

# Technical Deficiencies and Human Factors in Land Disputes: in the Context of Nepalese Cadastral Surveying

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## Abstract

*Systematic Cadastral Surveying, in Nepal, was initiated in 1964 to support the Land Reform Programme launched by His Majesty's Government of Nepal. Survey Department looks after these activities from the beginning. The activities are still in practice. The Cadastral Surveying (CS) is the foundation of land administration/management activities in Nepal. Inaccuracies and ineffectiveness in CS activities are the reasons for some of the cases of land disputes that exist in the Nepalese society. The reasons of inaccuracies and ineffectiveness in these activities have been considered in two broader perspectives: technical deficiencies and human factors. The paper is based on a research entitled "Identification of Technical Deficiencies and Human Factors in Land Disputes: in the Context of Nepalese Cadastral Surveying", which is mainly based on the studies of some of the cases of land disputes, interaction programmes with professionals and field observations, with the focus on identification of technical deficiencies and involvement of human being in various perspectives in the CS activities. Some reasons of possible land disputes because of the CS have been pointed out. SWOT Analysis was performed during the research work to develop guidelines for improvement in the accuracies and effectiveness of the CS activities in the line to mitigate land disputes. Some recommendations have been put forwarded to Survey Department in this regard.*

## Background

Major part of the national economy of Nepal depends upon agriculture. Land is the most important asset for Nepalese people. Nepal is a land locked country and about eighty percent of its geography occupies hilly and mountainous areas. The fertility of land and accessibility

of transportation in these areas is negligibly low. As a result, most of the people are migrating towards the urban and plane areas. The trend of migration is very high in recent days. Consequently, the value of land in the urban and plane areas of the country is considerably increasing day by day. Every centimeter of land in these areas is precious and the value is constantly increasing. Landowners are, therefore, seriously concerned over the boundaries of land they own. As a result, various kinds of land disputes exist in Nepalese society. Unfortunately, some of them are due to inaccuracies and ineffectiveness in cadastral surveying activities. Broadly speaking, activities of Cadastral Surveying mostly depend upon the technology used and human resources involved. With this consideration, it can be assumed that the role of technology and human factor is influential in maintaining accuracy and effectiveness in cadastral surveying activities.

## An overview of Nepalese Cadastral Surveying

The Nepalese Cadastral Surveying is basically conducted to prepare land records including ownership over a piece of land, the classification of land and area of land. The system of cadastral surveying was in practice for a long time in one way or another. However, Systematic Cadastral Surveying was started only in 1964 with the unveiling of Land Reform Programme in the country by His Majesty's Government of Nepal.

The Land Reform Programme imposed ceilings on land holding and hence the accurate record of area of every parcel of land was important. This step necessitated the beginning of Systematic Cadastral Surveying in the Kingdom. As cadastral maps were prepared during the cadastral surveying, it was made one of the essential

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components for the registration of ownership over individual parcel. Since then, every parcel of land requires its plan to some scale with its dimension to be registered under the ownership of an owner [2].

The cadastral surveying of whole the country was completed in 1997 leaving some dense areas, as village blocks, and government and public lands lying beyond the cultivated and residential area. In the mean time, several commissions constituted at different times by HMG/Nepal for distributing lands to landless people and establishing new settlements surveyed the public lands. Various inconsistencies and incompleteness in documentation in the surveys conducted by these commissions were realized. Considering the incompleteness and various inferiorities, in terms of technology and resources, in the first round survey, cadastral resurveying was initiated formally in 1994, and is under progress at different 13 districts of the kingdom, one of which has been recently completed. However, it was also held in Kathmandu district in late 1970's for some reason.

Survey Department, the National Mapping Organization of the Kingdom of Nepal, under the Ministry of Land Reform and Management is responsible for carrying out cadastral surveying in Nepal. The department conducts these activities through two types of district level offices: Survey Parties (*Napi Goshwaras*) and Survey Offices. Survey Parties prepare original maps and documents related to ownership over a piece of land along with its class. Survey Offices technically support the land administration and management activities within a district. Updating the cadastral information on maps and records is the major responsibility of these offices. Plane Table Survey Method is still in use for cadastral surveying in Nepal.

