नेपाल सरकार
सहरी विकास मन्त्रालय
काठमाडौं उपत्यका विकास प्राधिकरण

Vision 2035 and Beyond:
20 Years Strategic Development Master Plan (2015 - 2035) for Kathmandu Valley

काठमाडौं उपत्यका विकास प्राधिकरण
Kathmandu Valley Development Authority




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Kathmandu Valley Development Authority (KVDA)

Ministry of Urban Development

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Scenario of Kathmandu Valley in 2035

सन् २०३५को काठमाण्डौ उपत्यकाको परिदृश्य

'Scenario of Kathmandu Valley of 2035 A. D.' is a dream realized by an able political leadership enlightened through the technological spirit of modern age with development vision of optimum possibilities that envisages through the ownership and resolution of the people as a whole.

This document explicitly explains the ways to translate the vision into action through its Strategic Work Plan. The purpose of this document is to explain the urban development planning agenda for Kathmandu Valley. It is a road map for development of the Valley and recognizes its importance for the growth of rest of Nepal. It also targets at attracting international investors by showcasing KV's opportunity areas.

युग चेतनाको प्रज्ञाद्वारा आउने युगलाई नियाल्ने र उच्चतम विकासका सम्भावनाहरुलाई जनताको साझा संकल्प मार्फत मूर्तरुप दिने राजनैतिक नेतृत्वले देखेको सपना हो- सन् २०३५को काठमाण्डौ उपत्यकाको परिदृश्य । यसलाई रणनीतिक कार्ययोजना (Strategic Work Plan) मार्फत भौतिक रुपमा साकार पार्नका लागि यो दस्तावेज तयार पारिएकोछ । यस दस्तावेजको मुख्य उद्देस्य काठमाण्डौ उपत्यकाको कार्यसूचि (Agenda) का बारे विस्तृत विवरण उपलब्ध गराउनु हो । यो कार्यसूचि काडमाण्डौ उपत्यकाको विकासको मार्ग चित्र पनि हो । यस दस्तावेजले समग्र देशको विकासका सन्दर्भमा काठमाण्डौ उपत्यकाको महत्वमाथि प्रकाश पार्दछ । यसले काठमाण्डौ उपत्यकामा विद्यमान अवसरका क्षेत्रलाई उजागर गर्दै, अन्तराष्ट्रिय लगानीकर्ताहरुलाई आकर्षण गर्ने लक्ष्य पनि लिएकोछ ।

- Planned development will be enhanced though land pooling projects. 7 Satellite towns will be established on western and southern parts of Kathmandu Valley with 50,000 to 100,000 populations in each.
- भमि एकीकरण (Land pooling) परियोजनाहरु मार्फत योजनाबद्ध विकासमा वृद्धि गरिनेछ । काठमाण्डौको पश्चिमी र दक्षिणी भागमा ५०,००० देखि १,००,००० जनसंख्या हुने सात वटा स्मार्ट स्याटेलाइट मझौला शहरहरुको निर्माण गरिनेछन् ।

Figure 1 More planned and safer development will take place (Above is the example of Namuna Gaun, Sanga)

चित्र १: अझ बढी योजनाबद्ध तथा सुरक्षित विकास निर्माण कार्य सञ्चालन गरिनेछ (चित्रमा: उदाहरण नमूना साँगा गाऊँ)

स्रोत: Source: www.rabindra.com.np

- 4% of these towns will be separated for special zones for urban forests and parks as standard norms. Public land will not be allowed to be converted into built-up spaces.
- यस्ता शहरहरुमा ४% क्षेत्र शहरी वन र बगैंचाकोलागि छुट्याईने छ । सार्वजनिक जग्गामा कुनै किसिमको निर्माण कार्य गराईने छैन ।
- With the proper implementation of RSLUP and

building bye-laws, 50% of the built structures will be safer.

- RSLUP (जोखिम सम्वेदनशील भू-उपयोज योजना) तथा निर्माण सम्बन्धी नीति नियमको समुचित कार्यान्वयन गरी सुरक्षित निर्मित संरचनाहरुको परिमाण ५०% पुऱ्याइनेछ ।

- Transit Oriented Development (TOD) will be given priority and new planned developments will have TOD as a major urban structure.

