

# Looking from the Lens of Gender Mainstreaming: the Inclusiveness of Women in Surveying and Geoinformation Technology (GIT) in Nepal

Reshma SHRESTHA, Bhuwan RANJIT, Rehana SHRESTHA, Nepal and Liza GROENENDIJK, the Netherlands

**Key words:** gender mainstreaming, women, surveying, Geoinformatics, capacity building, profession

## SUMMARY

Abstract:

At a global level, ‘gender mainstreaming’ that seeks for gender equality, has always been a buzz concept in many disciplines including the Surveying and Geoinformatics profession. At the National level, Nepal is a signatory of various international treaties and covenants related to gender equality with a major focus on women’s rights like access to education, access to land, etc. National Women Commission is the official body to monitor the effective implementation of these treaties and covenants in Nepal. The national policy has addressed various approaches to women empowerment and bringing women into mainstream development. However, it is important to see how this policy has been practiced in ground reality. Therefore, this paper seeks to explore the gender-inclusive approach adopted in the capacity building and professional development in the surveying and Geoinformation technology. The survey was conducted among the students of the batch 2016 and 2017 undergraduate program in geomatics at Kathmandu University (KU). The gender differences perception and cultural belief about gender has been adopted in the framework in order to analyze the inclusiveness interventions and their effectiveness. The importance of role model is highlighted as one of the key factors to drive females towards this discipline and recommended strengthening the gender-sensitive policy towards developing women role models.

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## **1. SETTING THE SCENE ON GENDER MAINSTREAMING AND INCLUSIVENESS**

### **1.1 Gender Mainstreaming and inclusion**

The Gender mainstreaming approach, on one hand, seeks to institutionalize equality by embedding gender-sensitive practices and norms in the structures, processes, and environment of public policy (Daly, 2005). On the other hand, gender mainstreaming approach seeks to take equality issues out of the isolation of gender equality and involves other actors in building a balanced society because gender equality is an issue for both women and men. However, in any gender mainstreaming approach, it is important to consider the cultural belief in gender that exist in various communities (Wendoh & Wallace, 2005)

The gender mainstreaming in science and technology has now been given a high priority in the global context. The various initiatives and funding to strengthening women in science are now in growing trends compare to past scenario (McGregor & MacGregor, 2001; Oldham & Achmad, 1999). The importance of gender equality in the profession of surveying has been highlighted in the various country context (Turrell et al., 2002).

### **1.2 Mainstreaming gender and inclusion in surveying and GIT in Nepal**

The Constitution of Nepal has recognized the rights of women as one of the fundamental rights provisioning proportional inclusion of women (Nepal Law Commission). Civil Service Act 1993 has the provision of the inclusiveness of women in a government job. It is required to fulfill the vacant in civil service through open competition and promotion. The proportion of vacancy by open competition differs according to the level—60% non-gazetted second class and non-gazetted first class, 70% gazetted third class, 10% gazetted second class, and 10% gazetted first class. Forty percent of the position to be fulfilled by open competition are reserved. By considering 40% reservation seats into cent percent, thirty-three percent of the seats are reserved for women. Further, female are granted a concession on opportunities in civil service. The age bar to appear in the open examination for male is 35 years while for female is till 40 years.

The probation period of newly appointed female civil servant in permanent position is 6 months while of male civil servant is 12 months (Nepal Law Commission). These provisions have contributed to the rise of female from 8% in 2013 (Paudel, 2018) to 23% in 2018 (Mahila, 2010).

Besides, professional sector, there are many initiatives for inclusiveness from gender perspective. The knowledge delivery mechanism at Kathmandu University for the undergraduate program in Geomatics Engineering is one example. The program has geographical equity by reserving one place in each province of Nepal for female candidates during intake in the program (Shrestha & Bhatta, 2019).

In addition, there are various intervention that has been applied for gender mainstreaming in GIT. As shown by (Tripathi & Thapa, 2019), many specific training program has been formulated through out Hindu Kush Himalayan (HKH) region with the gender balance

### **1.3 Aims of the study**

The aim of this study is to understand the factors that can influence females' enrollment in geomatics study of Kathmandu University (KU). Therefore, two gender related factors "gender perception differences" and "cultural belief" have been considered to fulfill the aim of this study

## **2. GENDER MAINSTREAMING LENS: A FRAMEWORK TO ASSESS WOMEN IN SURVEYING AND GEOINFORMATION TECHNOLOGY (WIS&GIT) IN NEPAL**

The framework is based on the assumption that gender has an impact on the career choices of undergraduate students for perceiving surveying and GIT education. Therefore, gender related factors which consists of gender differences in perception and cultural belief about gender are considered as important to individuals' career choices.