### **Role of Nepalese Cadastral Surveying in Land Administration activities**

District level Survey Offices and District Land Revenue Offices are established in the district to carryout land administration activities. Although both the offices are under the same ministry, Ministry of Land Reform and Management, they have different institutional status in the district. Land administration activities are based on Cadastral maps and documents prepared by Survey Parties, which are authentic documents in this regard. Cadastral map is essential for transfer of ownership on a land parcel. All

the disputes related to ownership over a piece of land are resolved on the basis of maps and other documents. Even courts refer these maps and documents for taking judicial decisions for the cases of land disputes. Thus, cadastral surveying plays a significant role in land administration activities and hence it is a matter of public interest.

If we assess the institutional mechanism of land administration, technology adopted in cadastral surveying, political awareness about the essence of cadastre, and other various factors with the FIG Agenda of Cadastre 2014 it is out of reach for Nepalese context.

### **Cases of Land Disputes**

In this paper 'land dispute' has been considered as the cases of disagreement or clashes between/among landowners regarding the ownership over land parcel caused because of cadastral surveying. It further addresses the cases of problems faced by landowners or cadastral surveying authorities both, the reason behind which remains the cadastral surveying activities.

Various kinds of land disputes exist in Nepalese society. As the cadastral surveying prepares fundamental base (maps and documents) for land administration, its effectiveness certainly depends upon the accuracy and quality of cadastral surveying. Land disputes come to the front during land administration activities such as transfer of ownership, demarcation of parcel owned, etc. Deficiencies in cadastral surveying are some of the causes behind land disputes. Some categories of land disputes identified:

- a) Improper demarcation of parcel boundary on the ground.
- b) Errors in trace copy of original cadastral maps and wear and tear of documents.
- c) Errors in file maps prepared in larger scale from original maps.
- d) Displacement in the location of features, natural as well as cultural, with respect to existing maps.
- e) Implications due to impractical legal provisions.
- f) Inaccurate representation of reality at the margins of island maps.
- g) Problems with ownership in the land distributed by special commissions.
- h) Wrong survey of reality.

- i) Wrong marking of parcel subdivision on cadastral map.
- j) Wrong interpretation of the agreement mentioned on the deed document prepared at the time of transaction
- k) Encroachment of public lands.
- l) Transfer of ownership over public land by local authority beyond the legal provision.
- m) Mismatching of existing maps with new maps prepared by cadastral resurveying.
- n) Lack of proper coordination between the District Land Revenue Office and Survey Party/Office.
- o) Mistakes in documentations during cadastral surveying.
- n) Lack of incentives to the land surveyors deputed for fieldwork.
- o) Lack of necessary infrastructure and stationeries at the field office.
- p) Independent check of fieldwork is either very limited or lacking.
- q) Inaccuracy in control points established for surveying.
- r) Lack of ethics and follow of professional code of conduct in the land surveyors and other official involving with cadastral surveying activities
- s) Inaccuracy in surveying and mapping.
- t) Unintentional mistakes in distance measurement using chain/tapes.
- u) Carelessness in mapping and documentations of land distributed by special commissions.
- v) Misinterpretation or misunderstanding of legal provisions
- w) Lack of necessary technical knowledge to the land surveyor.
- x) Easy access of unauthorized persons to the cadastral maps and documents at Survey Offices.

### Reasons of Possible Land Disputes

Studying the cases of land disputes, some of the reasons of possible land disputes can be categorized as following :

- a) Distribution of land by the government without providing ownership certificate.
- b) Use of more than one duplicate copy of cadastral maps for cadastral information updating.
- c) Improper adjudication of land parcel and/or inaccurate record of land area on the documents during cadastral surveying.
- d) Negligible presence of landowners at the time of surveying their land parcel.
- e) Unawareness of landowner with cadastral surveying activities and its impact in future.
- f) Unnoticeable shift in the orientation of plane table during surveying.
- g) Lacking of standardization and quality of instruments/equipments and accessories provided to the land surveyors.
- h) Improper orientations of maps based on local control points.
- i) Carelessness in measuring horizontal distances during cadastral surveying.
- j) Poor visibility of land surveyors.
- k) Focus on the amount of area rather the accuracy during cadastral surveying due to imposition of fixed target of certain area to be surveyed to the land surveyors.
- l) Fieldwork carried out in off-season.
- m) Gaps and overlaps at the margin of the adjoining sheets of island maps.

### Technical Deficiencies in Cadastral Surveying

Technical aspect is the most important factor in maintaining accuracy and effectiveness in cadastral surveying. Performances of human being are limited by the available technology. A land surveyor cannot come up with better result than that could be achieved with available technology. However, one should try to make effective use of available technology to achieve optimum result.

