



*Jennifer Murphy*

## Making a Difference in a Developing Country – One Student at a Time

As background, I began my Geomatics career in 1977 working at the Canada Centre for Remote Sensing (CCRS) on the absolute radiometric calibration and relative correction of data from the Multispectral Scanner and the Thematic Mapper on the Landsat satellites. Our small team of Radiometry Specialists, including Dr. Frank Ahern and with ideas from Dr. Murray Strome, contributed to the production of Landsat products on tape and on film that were highly regarded for their accuracy (Murphy et al, 1985). In preparation for the launch of Landsat 4, CCRS developed an interim processing system to analyze in detail all the inflight data including calibration information. We were also able to qualify and quantify various anomalies that had not been predicted before launch. For the Landsat Image Data Quality Assessment (LIDQA) Symposium, we chose one random scene (that happened to include President Ronald Reagan's Ranch...) to exemplify, with considerable success, all these anomalies and our proposed correction method, as described by Murphy et al. (1985). I later worked as a Science and Technology Policy Advisor to an Assistant Deputy Minister and the Minister in Natural Resources Canada.

In 2009 I was 18 months into retirement, and it was time for a new challenge. After a whirlwind tour of Nepal in 2007, I began annual treks there in 2009 using the company, Three Sisters (also known as Empowering Women of Nepal), based in Pokhara about 300kms west of Kathmandu. It was founded by the Chhetri sisters in 1999 to train local young women to be trekking guides and assistants. I took the Teaching English as a Second Language (TESL) course in Canada and volunteered to teach English to these young women in January each year. This was a marvelous opportunity to support an organization that was actively encouraging young women in a developing country. I felt a wonderful sense of achievement when I later encountered on a trek in the mountains some of my students, with eyes sparkling, who seemed to be totally at ease with their clients. My pattern for the next six years was to spend two months in Nepal, teaching English in January, and then trekking in the mountains.

More opportunities in Nepal related to my remote sensing career were on the horizon. In 2012, Dr. Bob Ryerson gave me the contact information for two eminent Nepalese geomatics

scholars whom he had met at various international conferences. Within a year, I had started a series of informal meetings in Kathmandu with Dr. Rabin Sharma, the President of the Nepal Society for Photogrammetry and Remote Sensing. In 2013 Professor Krishna Bhandari, at that time a Ph.D. student in Thailand and a lecturer at the Paschimanchal Engineering Campus of Tribuvhan University, invited me for a tour of their campus, located in Pokhara, and we met with several of the faculty. He later returned the favour by joining my English class at Three Sisters, participating in some of the activities, and explaining to my students why science and mathematics are important.

When I returned home, I asked myself how it could be possible to teach geomatics on a campus that had none of the hallmarks normally associated with hi-tech subjects. There is an added challenge for the entire country since most of the power is hydroelectric. The electrical system works well during the monsoon season, but in the winter and spring, the power supply is intermittent at best and often non-existent for several hours a day as the rivers dry up. I decided that it must be the dedication of the Professors and the students that make the program feasible. They understand how desperately Nepal needs geomatics technology, not only on a routine basis to map resources, the landscape, and social infrastructure, but also during times of natural disasters such as earthquakes, mudslides, and glacial melting. I vowed that my next retirement project would involve setting up a scholarship to help deserving young students in Nepal in their quest to participate in Geomatics.