### **2.1 Gender difference perception**

The various studies have mentioned about the gender differences as a prominent factors that has influence the individual career choices (Wesarat et al., 2016). According to (Gokuladas, 2010), the extrinsic factors such as work environment, interpersonal relationships plays a role in female career choice whereas intrinsic factors such as value job content and long term career affect the career choice for male. Further, self-efficacy belief is also an important parameter as people are more likely to rely in perceive abilities then tested abilities (Burke et al., 2006). In this study we have selected the parameters related to extrinsic factors like availability of scholarships, opportunity of government job and field based study environment to analyze gender differences perception. Similarly, intrinsic factors like field based

subjects and desk based subjects are chosen to understand the differences in their perception for choosing surveying and GIT as their career choices.

## 2.2 Cultural belief about gender

The stereotypes and gender-role attitudes are considered as cultural belief about gender (Wesarat et al., 2016). The perception about the competence of female to work that is linked with their physical capability and also the family life as factors, comes under cultural belief (Srinivasan et al., 2013). Riska (2003) has mentioned that women are considered as less capable of doing work and making rational decision. McGregor et al. (2001) have mentioned that gender stereotype exist in the fields of Science, Technology, Engineering and Mathematics (STEM) while according to (Wang et al., 2013), the choices of the subject related to STEM and non-STEM are found to not dependent on the lack of ability but likelihood of wider opportunity of subjects to female. The author explained that due to high verbal ability of female, female are on non-STEM stream.

In this framework, we have considered the factors like categorization of discipline in terms of feminine and masculine, importance of role model to break cultural taboos, perception towards physical capability of woman in field based work.

## 3. DATA AND METHODS GEOMATICS STUDY AT KU

### 3.1 Participants

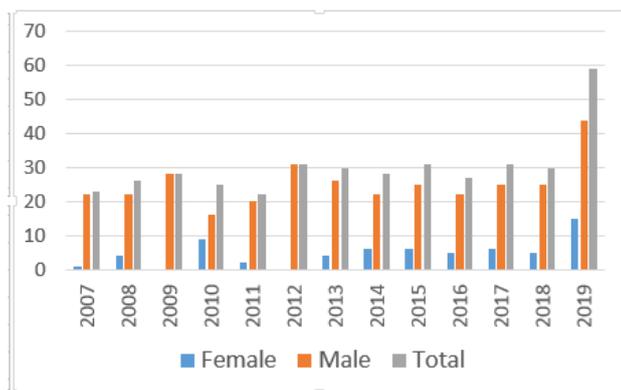


Figure 1: Students of Bachelors in Geomatics Engineering: (Shrestha et al., 2019)

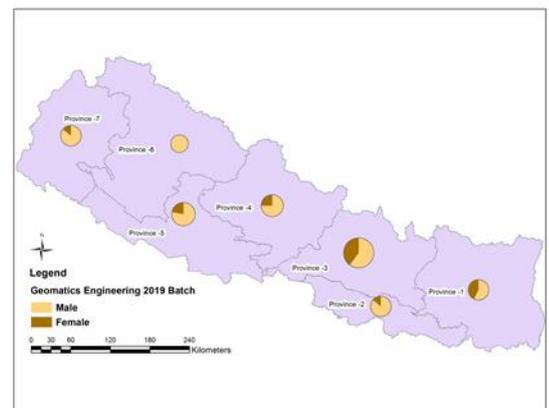


Figure 2: The distribution of students in Geomatics Engineering Batch 2019: ((Shrestha et al., 2019))

In this study, students studying in third and fourth year have been selected as study participants. The rationale is that the students from first year and second year are generally less familiar with the subjects to surveying. The questionnaire were sent by

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creating google form and sent to the total students of 58 from batch 2016 and 2017 as shown in **Figure 1**. In total 31 participants responded. Out of 31 responses, 23 are male and 8 are female. The responses of female students seems to be almost 100%.