Inaccuracy in surveying is mostly influenced by technical deficiencies. Use of traditional technology in the days of availability of modern and advanced technology can be regarded as root of technical deficiencies in Nepalese cadastral surveying. Various kinds of deficiencies can be noticed in the existing technology used and the other technical aspects that support the technology are also having deficiencies. On analysing the findings of field the deficiencies can be listed out as follows:

- a) Inaccuracy in control points used for mapping.
- b) Undefined parameters for coordinate transformation (i.e. transformation of coordinates from existing system to GPS system and vice versa)
- c) Lacking of standardization and regular maintenance of instruments/equipments used for cadastral surveying

- d) Poor quality of accessories used for preparing maps and documents
- e) Manual technique of producing duplicate copy and file maps
- f) Lacking necessary infrastructures during mapping
- g) Poor archive of maps and related documents.

### Human Factors in Cadastral Surveying as Reasons of Land Disputes

Land Surveyors, so called *Amin* in Nepalese society, have the most significant role in maintaining accuracy of cadastral surveying. The other officials involving directly in cadastral surveying activities have equally important role in this regard. Similarly, landowners are found to have significant role in helping to maintain accuracy in cadastral surveying with their indirect involvement in cadastral surveying activities. Basically for the preservation of public/government lands from unauthorised encroachment, the other roles of human being with indirect involvement in cadastral surveying activities could contribute significantly. The role of *Lekhandases (Lekhapadhibyabasayi)* is not clearly defined yet and their easy access to the maps and documents in Survey Offices has supported the unauthorised manipulation in maps and documents from third parties and malpractices during transaction. Inaccuracies in cadastral surveying ultimately result as the reason behind land disputes.

Human being by its nature is influenced by various factors. Some influencing factors, having significant role in land disputes, as analysed from field reality, have been pointed out as under:

#### a) Factors that influence Land Surveyors role:

Land surveyors' roles in cadastral surveying are found to be influenced by following factors:

- **Departmental Circulations regarding the speed of the work, i.e. fixing of target to be surveyed within a certain time frame.** Land surveyors are supposed to survey a full sheet of cadastral map in two months during field season [Technical circular from Cadastral Survey Branch]. The amount of detail and the nature of terrain are not taken into consideration. If the land surveyor remains unable to complete the targeted task, his/her performance is evaluated as poor. Hence, a land

surveyor's prime concern remains over amount of area to be surveyed rather than accuracy of his performance.

- **Working environment:** Working environment plays a significant role in preserving quality of surveying activities. While interacting with land surveyors regarding the working environment, most of them had a complaint that survey works are forced to carryout in rainy season as well. Further, they are not provided necessary infrastructure at office.
- **Deficiencies in technical aspects:** Deficiencies in the technical aspects greatly hamper the performance of a surveyor and accuracy of surveying activities.
- **Motivation/ Incentives from the job:** Land Surveyors are lacking sufficient measures of motivation. A land surveyor hardly gets US\$ 80.00 per month for his job. The amount is too little for his monthly expenditure. A land surveyor is not even provided travelling allowances while s/he goes for the fieldwork. The working hours for fieldwork are not same as that of normal office hours. A land surveyor may have to go to field either early in the morning or late in the evening. A land surveyor has to work on the off days also. No any extra allowances are given for the extra duty. On the one hand the monthly salary is not sufficient for necessary expenditure, on the other hand s/he does not have time for doing any extra job. Thus, land surveyors have to expect some financial incentives from landowners, which is illegal. To meet the expectation, land surveyors may overlook the reality and follow the landowner's interest. Ultimately, cadastral surveying loses the accuracy.
- **Individual Attitude:** Individual attitude of a Land Surveyor can influence the surveying of reality with true spirit of professional conduct. The quality and accuracy of survey works depend upon how the land surveyor performed his/her responsibility. Due care is required in case of cadastral surveying as it should demarcate actual boundary of parcel.
- **Professional Standard:** Professional standard in terms of academic background and trainings is the major factor that influences the performance of each individual. A professional having higher academic standard and sufficient training on required field certainly possesses higher skill and responsiveness to his profession.

