

Annexes

Annex 1 Annual Average Extreme Temperatures for 1985, 1999, and 2004

Annual average extreme temperatures for 1985, 1999, and 2004						
Month	1985		1999		2004*	
	Max	Min	Max	Min	Max	Min
January	18.1	2.4	21.0	1.0	18.2	3.1
February	20.1	3.7	26.0	6.0	22.0	5.2
March	26.3	9.0	28.0	8.0	27.3	10.7
April	28.6	12.1	33.0	14.0	27.7	13.2
May	28.0	15.5	29.0	17.0	28.6	16.5
June	28.9	19.2	29.0	19.0	28.8	16.9
July	27.1	19.6	28.0	20.0	27.7	20.2
August	28.8	20.2	28.0	20.0	29.0	20.6
September	26.7	18.3	29.0	19.0	28.1	19.3
October	24.4	13.7	26.0	14.0	26.0	13.1
November	22.2	7.0	24.0	8.0	22.7	7.5
December	19.3	4.8	21.0	5.0	20.6	4.5

Source: Handbook of Environment Statistics, Nepal - 2002; * Statistical Year book 2005

Annex 2

The Seven World Heritage Sites of Kathmandu Valley

1. Kathmandu Durbar Square

Kathmandu Durbar Square was built in 613 A.D. (B.S. 670) by the Lichchavi dynasty. During the reign of King Pratap Malla, a statue of Hanuman was installed at the entrance (dhoka) of the palace (1672 A.D.– B.S. 1729) and from that time the palace has been known as Hanumandhoka Palace. There are around 50 temples in and around Durbar Square, including the famous temple of Taleju Bhawani constructed in 1576 A.D. The majority of these were constructed in the 17th and 18th centuries. The main attractions of the square include the statue of Hanuman, the golden gate, Nasal Square, the nine-storied Basantpur Palace, a European style palace (Gaddi Baithak), Kumari Ghar (home of the living goddess, Kumari), Shiva Parvati Temple, Kasthamandap (from which Kathmandu derived its name as it is said to be built from the timber of a single tree), Vagwati Temple, Kala Bhairab, and the huge bell.

Some of the houses built against the prescribed code have been demolished. Many of the important temples, including Kasthamandap, have been renovated. Presently, the Jagannath Temple is being renovated.

2. Patan Durbar Square

At a distance of only five kilometres south-east of central Kathmandu, Patan Durbar Square is situated in the city of Lalitpur. It has a number of interesting monuments carved in stone and bronze statues, temples, and squares. The square and its surroundings provide very good examples of Newari architecture. The palace has three courtyards, the main being the Mulchowk. The main attractions of Patan Durbar Square are the Krishna Temple with 21 golden pinnacles, Bhimsen Temple, Taleju Bhawani Temple, the Old Palace with a golden gate and golden windows, Char Narayan Temple with fine wood carvings, and Chyasi Dega and Manga hiti (the stone spouts). The Char Narayan temple is the oldest and was constructed in 1565 A.D.

3. Bhaktapur Durbar Square

Bhaktapur Durbar Square is about 15km from central Kathmandu. The main attractions of Bhaktapur Durbar Square are the the famous Fifty-five Windowed Palace, Lion Gate (Singhadwar), the golden gate, the statue of Bhupatindra Malla, Bastala Devi Temple, the Pashupati Temple, and the National Art Gallery. The golden gate was erected by King Ranajit Malla. It is the entrance to the main courtyard of the Fifty-five Windowed Palace (Pachpanna Jhyale Durbar). The palace itself was built during the time of King Yakshya Malla in 1427 A.D. and was remodelled by King Bhupatindra Malla in the 17th century. The palace is being renovated at the moment. The Nyatapola Temple (the tallest pagoda temple in Nepal built in 1702 AD) and Dattatreya temple are situated in the square slightly below the square where the palace is situated.