- पारवहन अभिमूखी विकास (Transit Oriented Development -TOD) लाई प्राथमिकता दिइनेछ । नयाँ योजनाबद्ध विकासको प्रक्रियामा पारवहन अभिमूखी विकासलाई सहरी संरचनाको प्रमुख अङ्गका रुपमा ग्रहण गरिनेछ ।

Figure 2 Transit Oriented Development will be given priority

चित्र २: परिवहन निर्देशित विकासलाई प्राथमिकता दिइनेछ

स्रोत: www.treehugger.com

- By 2035, forest area in the Valley will increase to 40%.
- २०३५ सम्ममा, उपत्यकामा जङ्गल क्षेत्र ४०% पुऱ्याइनेछ ।
- River systems of Kathmandu Valley will be restored.
- काठमाडौं उपत्यकाका नदी प्रणालीहरु पुर्नस्थापना गरिनेछ ।

- Kathmandu Valley will have 56% of agricultural area and the built up will decrease to 12% by 2035.
- २०३५ सम्ममा काठमाण्डौ उपत्यकामा कृषि क्षेत्र ५६% कायम गरिनेछ भने निर्मित क्षेत्र १२%मा खुम्चिनेछ ।

Figure 3 56% of KV will become agricultural area once again

चित्र ३: काठमाण्डौ उपत्यकाको ५६% भूमीलाई फेरी कृषि क्षेत्रमा परिणत गरिनेछ ।

स्रोत: Source: en.wikipedia.org

Figure 4 KV will have food and water security
चित्र ४: काठमाण्डौ उपत्यकामा खाद्यान्न तथा पानीको सुरक्षा हुनेछ ।
स्रोत:: econitynepal.com

- The Valley will be more resilient and self sustainable in terms of food and water security.
- खाद्य पदार्थ तथा पानीको सुरक्षाका सवालमा काठमाण्डौ उपत्यका ज्यादा उत्थानशील तथा आत्मनिर्भर बन्नेछ ।

- Private sector participation in infrastructure development projects will increase by double.
- पूर्वाधार विकास परियोजनामा निजी क्षेत्रको सहभागिता दुई गुणाले बढाइनेछ ।

- All households will have access to piped water supply, toilet facility and telecommunication service.
- सबै घरहरुमा निजी पानीको धारा, शौचालय तथा दूरसञ्चार सेवाको पहुँच भएको हुनेछ ।

- Sewerage services will not be discharged into river channels.
- नदी प्रणालीहरुमा ढल निकास गरिने छैन ।

- All institutional/ commercial buildings will have their own waste water treatment system.
- सबै संस्थागत/व्यवसायिक भवनहरुमा खेर गएको पानीलाई सुद्धीकरण गर्ने आफ्नै प्रणाली हुनेछ ।

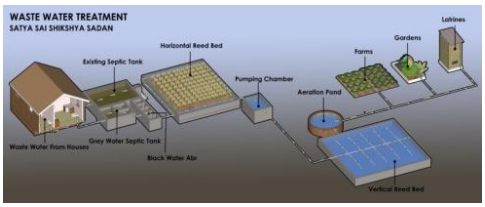


Figure 5 Institutional/ Commercial buildings will have their own Waste Water Treatment System
(Above example of Satya Sai SIksha Sadan)
चित्र ५: संस्थागत/व्यवसायिक भवनहरुमा खेर गएको पानी प्रशोधन गर्ने आफ्नै प्रणाली हुनेछ ।
(चित्र: सत्य साई शिक्षा सदनको नमूना)

- Number of functional solid waste management units will increase. Waste collection and segregation will be done more regularly in community level.
- ठोस फोहोर व्यवस्थापन गर्ने क्रियाशील प्लान्टहरुको संख्यामा वृद्धि गराइनेछ ।

- Road density in newly declared municipalities will reach 12km/sq.km. Pedestrian dedicated strips and sectors will be targeted as 35% of road surface, and minimum 35% will be dedicated for public transport. The principle of eco-sensitive design/ detail will be mandated.

- हालसालै घोषणा गरिएका नयाँ नगरपालिकाहरुमा सडकको घनत्व प्रति वर्ग किलोमिटर/ १२ किलोमिटर पुऱ्याइनेछ। सडक सतहको ३५% पैदल यात्री समर्पित बाटोको लागि लक्षित गरिनेछ र न्यूनतम ३५% सार्वजनिक यातायातको लागि समर्पित गरिनेछ। पर्यावरण संवेदनशील डिजाईनको सिद्धान्त अनिवार्य गरिनेछ।

- Central Kathmandu will be easy to get around with a walking and cycling network, and transit routes connecting to the urbanizing municipalities.
- मध्य काठमाण्डौमा पैदल, साइकल र सडकमार्गबाट पुग्न र हिड डुल गर्न सजिलो बनाइनेछ।

- The new satellite towns along the southern Kathmandu will become strong focal points for community life and will encourage a sense of belonging.
- काठमाण्डौको दक्षिणी क्षेत्रमा विस्तारित नयाँ स्याटलाइट बस्ती सामुदायिक जीवनका लागि आकर्षणको केन्द्र हुनेछ र यसले आत्मियतालाई प्रोत्साहन गर्नेछ।

- Streets and public spaces will be transformed to make them safer and more inviting especially for pedestrians and cyclists.
- सडक तथा सार्वजनिक खुला ठाउँलाई खासगरी पैदल तथा साइकलयात्रीका लागि अझ सुरक्षित र आकर्षक हुने गरी सुधार गरिनेछ।