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## 4. RESULT AND DISCUSSION

### 4.1 Gender based perceptions

#### 4.1.1 Motivating factors to study Geomatics Engineering

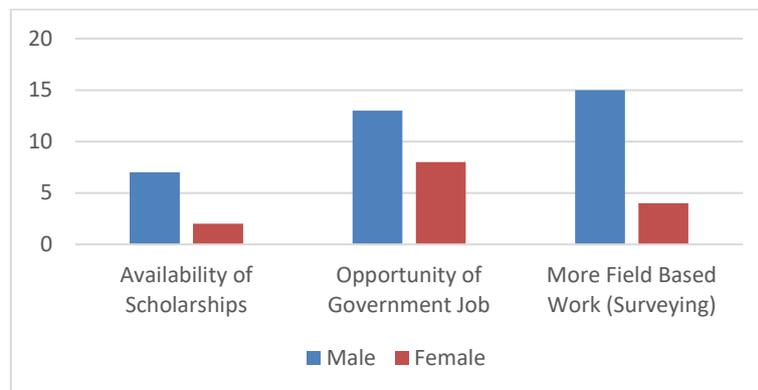


Figure 3: Motivating factors to study geomatics engineering

The responses on motivating factors that have driven the students to choose Geomatics Engineering reveals that 2 female (out of 8) and 7 male (out of 23) responded to the factor of availability of scholarship, 8 female (out of 8) and 13 male (out of 23) have responded to the factor of government job opportunity whereas 4 female (out of 8) and 15 male (out of 23) responded to the factor field work as motivating factors for choosing the subjects. This reveals that more female students are attracted due to the opportunity for government job compared to male although 4 female (out of 8) have mentioned about the inclusive criteria applied in the civil servant position by the government of Nepal.

#### 5.1.2 Perception on field based subjects

With respect to the subject choice, male prefer field based surveying most (20 out of 23) followed by subject with a collection of geospatial data from field, and desktop analysis of geospatial data. The least preferred subjects among male is theoretical subjects with no field work (15 out of 23). In the case of female participants, they prefer desktop analysis of geospatial data, field based surveying almost equally. Moreover, female participants also seem to prefer theoretical subjects with no field work in contrast to the male participants. The interesting thing to note is that although programming language is usually found to be preferred by male, in our study we do not find the stark difference among male and female. The findings aligned with the study conducted by (DASSE, 2001) in which the course

content should not be the barrier for female students for studying surveying education.

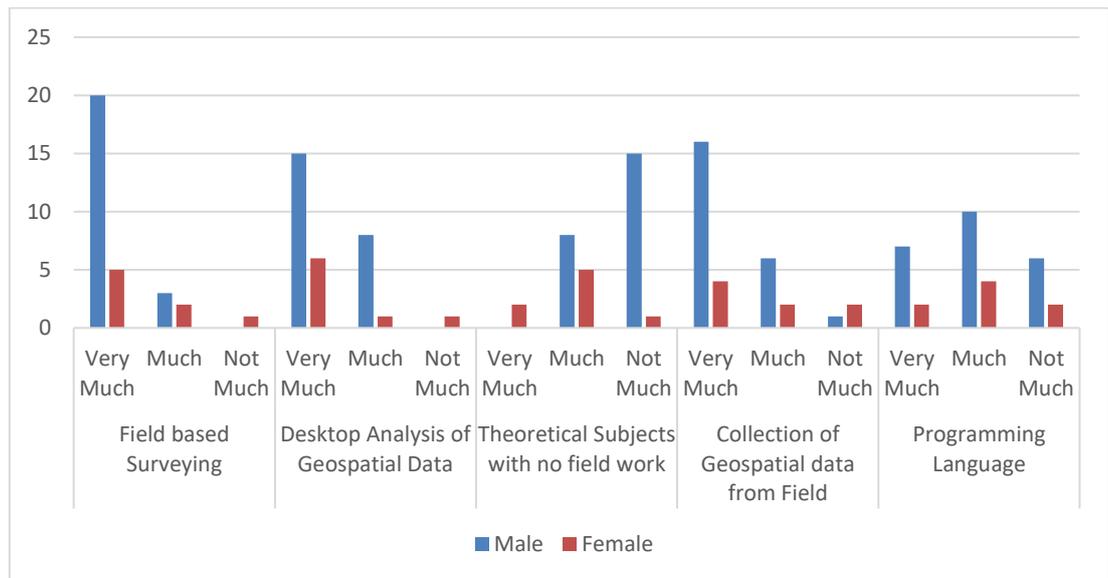


Figure 4: Perception on field based and non field based subjects

## 4.2 Cultural Belief About Gender

### 5.2.1 Importance of role model

According to Popp et al. (2019), role model can encourage students to pursue a career in the field where gender stereotype taboos exist.