Opportunity of continuous professional development like refresher trainings and academic degrees contribute considerably in enhancing the professional capability. Land Surveyors involving in the field surveying activities in Nepal are having the academic standard of high school with one year training courses. It is very hard to get an opportunity of refresher trainings. Such a professional standard can be considered as inappropriate with respect to their responsibility. Being the cadastral surveying activities to be done with public relations and bounded by legal provisions, a land surveyor has to tackle various kinds of challenges in the field. No creativeness can be expected in the performance from most of them. Sometimes wrong interpretation of legal provisions increases land disputes in the field. Many of such cases occur due to wrong understanding of meaning of legal provisions. Lack of refresher courses to the concerned professional obstructs organizational attempt of introducing advanced technologies, which Survey Department is facing at the moment. Hence, professional standard is one of the major factors that influences the land related issues.

- **External Pressure:** External pressure, basically from the persons affiliated to certain political party and officials holding administrative power, sometimes make the land surveyors and/or other officials involving in cadastral surveying activities to overlook the reality for their interest. The pressure seems higher for the cases of encroachments of public lands.
- **Legal and Supporting Documents:** Cadastral activities are endorsed remaining within a given legal framework. Many supporting documents are provided to make the dealing easier. Such documents, legal as well as supporting, should be clear and objective; otherwise their interpretation may mislead the land surveyors and other officials involving in the activities of cadastral surveying.
- **Ethics and Professional Code of conduct:** Ethics and professional code of conduct are the main sources that influence one's individual attitude. It is the responsibility of everybody to maintain ethics and follow professional code of conduct while serving for the nation. If someone lacks it, the activities performed by him/her lose the reality and accuracy. Cadastral Surveying being the profession by which each individual is highly affected in terms of

securing ownership over property, high standards of ethics and follow of professional code of conduct are required.

**b) Factors that influence the roles of other officials having direct involvement in cadastral surveying:**

The officials other than land surveyor those directly involve in cadastral surveying are influenced by the factors such as working environment, technical deficiencies, motivation/incentive from job, individual attitude, professional standard, external pressure, legal and supporting documents, ethics and professional code of conduct etc as mentioned above. The factors can be generalised for their respective responsibilities.

**c) The other human factors influencing cadastral surveying activities to cause land disputes**

Some other human factors that influence the cadastral surveying activities to cause land disputes can be pointed out as follows:

- Lack of awareness regarding the importance of cadastral surveying and its impact in future
- People do not hesitate to occupy larger extent of land even in it or some part of it is not under their ownership
- Involvement of Land mafias/ political leaders/ interested groups in the issues of land disputes
- Irresponsiveness of concerned authorities and personalities
- Lack of proper coordination among the agencies involving in the land administration activities
- Exploitation of legal provisions for ones benefit

**Some Strategies to mitigate land disputes**

Following strategies have been developed by performing SWOT Analysis in the line to mitigate land disputes:

- a) Upgrade the professional and academic standard of land surveyors
- b) Enforce code of conduct and professional ethics for land surveyor and other officials involving in cadastral surveying activities
- c) Fix the target to be surveyed scientifically so that the land surveyor could focus on accuracy during cadastral surveying
- d) Increase the amount of remuneration and incentive to land surveyors

- e) Provide necessary infrastructure and financial resources for cadastral surveying activities
- f) Enforce to follow existing working manuals and technical circulars strictly
- g) Introduce modern technology in cadastral resurveying
- h) Establish digital system of service delivery
- i) Make digital archive of map and documents
- j) Involve licensed surveyor in cadastral surveying activities
- k) Implement single window service delivery system in land administration sector
- l) Amend existing laws and acts to overcome the difficulties and shortcomings in the line to mitigate land disputes
- m) Develop appropriate land policy for mitigating land disputes
- n) Make the system of publicity effective and organise awareness programs to make active participation of public in cadastral surveying activities
- o) Make the participation of landowner in adjudication process compulsory
- p) Enforce the provision of punishment for unauthorised encroachment /holding of land
- q) Develop a mechanism of prohibiting unauthorised persons' access to the maps and documents
- r) Define the role and jurisdiction of a *Lekhanda* (*Lekhapadhibyabasayi*) in land administration activities clearly
- s) Develop a mechanism for proper coordination between / among district level organisations involving in land administration activities

## Conclusions

The maps and documents prepared by Cadastral Surveying are the foundation of land administration and management activities in Nepal. Systematic cadastral surveying is underway since 1964 under the responsibility of Survey Department and resurveying has been initiated in some districts since a decade back after the achievement of nationwide coverage leaving some village blocks and public/government lands.

