

LANGTANG VALLEY: A 3D TOURIST TREKKING MAP CASE

ABSTRACT

Tourism is one of the main sources of earning foreign currency in Nepal, which is emerging as a new industry in the country. To promote tourism, Visit-Nepal-1998 year was celebrated. Among various possibilities, trekking is one of the favourable options tourists visiting Nepal do not like to miss. As a result of this, various trekking organisations are offering services for undertaking trips in the mountainous areas. But, not every tourist is aware of the physical consequences of trekking in the mountains. In order to facilitate providing information on topography and physical conditions in the mountainous terrain, a case study is undertaken to prepare trekking map. For this purpose, Langtang National Park is used which is one of the popular trekking routes in Nepal. The trekking map is designed on a DEM-based perspective view of the area on which a geo-referenced satellite image was draped. Trekking route and the location of villages were drawn on the three-dimensional satellite image. This gives realistic impression of the terrain and the conditions of the trekking route since three-dimensional representation is more effective as compared to two-dimensional map.

APPLIED METHODS AND TECHNIQUES

Data and software's used:

- Topographical map sheets of the area at scales 1:125,000 and 1:50,000, Department of Survey, HMG, Nepal
- Landsat TM data of the area, acquired on 21 December 1990
- ILWIS ver. 2.2, Macromedia Freehand ver. 8.0, Adobe Photoshop ver. 5.0

Methods followed:

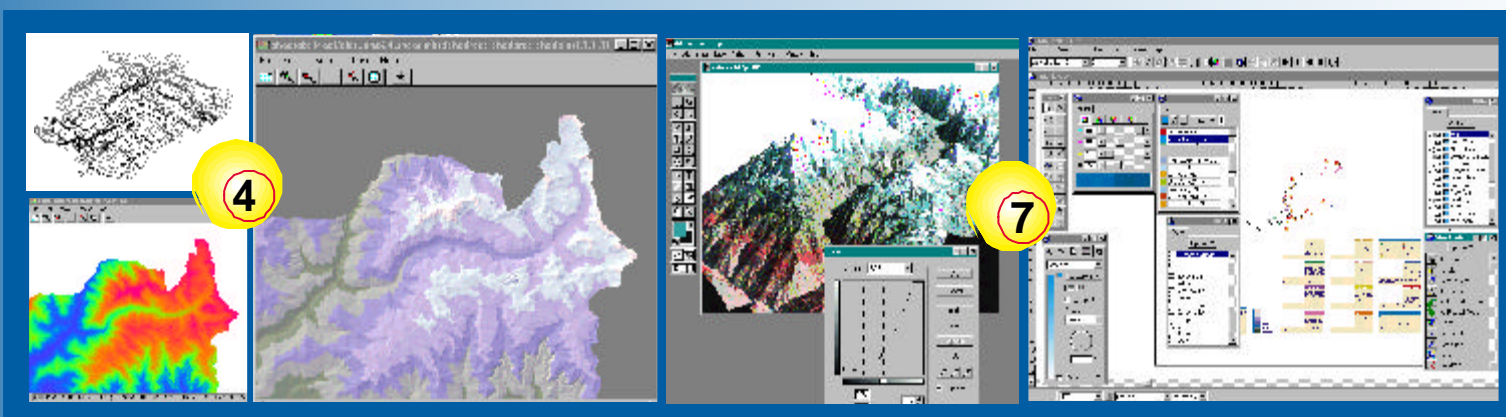
- 1) An analysis of the mapping-needs of trekking agencies in perspective of their clients is executed. Trekking agencies are convinced that realistic viewing maps may assist their customers to be better informed upon trekking circumstances and conditions.
- 2) Topographic map sheets were digitally scanned on which co-ordinates were added. Contour lines were digitised by following screen-digitising option using the software ILWIS ver. 2.2.
- 3) Contour interpolation was carried out to create a raster image, a digital elevation model (DEM). This DEM is used to create a 2-dimensional grey scale hill-shaded image, by running a shadow filter, which simulates sun illumination from the northwest direction.
- 4) DEM is also used to create several 3-dimensional images with different viewpoints to achieve the most appropriate view of the Langtang valley.