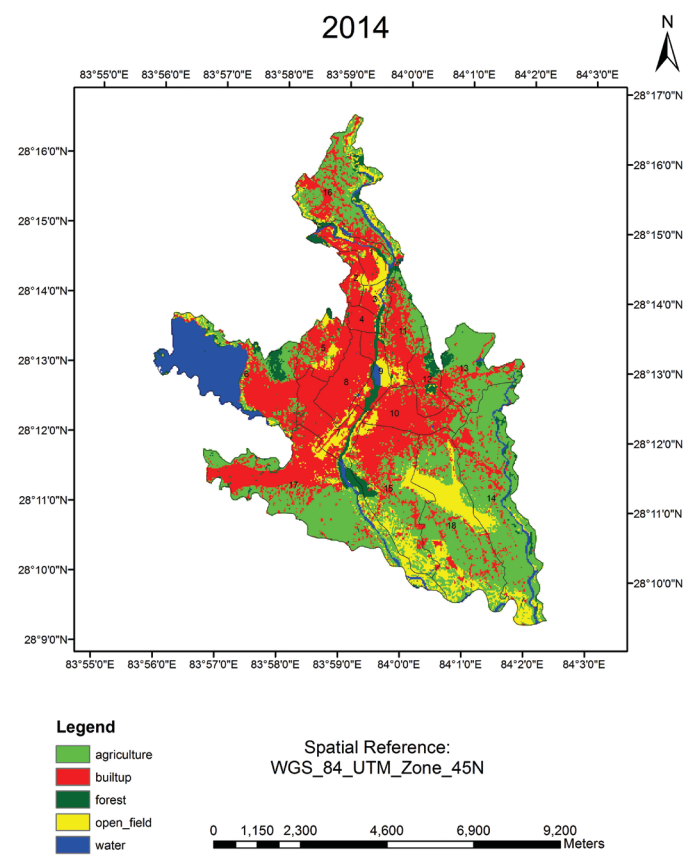
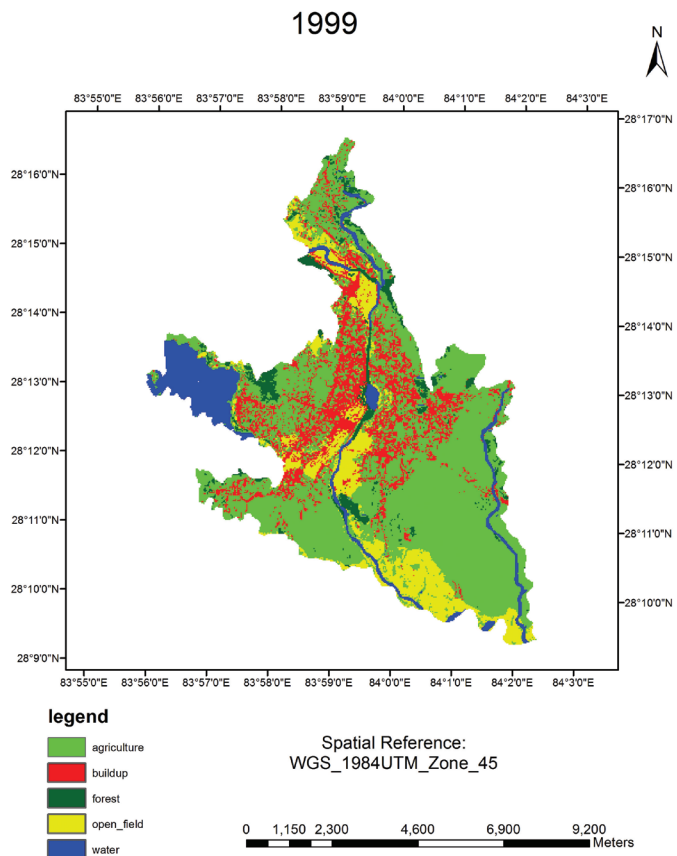
The Canada Nepal Geomatics Advancement Foundation (CNGAF) was registered in 2016 as a Charity with Canada's tax agency, the Canada Revenue Agency (CRA). Our work is challenging since we speak no Nepali, and the CRA requires a raft of forms and record-keeping to be archived, including details of the students, their technical work, and their

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The two maps above from 1999 and 2014 are from a project to map land use change in the area of Pokhara, Nepal over five time periods using Landsat data. The work by undergraduate student Sudip Kuikel (now a government officer in Nepal) was supervised by Dr. Bhandari and supported by the Canada Nepal Geomatics Advancement Foundation.

expenses. I visited with Dr. Bhandari three more times, and I gave a short lecture to the geomatics students about the CNGAF Scholarship. I had several meetings with various Nepalese University officials, and we were finally successful in having the Foundation ratified there in February 2016, marked by a Certificate of Appreciation signed by Dr. Bhandari, Coordinator of the Research Management Unit, and by Associate Professor Gautam, Paschimanchal Campus Chief. We sent scholarships to our first two deserving young students in 2017 in their graduating year, which marked the first graduating class for the Geomatics program on that campus. Dr. Bhandari has subsequently extended the program to include a master's degree and was instrumental in setting up the related Centre for Space Science and Geomatics Studies (CSSGS). (See <https://www.facebook.com/wrc.cssgs/> for more details.) Dr. Bhandari is also using the CNGAF Scholarships to leverage collaboration with other universities, and he cites an MOU with the Centre for Spatial Information Science at the University of Tokyo.