Some cases of land disputes that exist in Nepalese society are because of inaccuracies and/or ineffectiveness in Cadastral Surveying activities. The reasons of inaccuracies and ineffectiveness in cadastral surveying

activities have been observed in two broad perspectives: technical deficiencies and human factor.

Use of traditional technology itself is realised as the major technical deficiency in cadastral surveying. Inaccuracies in control points, lacking standardisation and regular maintenance of the instruments/equipments used, inferiority in the quality of accessories used, manual method of map preparation etc. are the technical deficiencies that directly influence the accuracy of cadastral surveying.

Regarding the role of human factors in cadastral surveying activities, Land Surveyor has the most significant role, supported by other officials directly involving in cadastral surveying activities, in maintaining accuracy of cadastral surveying. Various cases of land disputes are due to landowners' negligence or unawareness about cadastral surveying activities. Lack of sincerity in performing respective responsibilities of various personalities with indirect involvement in cadastral surveying activities is the other factor that promotes the possibilities of land disputes. Easy access of unauthorised persons to the maps and documents not only increases the rate of wear and tear but also possibility of losing important documents is high. Interference of *Lekhanda* (*Lekhapadhibyabasayi*) in land administration activities sometimes results in land disputes.

## Recommendations

Following recommendations have been put forwarded to Survey Department, the national authority for cadastral surveying. It is expected that the execution of these recommendation would greatly contribute in the mitigation of land disputes because of cadastral surveying. The recommendations are as following:

- a) The technology used in cadastral surveying along with the other supporting factors has a number of deficiencies. Going ahead with the same technology will never make the cadastral surveying free from the reason of land disputes, rather it will expand. As Survey Department has already introduced digital technology in the sectors other than cadastral surveying, the department possesses some infrastructure and human resources. Introduction of digital technology in cadastral surveying could contribute in minimizing the possibilities of land disputes. Using the available resources of the department the technology could be

introduced on pilot basis, based upon the result of which the use could be expanded. Hence, it is recommended to introduce digital technology in the Cadastral Surveying sector as well.

- b) Land Surveyors (*Amins*) have the most significant role in maintaining accuracy of cadastral surveying, as they collect primary data. The professional standard of these officials is not enough to maintain the standard of cadastral surveying. Further, the existing professional standard of land surveyors cannot contribute in technology transfer. Hence, it is recommended to work in the line to upgrade the professional standard of Land Surveyors.
- c) Monthly salary of a land surveyor and other staffs involving in cadastral surveying activities is very low. Land surveyors are deputed for fieldwork without any travel and field allowances. The working environment at the office is not good enough. Due to these reasons, land surveyors and other field staffs are highly demotivated. For possibilities of malpractices and negligence in maintaining accuracy of cadastral surveying it may be one of the reasons. Hence, it is recommended to motivate land surveyors and other staffs by increasing financial incentives and arrange for proper working environment.
- d) Some cases of land disputes are due to unclear legal provisions. General public is facing a number of disputes during cadastral resurveying due to the provision of verifying the new map with existing maps. Although the intention of verifying is not to exactly overlap the new map with existing map, the provision is either misinterpreted or misunderstood. Further, the working manual and technical circulars do not provide any clear-cut way to deal with such cases. Similarly, there are many cases that are not practical. Hence, it is recommended to amend existing laws, technical circulars and working manuals to meet the requirements in the line to mitigate land disputes because of cadastral surveying
- e) Many of the cases of land disputes are due to unawareness or negligence of landowners with cadastral

surveying. As the literacy of Nepalese society is low, most of the people from rural areas are even unable to read the notices. In the urban areas, people are always busy with their business. Their active participation cannot be expected without prior notice or information. Hence, it is recommended to enhance public awareness regarding cadastral surveying.

- f) During the research, it was realised that one door policy for service delivery in land administration sector would provide better services to the public. Hence, it is recommended to determine the framework for establishing single window service delivery system.
- g) The research only concentrates on technical deficiencies and human factor in cadastral surveying to cause land disputes. During the research, it is realised that legal and institutional aspects are equally important factors in land disputes. It is recommended to carry out further research in this sector.
- h) During the research, it is also realised that Nepalese land administration is lacking National Land Policy that drives the land administration activities to meet the national objective of poverty reduction. Further research is recommended to find out the proper issues that could contribute in formulating National Land Policy to mitigate land disputes.

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- Informal discussions with senior level officials of the department during the research period.*

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