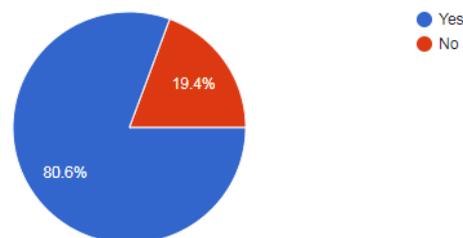


Figure 5: Perception on requirement and importance of female role model

Regarding the important of role model (female) to motivate the female to join surveying and GIT career, most of the students (80.6%) have responded as "yes". The justification was that female can understand various problems of female and having female role model taking a lead in the field can uplift the confidence and inspire female to consider geomatics as a career choice. Moreover, people believe more on what they see than hear. So, having a female role model in the field of geomatics engineering can play very

important role to bring females in this field. This finding also resonates with the previous study by (Turrell et al., 2002). The author has highlighted that the female role model can play a significant role in mentoring female to enter in the surveying profession. Vila-Concejo et al. (2018) showed that a lack of role models is perceived to be a key obstacle for gender equity. Hence, providing same-gender role models is now one of the most promising retention strategies for female scientists in the geosciences (Hernandez et al., 2018).

Therefore, a female role model can play a vital role in addressing the cultural belief that surveying and GIT are more suitable for male students.

### 5.2.2 Belief on female competence in handling surveying instruments

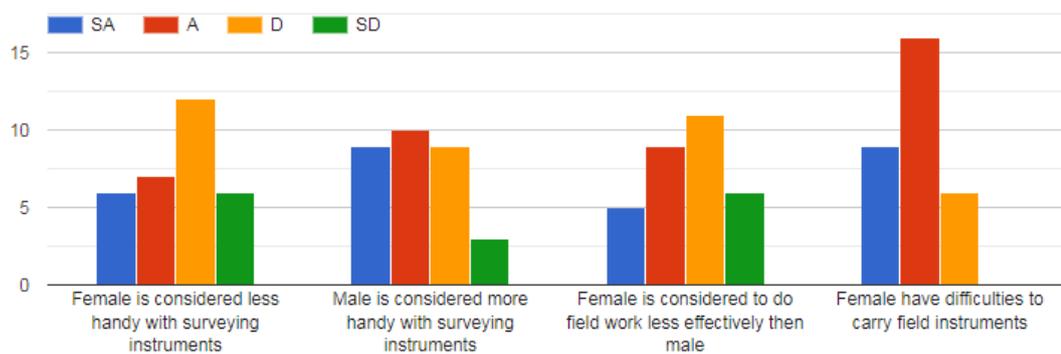


Figure 6: Perception regarding competence in field based work

In the Geomatics study at KU, students are nurtured to acquire various types of skills and competences. Among these, field based skill and knowledge is one of the core skills provided within the subject. The field based subject, especially surveying, not only include the theoretical aspect of conducting field work but also practical experience actively handling instruments. In the survey we asked the perception of participants on the competence of their own gender and the counterpart to handle field based work. Among various aspects related to field based work, participants strongly agree that female have difficulties to physically carry field instruments. In contrast, participants disagree that female is less competent in handling survey instruments. Nonetheless, it can be seen that some cultural biases exist, as (61%) of participants generally agree that male is considered more handy with surveying instruments. The

The questionnaire regarding the judgement of competence based on the gender, out of 8 female students, 5 have responded that they have experienced some discrimination basically related to field work from their counter peer.