- 5) Landsat TM data of the area, acquired on 21 December 1990, was available. After georeferencing the individual bands, a pseudo natural colour composite was created by using TM band combination of 3, 4 and 5 and following necessary image enhancement technique.
- 6) The pseudo natural colour composite was draped on the 3-dimensional perspective view of the area, created by using DEM. A layertint map is created by generating a height zone map. For each zone a colour is assigned. The colour intensity is generated by multi-plying primary colours with the hillshading.
- 7) The draped satellite image on the 3-dimensional perspective view of the area is then converted to a format (file type .shp), which can be handled in Macromedia Freehand version 8.0, a popular graphic software program that is widely applied by cartographers, using the G.I.S. plug-in filter Avenza MAPublisher 3.0. Adobe Photoshop 5.0 is used to enhance the 3D image of the Langtang Valley and the layertint map.
- 8) Using Freehand, cartographic colour, line, fill and text styles are applied to groups of map objects, illustration etc. to finalise the map.
- 9) After making a colour proof, the map is evaluated with the involved trekking agency. Adjustments of the final map will include the wish of a more detailed image, the visualisation of trekking slope angles and track conditions.

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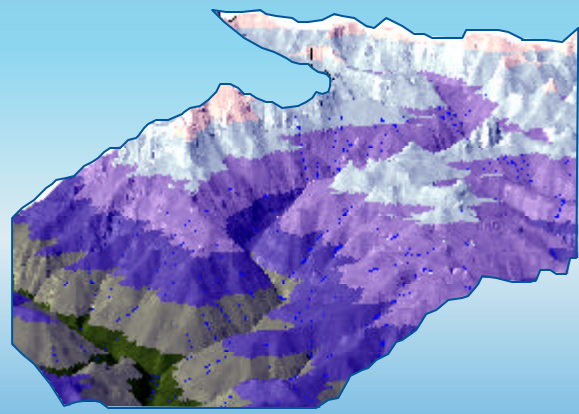
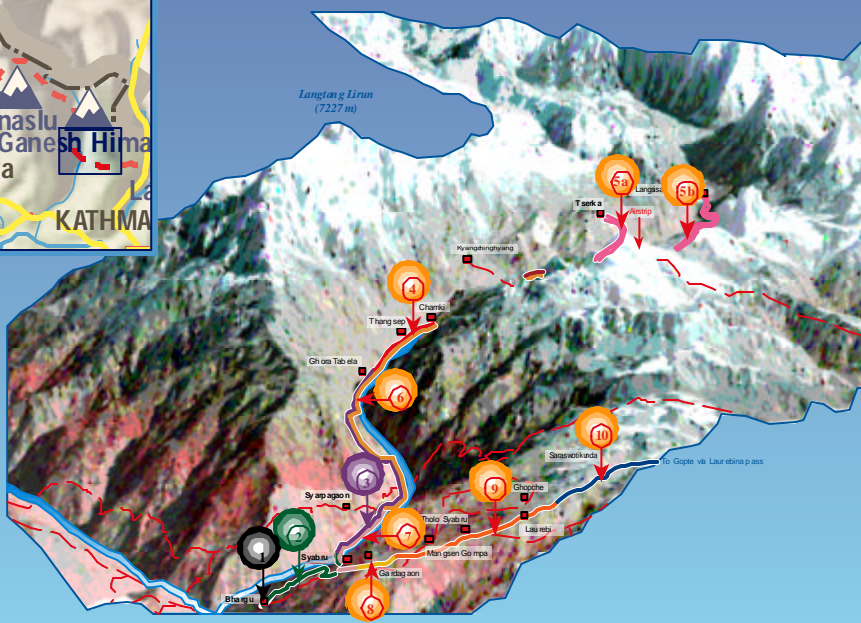
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CONCLUSION

Spatial modelling technique in GIS can be very useful in creating 3D tourist maps. Use of satellite image gives information on land cover, land use and other topographic/geomorphic features, which could be useful information for planning trekking routes. Improvement would be to classify slope classes along the trekking routes to classify portions of the routes into classes such as heavy, moderate and light. Combination with graphic software and landscape rendering software can be useful to assist map makers to create low budget 3D tourist maps which have natural looking impression. DEM can be also applied as base for 3D "fly through" models of the area, or as a dynamic, map interface for Web applications.



