSM services for themselves. The limited public funding in FSM to date mainly targets the treatment component without due attention to other parts of the sanitation service chain such as containment, emptying, and transportation services, as well as the regulations and enforcement that drive demand for safely managed services.

2.1 Service Delivery and Business Models

The adoption of public center service-oriented approaches in which improved infrastructure and technology contribute to efficiency and effectiveness. It is good develop models for integrating FSM with Solid Waste Management (SWM) to customize the land, logistics, and disposal, with the preparation of specific national guidelines for recycle and reuse.

- Capacity building and awareness raise to the municipality for the proper containment system design and construction.
- Ensure service delivery including the long-term community engagement, and marketing to promote and maintain demand for improved FSM services.
- Develop viable cost recovery models to ensure a sustainable service that customers are willing to pay with own source revenues at least to cover operating expenditure (OpEx).
- Provide technical assistance to formalize emptying and transport operators and also access to finance, the capital expenditure (CapEx).
- Tracking and recording system for the emptying and transportation to optimize the logistics and discharge at treatment unit.
- Outsourcing of services from the private operators, which enhances the private sector businesses.

2.2 Treatment Disposal and Reuse

For the safe management consideration of the different international practices and knowledge is increasing. The local FSM technical knowledge specific to Nepal is being developed and the consideration of feedback between designs, operation, monitoring, and regulation are important. It is good to have benchmarking of technical design and regularize the operation and performance parameters for existing FSTPs and upcoming new construction.

- Cost comparison specific for Nepal context to evaluate the existing and planned networked sewerage, and FSM on CapEx and OpEx perspective.

- Improve design and operation considering access for safe operation and maintenance,
- Feasibility study of fecal sludge treatment plants, with excess capacity, with separation facility for fecal sludge and undergoing further treatment at FSTP.
- Standard Operating Procedures (SOP) are important essential for technical operations but also customer orientation on monitoring of performance indicator.
- Land management for the construction of FSTP for the attention of early planning and prefeasibility phase.

3.0 Enabling Environment and FSM Promotion

After flushing of your toilet, where does it go? The 11% of it is discharging the untreated wastewater, and sludge from on-site systems is 89% from home is largely dumped into water bodies or lowlands, without any treatment. It shows that the efforts have not thought for the extent of sanitation crisis and the risks to the public health, the environment. Though MICS 2019 reported that 93% of households with improved sanitation services, due to inadequate information, new information and analysis at the municipal and national levels is needed for decision making.

3.1 Regulatory Framework: Policy and Planning

Constitution of Nepal (2015) recognizes the citizen's right of access to safe water and sanitation services as laid out in Article 35. In addition, Article 30 recognizes that: (1) every person shall have the right to live in a healthy and clean environment, (2) and the victim of environment pollution and degradation shall have the right to be compensated by the pollutant as provided for by the law. These clauses are interpreted as including the management of wastewater and human waste to ensure these rights. It is the responsibility of national government to seek progress year by year on the right to access to safe water and sanitation services. The key revisions to acts and policies underway includes:

- New water supply and sanitation bill includes fecal sludge implicitly as part of wastewater management yet FSM does not appear receives inadequate attention.
- Draft water supply and sanitation policy (replacing 2004—rural water and sanitation policy and 2009—urban water and sanitation policy) underscores addressing the proper collection, treatment, and discharge of fecal sludge; and
- Draft water, sanitation and hygiene sector development plan (2016 – 2030).

3.2 Service Delivery Business Model

The regulations are the foundation of viable cost recovery business model. The efficient service delivery model of FSM is the well-established principles for septic tank design, construction and emptying regulation. This becomes more challenging in slums and unplanned settlements, where house building permits are not utilized. So, important actions need to be taken to overcome existing challenges include capacity building of municipal officials charged with building permits and designers and masons on proper septic tank design and construction; awareness campaigns on proper septic tank practices among the general public; and to these same audiences on containment improvement to name a few. To the extent to which municipalities provide the emptying service directly, or funding for private sector emptiers, there may be a need to support household level funding as improving containment will improve overall FSM throughput and efficiency of operations and business models across the service chain

3.3 Financing Mechanism

For the proper management of FSM service chain households need to cover the costs of basic sanitation services. To protect the public health and the environment, the households should pay and to be attended for the primary purposes of safely managed sanitation. The private operators emptying services and engage for other service chain, need to readiness for accessing the commercial finance. In Nepal those

FSM projects in operation, only public funding was mobilized for infrastructure development and treatment component only without due attention to improving other parts of the sanitation service chain such as containment, emptying and transportation services, regulation, and demand for services. Municipalities are getting financial constraints, which limits their ability to appropriately fund safely managed sanitation services for the population.