### 5.2.3 Perception on the interventions to increase female

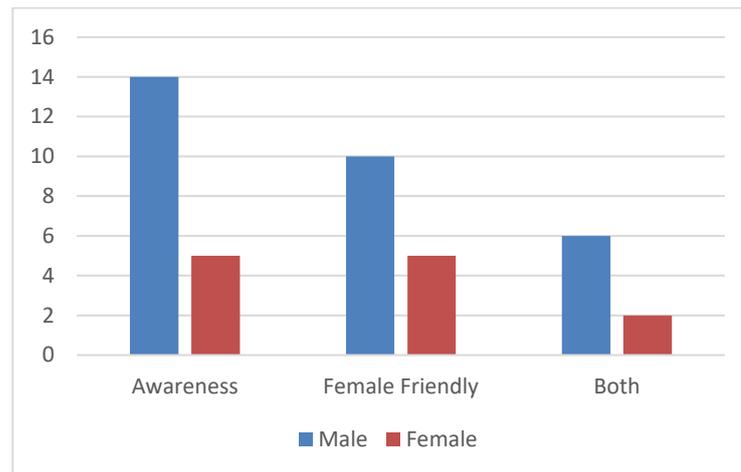


Figure 7: Perception on factors to increase female participants

The questionnaire was asked on the various intervention to increase female participants. In this questionnaire, the participants allowed to choose more than one options. The options were, "By developing awareness for the career as women surveyor" and "By developing female friendly field arrangements". In general, male participants think awareness raising as most important interventions followed by interventions on developing female friendly field arrangements. While there is divided opinion in the case of female. Almost equal number of female participants consider either awareness and female friendly as a strategy to increase female students in Geomatics Engineering. Nonetheless, commonality exists among the male and female in the sense that male and female do not consider both awareness and female friendly as intervention strategies. The findings indicate the intention based on equity. As highlighted by Ugwulebo (2011), to enhance gender equality in education, the differences in the need of different gender should be fulfilled.

## 5. CONCLUSION

Although the findings from this study cannot be generalized, this study shows that some interventions are still required to obtain significant changes in gender equality and inclusiveness.

The two factors comprising of "gender differences in perception" and "cultural belief about gender" which are considered important to career choice, ultimately effects the gender mainstreaming and inclusion policies in the surveying and GIT. Although, the policies exist for gender balance, however, if female are not attracted to study program

related to surveying and GIT, due to extrinsic factors, the inclusive intervention like availability of scholarships for female candidate could not be effective.

The importance of role model is found the most prominent. It is the key factors to drive females towards this discipline and recommended strengthening the gender-sensitive policy towards developing women role models in academic and professional related to surveying and GIT.

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## **BIOGRAPHICAL NOTES**

Reshma SHRESTHA is an Assistant Prof. in the Department of Geomatics Engineering at Kathmandu University. She has more than six years of experience in the academic field. Besides academics, she has professional experience in many projects related to the application of geo-information technology in land management. She was Co-chair for the working group in FIG commission 2 from 2015 to 2018. Her research interest is in Urban Land Governance, Land Administration, Land Use Planning, Urban Planning and Management, Land Readjustment,

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Geo-information Technologies and capacity building in geoinformatics. She holds PhD in the Title “Understanding Urban Land Governance through " Action Space": Implications for Access to Land for Low-Income Housing in Managing Informal Settlements” from the Faculty of Geo-information Science and Earth Observation, University of Twente

Bhuwan RANJIT is an instructor at Land Management Training Centre. She Holds her MSc. Degree in Geoinformatics from ITC, Netherlands. She was awarded the best paper in Advances in SAR: Constellations, Signal processing and application in 2019. She has awarded Nepal Chhatra Bidhyapadak at her Bachelor level in Geomatics Engineering. She is the first female geomatics engineer from Kathmandu University. She teaches surveying courses and also supervised in fieldwork.

Rehana SHRESTHA is GIS Expert in NEST (P).LTD. She holds PhD in Interactive map-based support systems: supporting social learning and knowledge co-production on environmental health issues. She has worked on many projects related to land use planning. Her research interest is in social learning, knowledge co-production, citizen science, environmental justice, integration of urban planning and health.

Liza GROENENDIJK is a senior lecturer in Land Administration at the Faculty of Geo-information Sciences and Earth Observation (ITC) of the University of Twente, The Netherlands. Main areas of expertise: Land Administration, Securing Land Tenure, Women Land Rights. Further she is experienced in experience-based learning. Within the domain of land administration she worked in Africa with governments and academia and contributed to the creation of the Eastern Africa Land Administration Network.

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