Day 1 (arrival)
Trekking participants are arriving from Kathmandu to the small village of Barshu near Dauche. Barshu is the starting place of the trekking, that will lead the participants into the heart of the Langtang Valley.

Day 2 (7 hours):
The first walking day is a long but enjoyable one. The trek is gently sloping and leads you through a dense forest to Salyan. From Salyan the trek will gently slope down through a number of terraces to the Ghopche Khola. After Lama Hire and the Bamboo Lodge, the first camp place is reached at a height of 2000m. The whole day you will enjoy the beautiful view on the Ganesh Himal region.

Day 3 (5 hours):
Today's trek is short, but not too easy. It will bring you to Chon Tabela at a height of 3000m.

Day 4 (6 hours):
Today's trek leads gently sloping through the Langtang valley. It will lead to the camp place near the Gangshero (6000m). Nature is quite impressive. Also you will notice the Tibetans living in this area who call Tibet their home. The Chinese in vest on the camp is the Kyanggin Group (3000m). Kyanggin Group can be used for short one day treks to the 5000m high. The go 98 or Langshin. Visit also the cheese factory in Kyanggin Group.

Day 6 (6 hours):
During a long six hour's descending walk, you will return through the Valley to the Riverside Lodge (2400m).

Day 7 (6 hours):
A more difficult day than yesterday! Especially the walk out of the river valley through the steep ascending landside that leads to Salyan (2200m) is very tiring!

Day 8 (5 hours):
Although the trek leading to the top of the Salyan is a steep one, it should not deliver too much problems as you may be used to the high difference.

Day 9 (6 hours):
A gently sloping trek leads us to the glacier holy lake of Gosainkunda at a height of 4300m.

Day 10 (6 hours):
Today you will reach the highest point of this trekking. Though a rocky landscape and passing some small lakes, you will arrive at the top of the Langtang La at a height of 4605 meter!! The end will be followed by a descent to the upper camp of the Tadi Khola. This place is ideal for a good lunch, after which you can further descend to Gopke (3400m).

Day 11 (6 hours):
On the map, this is the last part of the trek that is shown. From Gopke the trek continues to descend. The forest is less dense and after many ups and downs you will reach Tharpholia at a height of 3500m. From there a steep going descent, east of Melandaigani will bring you to the Riverside Lodge, a magnificent place for your camp at a height of 2000m. From here on the trek will lead back into the direction of Kathmandu.

Information History:
Data source: Geomay Toponet, scale 1:100,000
Data year: 1995, sheet no. 2885/10, B scale 1:50,000
Landsat TM data obtained on Dec 1990
Trekking information supplied by: Steve Leppard, The Hague, The Netherlands
Image Processing of Landsat data: Dhruba P. Khas Shrestha, Division of Soil Science
Design & Cartography: Anu Raj Shrestha as a Final Project, GIS 4 course 1998

Legend:
Day 2
Day 3
Day 4
Day 5 (a/b)
Day 6
Day 7
Day 8
Day 9
Day 10
Trekking Stop
Tracks
Villages
River

General information
Langtang is one of the most famous trekking sites of Nepal. This is a region that enables visitors to enter the heart of the Himalayas and visit a few days. In total, several days are enough to visit Kyanggin Group, a small valley in the middle of the Langtang Valley. Also the beautiful lakes of Gosainkunda and the Himalaya Valley are within reach of the tourist.

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