Other option can be coordination and collaboration with Town Development Fund (TDF), the only autonomous financial institution for urban investment at country context. TDF can provide loans for investment in basic urban infrastructure and services including sanitation infrastructure development. Also TDF encourage preparing the projects that have a relatively short payback period or a cost recovery component from revenue generation through user fees and service charges. But the COVID-19 pandemic has reinforced the essential role that safe sanitation and water services play in protecting people from disease. The key issue therefore, an urgent action by strengthening policy, institutional arrangements, regulation, financing, practices, and incentives to ensure toilets are connected to systems and services that treat and safely dispose of human waste to protect public health and prevent environmental pollution.

3.4 Public Private Partnerships (PPP) Model

For the sustainable FSM operations from municipalities, an improved FSM service system need to be established by community offering something that will run the existing service options by the informal /private operator. In Nepalese context, internal capacity to know how and financial resources is limited. To achieve full recovery to run the system good to adopt a service-oriented PPP approach in which improved infrastructure and technology are associated. Those improvements include easy access to service providers, to run the service chain with treatment and safe disposal or reuse. The private sector has flexibility, ability to innovate, and the commercial incentive to improve efficiency. It is good option for municipalities. The private sector can still prove to be an effective partner in providing fecal sludge collection and transport services, and may also have capacity to undertake treatment and production of biosolids for sale based on different contract models. Nepal has experience developing the PPPs in Solid Waste Management, and indeed the Gulariya Municipality of Bardiya district have able to integrate FSM and SWM in an existing FSTP and outsource to a private operator under a Service Level Agreement.

4.0 Conclusion

FSM is in beginning stage of development in Nepal and services in growing municipalities is poorly run, and unregulated with haphazard disposal of fecal sludge on water bodies, significant risk to public health and the environment. The Institutional and Regulatory Framework for Fecal Sludge Management (FSM) in Urban Areas was issued in 2017 to clarify the role of local government and aid planning and regulation, in practice, the majority of Nepal's 753 local governments have yet to invest in viable post open defecation free sanitation solutions. Few treatment facilities that exist were generally developed for demonstration or piloting of projects were not completed to run as a viable public service on a cost recovery basis. For the improvement of sludge treatment facilities requires expertise, information and skills. To find place / the land to construct FSTP is a major challenge in most of the municipalities. It is need of today to think for Resource recovery (RR) as an opportunity to increase revenue.

The level of interest and stated commitment to improve the enabling environment and capacity enhancement is encouraging. It is anticipated to increase the public funding and development partner initiatives to support leveraging of new sources of finance through cost recovery service and business models with private sector participation.

Crossing Continents – Nepal to Germany

Priti Regmi, PhD

Central Department of Biotechnology, Tribhuvan University, Kirtipur, Nepal
Email s: preityregmi@gmail.com

Germany, known for its rich history, diverse culture, and modern innovation, offers a unique experience for every traveler. My journey through this nation was filled with learning, personal growth, travelling, friendships, excitements and some struggles as well. I traveled to Germany primarily for academic purposes, thanks to the generous support of the DAAD scholarship. From bustling cities to serene countryside, Germany's blend of old-world charm and modern lifestyle left an impression on me. Here's a glimpse into my experience in Germany from the perspective of someone who had never been outside her home country, Nepal, before.

My First Day in Germany

On August 1st, 2019, I made my first entry into Germany, with Cologne as my initial destination to study a two months intensive German language course. As I queued at the Cologne airport arrival department, I encountered many other students from different countries. We chatted while waiting, united by our shared destination: the Carl Duisberg Center, in Cologne for our German language studies. The excitement was so high that I almost forgot the exhausting long transit at Istanbul (Turkey) the previous night. The Cologne airport was beautiful, a sight to see. A friend's friend arrived to pick her up, and I got the choice of taking a taxi or the train. She kindly offered to let me accompany her since we shared the same route until the main station, from where I would then continue on to Hahnenstraße to reach my apartment. I was impressed by the clean seats and pristine condition of the train, a public property so well-maintained. Also, the cleanliness maintained on the streets and everywhere else was quite impressive. Upon arriving at the main station, I sought guidance from passersby to reach my destination, and they were incredibly helpful. This warm welcome and the orderly public transport system left a lasting positive impression on my first day in Germany.