4. Swayambhunath Stupa

The historically and culturally important stupa of Swayambhunath is located three kilometres west of central Kathmandu on a hillock about 77m above the level of Kathmandu Valley. There is a belief that the stupa is not human-made but was created by the power of god. The name 'Swayambhu' means self created. The stupa is believed to be more than 2,500 years old. According to history, the stupa was already there at the time of King Mandeva in the 5th Century A.D. On the west side of Swayambhu hill, there is a Buddhist Chaitya of Manjushri, which is worshipped by both Hindus and Buddhists. A number of statues and monasteries are being built in and around the hillock. A Buddha statue on the western side of the hill is among these new ones. Swayambhu hill has been stabilised.

5. Pashupatinath Temple

Located five kilometres east of central Kathmandu and on the western bank of the Bagmati River, the temple of Pashupatinath is a world famous temple for Hindus. Built in the 5th Century, the temple draws a huge

number of Hindu pilgrims annually from South Asia and particularly from India. The temple has a gold-plated roof and four silver doors.

There are more than 550 small and big monuments in the area. The monument complex is important not only from a religious but also from historical and archeological perspectives. The raised platforms on the bank of the Bagmati and behind the temple of Pashupatinath are used for cremation. The important sites within the Pashupati area are the temples of Guheshwori, Vastsaleshwari, Bashuki, Jaya Bageshwari, Kirantashwor, Dhando Stupa, Vishworupa, Chandra Binayak, Shreeram Temple, Lolashwor, Bhandarashwor, Gorakhanath, Jamrashwor, Bhuvanishwari, Bankali, and Rajarajeshori.

Pashupatinath Development Trust has been active in demolishing buildings encroaching on the area and also in constructing new monuments and service areas, including green areas.

6. Boudhanath

Boudhanath Stupa is the biggest stupa in Nepal. It is located 8 kilometres east of the centre of Kathmandu. The stupa is 36 metres high and occupies a sizable area of 82.36 by 82.03 metres. At ground level there is a brick wall with 147 niches and 108 images of the meditational Buddha inset behind copper prayer wheels. The stupa is said to entomb the remains of a Kasyap sage revered by both Buddhists and Hindus. Believed to be constructed during the 5th Century A.D., the stupa is located along the ancient trade route to Tibet. Tibetan merchants rested and offered prayers here for many centuries and when Tibetan refugees entered Nepal in 1950, many of them settled around this area. Boudhanath area is the centre of Tibetan culture in Nepal. There are more than 45 Buddhist monasteries in the Boudhanath area.

7. Changunarayan Temple

The temple of Changunarayan is situated in Changu Village in Bhaktapur at about five kilometres north of Bhaktapur on a hill top. It is one of the finest and oldest specimens of pagoda architecture and is dedicated to the Hindu god, Vishnu. The temple is embellished by stone, wood, and metal crafts. The temple has great historical, archeological, and religious importance. It was constructed in 306 AD by King Mandev. A fifth century stone inscription in the temple proclaims it to be one of the oldest shrines in the Kathmandu Valley.

Annex 3

Industrial Location Policy in the Valley

List A: Industries that may be established inside the municipalities of Kathmandu Valley

- a. *Cottage Industries*
 - Traditional cottage industries (except rural tanning)
- b. *Tourism Industries*
 - Travel Agency
 - Trekking Agency
 - Hotel Resort, Restaurant
- c. *Manufacturing Industries*
 - Food Processing Industries (with machinery worth a maximum of Rs. 200,000) – except for meat processing
 - Electronic Assembly Industry
 - Candle Industry (with machinery worth a maximum of Rs. 100,000)
 - Stationery Industry (with machinery worth a maximum of Rs. 100,000)
 - Wooden Furniture Industry (Band saws are not allowed and with machinery worth a maximum of Rs. 50,000)
 - Woollen yarn spinning (by manual spinning)
 - Rexene Bag Industry (with machinery worth a maximum of Rs. 100,000)
 - Leather Products (with machinery worth a maximum of Rs. 100,000)
 - Herbal Medicine Industry (with machinery worth a maximum of Rs. 50,000)
- d. *Construction Industries*
 - Flyover Bridges
 - Office, Commercial, and Residential Complexes
 - Trolley Bus Service (outside municipalities if they have a workshop and garage)
- e. *Service Industries*