By mid-2021, the CNGAF has already provided scholarships to eight students. Their Research Projects are varied and have included a study on land pooling to improve agriculture production. Another included a 3-D spatial information system for the recently upgraded Pokhara Airport. One student did a carbon stock estimation of above-ground tree biomass using geospatial technology. Another reported that the scholarship gave him the means to travel to Chandigar, India, to present his paper "Participatory Geographic Information System for Sustainable Ecotourism in Mountainous Area" at the International Conference on "Global Frameworks in the Local Context: Challenges and Way Forward." As a bonus, he was able to attend the related two-day Pre-Conference Workshop. Yet another is now studying in the master's program in Geoinformation Science and Earth Observation. Immediately after completing his bachelor's degree with a CNGAF scholarship, this student received an additional scholarship from the CSSGS. This allowed him to travel to Thailand to work as a Research Associate at the Asian Institute of Technology, where he worked on projects such as Global Navi-

gation Satellite Systems data analysis which could lead to the prediction of an earthquake. One of the first recipients worked on Land Use and Land Cover (LULC) using GIS and Landsat data to evaluate changes over time, due to human and natural causes, and another worked on visualization of public vehicle routes. These last two CNGAF scholarship recipients are both currently employed as Survey Officers in the Nepal Government.

One major goal of this scholarship is to foster local growth and to encourage the scholarship recipients to remain in Nepal after graduation so that these valuable skills remain in their home country, where they are so desperately needed. The Foundation has now settled into a routine of supporting three students a year, one in each year of Geomatics specialization, with a new student being selected each year based on their academic evaluations and their project proposal. The quality and content of their reports testify that they are contributing in a meaningful way to the wellbeing of their beautiful country. Despite the challenges of the Covid-19 epidemic, the University is persevering in training young people in the valuable discipline of geomatics.

I feel honoured and privileged to be able to contribute in this way to the scientific discipline that I found so satisfying, and to people in a country who are richly deserving of this support. I hope this Insight into our program encourages others in our profession to support students in other developing countries. For further information contact the CNGAF at [cngaf@bell.net](mailto:cngaf@bell.net).

## Reference

Murphy, J.M., Ahern, F.J., Duff, P.F., and Fitzgerald, A.J., 1985. Assessment of Radiometric Accuracy of Landsat-4 and Landsat-5 Thematic Mapper Data Products from Canadian Production Systems, *Photogrammetric Engineering and Remote Sensing*, vol. LI, No. 9 (September), pp. 1359-1369.

**Jenny Murphy** (BSc Physics 1966, MSc Radioastronomy 1967, UK) specialized in the radiometric correction of Landsat satellite data at the Canada Centre for Remote Sensing and was later the Science Policy Advisor in Natural Resources Canada. In retirement she has taught English in Nepal to female trainee trekking guides and is the Founder of the Canada Nepal Geomatics Advancement Foundation registered charity. She anticipates completing her Bachelor of Humanities at Carleton University in 2023.

## GIS Tips & Tricks, continued from page 605

- Click Close on the Customize Keyboard dialog box ( Figure 3). Click Close on the Customize dialog box (you will be returned to Figure 1). Once you have assigned a shortcut to a tool, that shortcut will appear to the right of the tool if the tool appears in a menu ( Figure 4).

Remember that you can also assign shortcuts to key combinations for when you run out of options. And that is all there is to making custom hotkeys.

Please feel free to share your Tips & Tricks with us. Send your questions, comments, and tips to [GISTT@ASPRS.org](mailto:GISTT@ASPRS.org).

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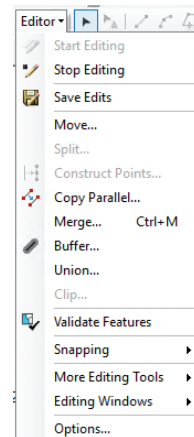


Figure 4. Editor menu showing the "Ctrl-M" shortcut assigned to the "Merge..." function.

## NEW ASPRS MEMBERS

ASPRS would like to welcome the following new members!

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