Settling In and Learning German

Finally, I arrived at the apartment in Cologne where I was to stay, and a resident was waiting for me. She kindly walked me through everything around the apartment before she left. She had also left some plants for me to water during my stay.

During her explanation, I asked her where I could get drinking water. She replied, "Tap water." Coming from a country where tap water always needs to be filtered or boiled before drinking, I was hesitant. However, I drank the tap water, despite my reservations. Later, I learned that tap water is safe to drink throughout Germany and much of Europe. I was amazed that this was possible and it highlighted another fascinating aspect of living there.

During my beginning days in Germany, another unique experience I encountered was the two-day weekend. In Nepal, I had only ever experienced a single day weekend—Saturday. Hence, the initial

days in Germany, the weekend felt unusually long to me. Spending Saturday was normal, but by Sunday, I was desperate to go outside or to work. To make the most of the day, I decided to take a short trip to the Rhine river area, hoping to shop and enjoy some good food and coffee. However, I was met with silent streets, occasional street musicians, and closed shops. I wondered if it was a public holiday. Walking through, I stumbled upon a coffee shop, enjoyed some cake and coffee, and further walked towards the Cologne Cathedral, a historical building with an amazing architecture. Later, I learned that in Germany, almost everything is closed on Sundays, including major supermarkets. This was quite a surprise, and it took me a few more weeks to fully adapt to this lifestyle.

For two months stay in cologne, I immersed myself in learning the German language, advancing from A1.2 to B2.1. My progress during this time was quite good according to the persons whom I interacted in German. In the language center, the support extended beyond language instruction, encompassing every aspect of an international student's initial steps in a new country, including bank account creation, visa extensions, city registration, and more. We also enjoyed recreational activities like sightseeing and museum visits.

Midway through my stay, I needed to change apartments for more than two weeks, and I moved in with a lovely lady named Gisela Ring. She was a wonderful companion who assisted me with many things and even explored nearby cities like Bonn with me. I remember how helpful she was for improving my German language on those days. These experiences combined with my German learning made my stay in Cologne incredibly enriching.

Settling into University Life

During my time in Cologne, I had the opportunity to visit my supervisor and his lab in Frankfurt. For this, I took an ICE train from Cologne. Now, it's amusing to recall that for a 7 o'clock train, I was so concerned about potential delays to occur and ended up arriving the main station far too early. That day, I realized that arriving just a few minutes early is sufficient because the trains are reliably punctual. From then on, I became adept at timing my arrivals so I wouldn't have to wait excessively or risk being late. Upon arriving Frankfurt Hauptbahnhof (main station) I took U bahn (underground) to reach Uni campus Riedberg and found N230 building, where I had an appointment with the Professor. Despite my initial nervousness, I arrived ahead of time and was warmly welcomed by my supervisors and the colleagues. We chatted for a while before I joined my future colleagues for coffee. The atmosphere was warm and inviting, and I felt a strong sense of camaraderie with my new lab mates.

On October 1st, 2019, few weeks after my first visit to Frankfurt, I officially moved to Frankfurt and began staying in a single-room apartment in the university dormitory located at Dornbush. The location was excellent with good public transport facility just 5 minutes away allowing me to reach campus in less than 25 minutes. This marked the first official day in my lab. I met the Professor, who provided me with some literature papers and, we discussed about the project and how to proceed then. Although I had limited laboratory exposure in Nepal, my new colleagues in Germany were very supportive and helped me in initial days to learn various scientific techniques and instrumentation as well. During the work life, sometimes mistakes happened but my supervisors handled any mistakes with kindness and that always made me feel motivated. I enjoyed times with my colleagues as well, we often chatted, had tea/coffee, and enjoyed lunch together, making my experience good in Germany.

My doctorate studies went full of determination as I threw myself into my work, driven by the desire to achieve results, and I was not disappointed. Along the way, I took the opportunity to attend international conferences, a highlight being the ‘PYFF8’ conference in Cork, Ireland, where I had the chance to immerse myself in the world of yeast and filamentous fungi research. Surrounded by esteemed scientists from around the globe, I couldn't help but feel a sense of pride. Coming from a

small, developing country like Nepal, being surrounded by such eminent figures in the scientific community felt grateful. The journey to Cork, shared with my colleague Sandra, was nothing short of amazing, filled with enriching experiences and invaluable connections made within the scientific community.