The following service industries can not be established in the municipalities of the Kathmandu Valley

 - Medium and large chemical laboratory
 - Workshop (workshops with machinery worth more than Rs. 200,000)
 - Cut to length sheets, strips, and tubes
 - Repackaging industries other than food items packaging tea, household spices, sugar, maida flour, salt, dal, etc.
 - Processing laboratory for cinema or movie making
 - Washing dyeing plants, textile printing
 - Cold storage

List B: Industries that are not allowed in the Kathmandu Valley

- Tannery
- Chemical fertiliser
- Cement
- Medium and large steel melting foundry
- Pulp and paper except for traditional handmade paper and small-scale recycling plants
- Caustic soda chemical manufacturing industry
- Oil refinery – petroleum products (petrol, diesel, kerosene, lubricant, furnace oil, etc.)
- Medium and large dyeing
- Acid manufacturing
- Fermentation, distillation, and blending (distillery and beer)
- Electroplating and galvanising (medium and large)
- Sugar production and khandsari (food processing)
- Rubber processing (tube and tyre manufacturing)
- Paint industry (medium and large scale)
- Bleaching powder

Annex 4

Geological Features of the Kathmandu Valley and Surroundings

Geological Features

Kathmandu Valley is an intermontane basin surrounded by mountain ranges in the North and South: Shivapuri (2,732m) and Phulchowki (2762 m). The Kathmandu Valley is comprised of Quaternary sediments on top of basement rocks.

The Basement Rocks

The basement rocks are of the Phulchowki and Bhimpheedi groups of the Kathmandu complex of Stocklin and Bhattarai (1977) and are formed by Precambrian to Devonian rocks

The rocks of the Phulchowki and Bhimpheedi groups together form the Kathmandu Complex, which is interpreted tectonically as thrust mass (allocthonous). The rocks of Kathmandu complex together with the underlying Para-autochthonous Nuwakot Complex constitute the Mahabharat Synclinorium, the axis of which passes along the Phulchowki-Chandragiri range, south of the Kathmandu Valley. The basement rocks are intersected by numerous fault systems within Kathmandu Valley (Figure 1). The Bhimpheedi Group consists of relatively high-grade meta-sedimentary rocks of Precambrian age. The group is eight kilometres thick and divided into six formations. The Phulchowki Group is comprised of un-metamorphosed or weakly metamorphosed sediments containing fossils from the early middle Paleozoic age. It consists of a five to six kilometre thick sequence of rocks divided into five formations (Table 1). There are intensely folded and faulted meta-sediments, such as phyllite, schist, slate, limestone, and marble, covering the southern, eastern, and western part and intrusions of acid and basic rocks (granite and gneiss) known as the Shivapuri injection complex in the northern part of the valley. Some isolated rock outcrops of the Tistung and Chandragiri Formation can also be observed in some parts of the valley basin in Balkhu, Pashupatinath, Swayambhu, and Chobhar (see Figure.1). The source rocks of the basin fill sediments are limited to the Phulchowki group and Shivapuri injection complex because the Bhimpheedi group lies outside the watershed boundary of the Kathmandu Valley. The geological succession of the Kathmandu Valley is given in Table. 1.

Quaternary Sediments

The Basement rocks of the Kathmandu Valley are covered by thick semi-consolidated fluvio-lacustrine sediments from the Pliocene to Pleistocene age. The basin is filled by thick semi-consolidated fluvio-lacustrine sediments. The maximum depth of the valley sediment is more than 550 m on the basis of borehole log DMG6 located at the central part of the valley. These thick sediments are mainly derived from the surrounding hills by the ancient drainage channel system.

The fluvio-lacustrine sediments of Kathmandu Valley have been studied by many researchers: Yoshida and Igarashi (1984); Dongol (1985, 1987); Yoshida and Gautam (1988); Shrestha et al (1998); Environmental Geological Project (EGP/DMG in cooperation with BGR/Germany, (1998); Natural Gas Project/DMG and Sakai (2001). Yoshida and Igarashi (1984) have divided Kathmandu Valley sediment into eight different stratigraphic units: Lukundol Formation, Pyangaon, Chapagaon, Boregaon terrace deposits, Gokarna, Thimi, Patan, and Lower terrace deposit. These eight units are again divided into three groups based on their different stages. Lukundol Formation (older deposits); Pyangaon, Chapagaon, and Boregaon terrace deposits (middle stage deposits); and Gokarna, Thimi, and Patan Formations (more recent deposits).

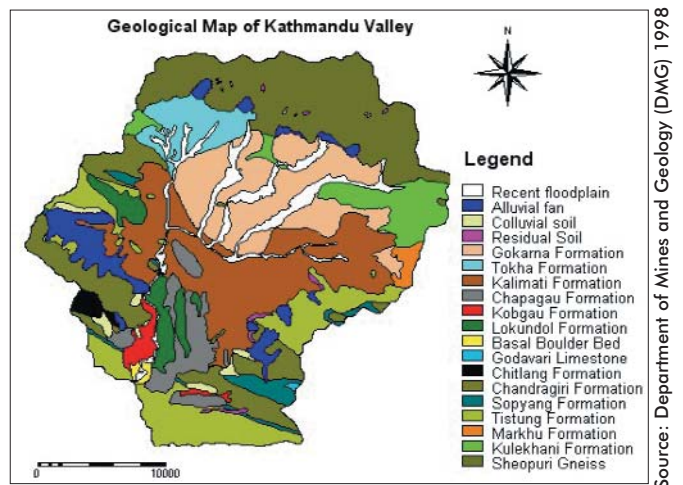


Figure 1: Geological Map of Kathmandu Valley

Source: Department of Mines and Geology (DMG) 1998

Geological Succession of the Kathmandu Valley (modified after Stocklin and Bhattarai 1977)		
Cenozoic	Holocene	Fan gravel, soil, talus, fluvial deposits (gravel, sand, silt)
	Pleistocene	Lake deposits (gravel, sand, silt, clay, peat, lignite and diatomite),
	Late Pliocene-Early Pleistocene	Fluvial deposits (boulder, gravel, sand, silt)
---	-----	-- -----Unconformity-----
Lower Paleozoic	Devonian	Phulchauki Group Godavari limestone - limestone, dolomite Chitlang formation - slate Chandragiri limestone - limestone, phyllite Sopyang formation - slate, calcareous phyllite Tistung formation - meta sandstone, phyllite
	Silurian Cambrian-Ordovician Cambrian Early Cambrian	
---	-----	-- -----Unconformity-----
Pre-Cambrian		Bhimphedi Group Markhu Formation - marble, schist Kulekhani Formation - quartzite, schist
Intrusion		Metamorphic - Sheopuri gneiss Igneous rocks - pegmatite, granite, basic intrusive

Annex 5

Inception cum Training Workshop on Kathmandu Valley Environment Outlook on the 21st-23rd December, 2005



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Kathmandu Valley is a place of extraordinary natural and cultural beauty. But it is a valley now transformed almost beyond recognition. Although some measures have been taken by the government, constantly growing traffic congestion, polluted air from vehicles and brick factories, rapidly expanding urban sprawl, streams and rivers that too often resemble sewers, piles of waste, and shortages of drinking water too often obscure the beauty beneath and beyond. In Kathmandu Valley Environment Outlook, ICIMOD has joined with the United Nations Development Programme and the Ministry of Environment, Science and Technology, Government of Nepal to provide a detailed account of the status of the Kathmandu Valley environment highlighting five key environmental issues – air quality and traffic management, settlement pattern, water quality, waste management, and disaster preparedness. The book reviews their status, and recommends measures to prevent or minimise negative impacts, providing direct options for management by various levels of government, civil society, the public-private sector, and residents. The report provides a reference document for all institutions and individuals involved in the field of environmental management of urban areas, both in Kathmandu itself and in other cities in the region.

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