Exploring Historical Landmarks

Germany's history is palpable in its architecture and landmarks. During my four year long stay, I explored different cities of Germany as Berlin, Bonn, Cologne, Frankfurt, Darmstadt, Hannover, Saarland, and Mainz. Historically rich of the cities I visited was Berlin, the capital city, where history unfolds at every corner. Walking through the Brandenburg Gate, I could almost feel the weight of the past, standing as a symbol of unity and resilience. The Berlin Wall, or what's left of it, serves as a poignant reminder of division and reunification. The city is a living museum, with every street and building telling a story of a bygone era interwoven with modern vibrancy. Frankfurt became a second home to me where I spent three years and ten months of my lifetime with primary purpose to gain PhD degree. There were many moments I spent time in river side of Main watching boats, ducks and sometimes exciting festivals as well. Senckenberg nature museum, Zoo, or Palmengarten is some of the main touristic highlights of Frankfurt and I enjoyed roaming around. Easy access to public transport with buses, U- bahn, S- bahn, Straßenbahn, and having student Id card, it was easy for me to decide for short travelling within the state. The city is vibrant with many international fellows and provided with tremendous food variety as well. While mentioning food, I have to say that now I really miss the German bakery products especially cakes. This period in the country was not only academically fulfilling but also rich in personal experiences and friendships.

Navigating the Pandemic

Suddenly, the COVID-19 pandemic hit, and news of deaths and strict regulations dominated the headlines. For a few days, I couldn't go to the lab, but eventually, I resumed work while strictly following safety protocols. Being far from my family during this time was tough, but I found solace in my work and, the support of my colleagues and supervisors. Regular testing, maintaining distance, and adhering to university and public health rules were essential. Wearing a mask for whole day long became a routine for everyone; although it was sometimes annoying, especially in the summer. However, it was crucial to follow the rules so we could all fight against the pandemic. During this time, I realized how unpredictable life is and the importance of living it to the fullest with what we have, because we never know what tomorrow will bring. Be grateful for whatever we are given with, and to never hesitate taking chances and explore the path we desire.

The Final Stretch: Dissertation

After months of rigorous research and meticulous writing, the day finally arrived for me to submit my thesis. Throughout this journey, I found inspiration in various nooks of my surroundings – from the quiet solitude of my room's table and chair to the bustling atmosphere of the common lobby downstairs, these were my favorite spots for writing and that lasted for few months. Even my office desk and, during lazier moments, my bed, became sanctuaries for my thoughts to flourish.

The day of submission marked the beginning of a nerve-wracking countdown to my defense. As I fine-tuned my presentation and rehearsed tirelessly, the anticipation of the upcoming disputation brought forth a whirlwind of emotions – from anxious nerves to exhilarating excitement. On July 11th, 2023, surrounded by supportive colleagues and with my dear friend Sima Bhattarai, who traveled all the way from Berlin to support me there, I embarked on the journey of my defense. Finally, as the examiners declared my successful disputation, tears of relief and elation streamed down my cheeks. The sense of accomplishment and fulfillment that followed was extraordinary– a testament to the years of hard work and dedication. For preparing journey to thesis defence, I

remember the kind support of my doctorate advisors for their valuable comments and discussions. Together, we celebrated with cake and drinks making the day memorable for lifetime.

In the days that followed, I savored the tranquility of relaxation and the satisfaction of this goal achieved. With gratitude in my heart and pride in my accomplishments, I eagerly awaited my return to Nepal. As I embarked on my journey back to Nepal, leaving Germany behind, I couldn't help but feel a wave of emotion wash over me. Saying goodbye to the many wonderful people I had met in my lab and the friends I had made outside of it was bittersweet. Yet, amidst the goodbyes, there was also a glimmer of hope, knowing that the friendships forged would endure despite the distance. Finally, on September 9th, I landed at Tribhuvan International Airport, Nepal where the warm embrace of my family awaited me eagerly, marking the beginning of a new chapter enriched by the experiences of my time in Germany.

In summary, my time in Germany was a blend of academic growth, cultural immersion, and personal development. From learning the language to navigating a pandemic in a foreign country, every moment was a step towards greater independence and resilience.

Author's Introduction

Dr. Priti Regmi is working as an Assistant Professor at the Central Department of Biotechnology, Tribhuvan University, Nepal, since 2017. She earned Bachelor's degree in Chemistry from Prithvi Narayan Campus, Tribhuvan University, and Master's degree in Biotechnology from the Central Department of Biotechnology, Tribhuvan University. In 2023, She completed her PhD at Goethe University, Frankfurt am Main, Germany, funded by the DAAD scholarship (2019-2023). Her research expertise lies in molecular biology and the genetic engineering of yeast, with a focus on developing innovative solutions and enhancing our understanding of yeast biochemistry and physiology, particularly towards the production of valuable compounds.

King Birendra and His Peace Zone Proposal

Surendra Dhakal
Past President
Nepal German Academic Association

While addressing the high level guests of 60 nations from all over the world participating in his coronation ceremony in 1977, King Birendra proposed Nepal to be declared a Zone of Peace. Delegation of Soviet Union endorsed the proposal then and there but later withdrew following the Indian pressure. Thus People's Republic of China became the first country to endorse the proposal formally. In course of time 116 countries including USA, France, United Kingdom, Japan and Germany endorsed this proposal formally. Why India did not endorse this proposal? To find the answer of this very question, one has to know well as to why King Birendra forwarded a proposal as such. The decade of 1970 was a period of uncertainty and insecurity generally for South Asia as whole and particularly for Nepal. India under Prime Minister Indira Gandhi signed a security pact with the then Soviet Union- one of the two Super Powers – in August 1971 to recover its defeated image during Sino-Indian war of 1962. As backed by this Treaty, India disintegrated Pakistan through a war and emergence of East Pakistan as independent Bangladesh took place. And after 4 years in April 1975, India annexed independent Sikkim into Indian Union by force. It was that same year Birendra became the King of Nepal and was very anxious about the political development taking place in South Asia as a result of continuous hegemonic behavior of India. He was anxious also because the People Republic of China under Chairman Mao and USA under President Nixon could do nothing to save Pakistan from disintegration and Sikkim from annexation. India after those two successful hegemonic actions was designing to deal with Nepal in a same way it did with Sikkim. King Birendra by understanding well all such developments taking place in South Asia thought it is wise to give somehow a counter to Indian hegemonic tendency internationally. It was the reason he proposed Nepal be declared a zone of peace before the international high level community gathered in his palace for his coronation. India pursued Soviet Union to withdraw and did never endorse that proposal saying formally that the proposal was a tool to give continuity to King's autocratic Panchayat Regime in Nepal. Moreover, India incited banned Nepalese political parties to fight against so called Royal autocracy. Then King Birendra declared in May 1980 a Referendum and granted Nepalese People a right to choose either the same Panchayat System with timely reform or a Multi-Party Democracy. As the result of referendum went in Panchayat's side, India became more aggressive towards Nepalese Court (Durbar) and continued destabilize Nepal's internal politics. Its intention was to throw somehow the Peace Zone Proposal in

dustbin by mobilizing Nepal's internal political forces. It took another ten years of time and in 1990, India became successful to cause to fall Panchayat System, restore Multi-party System and to declare null and void King Birendra's Zone of Peace Proposal. After the restoration of Multi-party system in Nepal in 1990, India chose demographic way of invasion to annex Nepal into India and lobbied for easy Nepalese citizenship for 10 million Indians living in Nepal. King Birendra never endorsed the Citizenship Bill as such forwarded by the then Nepalese parliament rather diverted it one after another to Supreme Court of Nepal to test the legal validity thereof. Then Indian regime became more aggressive and followed two different ways to do away with Nepalese monarchy. On the one hand, it hatched a plot of mass massacre of Birendra's family and nurtured on the other Maoist's people's movement for establishing a republican system in Nepal. As in both front India became successful, the republican government of Nepal issued Nepali citizenship in the first phase to 6 million Indians living in Nepal and in Indian villages of Nepal India boarder. Now, the puppet government of Nepal with its new Citizenship Act is again granting Nepalese Citizenship to more 4 million Indian populace and descendants of previous 6 million already having had Nepalese citizenship. Thus, Nepal is gradually losing its face as an independent country as a result of Indian demographic invasion. To save Nepal from this very danger situation, all the patriots should be united to revive Peace Zone Proposal of King Birendra and declare null and void all the citizenship certificates issued to Indian since 1990.