- Better pedestrian links will be created with installation of energy efficient lighting, improvement of footpaths and greening of streets.
- ऊर्जामैत्री प्रकासको व्यवस्था, पैदलपथको सुधार र सडकको हरितकरण गरी सुधारिएको पैदलपथ सञ्जाल निर्माण गरिनेछ।

Figure 6 Green infrastructure and cycle lanes will be installed on streets and public spaces

चित्र ६: सडक तथा सार्वजनिक खुला ठाउँमा हरित पूर्वाधार तथा साइकल पथ निर्माण गरिनेछ। स्रोत: nacto.org/publication/urban-bikeway-design-guide

Figure 7 Tokyo Tower as an example
चित्र ६: उदाहरणका रुपमा टोकियो टावर
स्रोत:: www.destination360.com

- Creation of public space of international quality, scale and relevance will be targeted in each municipality of the valley.
- काठमाडौं उपत्यकाको हरेक नगरपालिकामा अन्तरराष्ट्रिय स्तरको सार्वजनिक स्थल बनाईनेछ ।

- All street lights will be run by solar power.
- सडकका सबै बत्तिहरु सौर्य ऊर्जाबाट सञ्चालन गरिनेछन् ।
- Utility tunnels will be installed in 50% of the road corridors in the Valley.
- उपत्यकाको ५०% सडकहरुमा उपयोगिता सुरुंग स्थापना गरीनेछ ।
- Public transportation will be accessible to all and whole Kathmandu Valley will have a connectivity plan.
- सार्वजनिक यातायात सर्वसुलभ हुनेछ । यसमा सम्पूर्ण काठमाण्डौ उपत्यकालाई जोड्ने योजना हुनेछ ।
- High capacity vehicles will be used for public transportation service.
- सार्वजनिक यातायात सेवाका लागि उच्च क्षमताका सवारी साधनहरुको प्रयोग गरिनेछ ।

- By 2020 the Ring Road expansion project will be completed and BRT will be installed on the Ring Road.
- २०२० सम्ममा, चक्रपथ विस्तार परियोजना सम्पन्न गरिनेछ र चक्रपथमा द्रुत बस परिवहन (BRT) सञ्चालन गरिनेछ ।

- By 2025 the Inner Ring Road Development will be completed and BRT will be installed on the Inner Ring Road.
- २०२५ सम्ममा, भित्री चक्रपथ विकासकार्य सम्पन्न गरिनेछ र भित्री चक्रपथमा द्रुत बस परिवहन (BRT) सञ्चालन गरिनेछ ।

Figure 8 BRT and AGT will be running in various sections of the Valley

चित्र ८: द्रुत बस पारवहन **(BRT)** तथा निर्देशित मार्गगामी स्वचालित परिवहन **(AGT)**
स्रोत: JICA KUTMP Presentation

- By 2030, AGT will be installed on East-West and North-South route.
- २०३० सम्ममा, पूर्वी-पश्चिमी र उत्तर-दक्षिणी रुटमा निर्देशित मार्गगामी स्वचालित परिवहन **(AGT)** सञ्चालन गरिनेछ ।
- Inter-city bus terminals will be established at major transit points.
- परिवहनका प्रमुख विन्दुहरुमा बस टर्मिनलहरु निर्माण गरिनेछन् ।

- The hierarchy of open spaces will be maintained and they will be accessible to all.
- खुला क्षेत्रहरुलाई प्राथमिकताका आधारमा वर्गीकरण गरिनेछ र सबैको पहुँचको सुनिश्चितता गरिन्छ ।

- A neighbourhood park will be made available for each 1sq. km. area of housing in new developments (in 15 minutes walking distance).
- नयाँ विकसित हुने क्षेत्रमा प्रत्येक १ किलोमिटरको दूरीमा (१५ मिनेटको पैदल दूरीमा) पार्क निर्माण गरिनेछ ।

Figure 9 Open spaces will be available in all levels

चित्र ९ सबै तहमा खुला क्षेत्र उपलब्ध गराइनेछ ।
स्रोतः : nepalitimes.com & antvus.com

- River corridors will be developed into green pathways.
- नदी किनारहरुलाई हरित पदमार्गका रुपमा विकास गरिनेछ ।

Figure 10 Green river corridors
चित्र १०: हरित नदी किनारहरु
स्रोत: www.inhabitat.com

- Historic core city areas and traditional settlements will be well preserved in terms of architecture, culture and economy.
- ऐतिहासिक मुख्य सहरी क्षेत्र र पुरातन बस्तीहरुलाई वास्तुकला, संस्कृति र अर्थतन्त्रका आधारमा संरक्षण गरिनेछ ।

- All the major heritage areas will be pedestrianized.
- सबै प्रमुख पुरातात्विक महत्वका क्षेत्रहरुमा गाडीको प्रवेश निषेध गरिनेछ ।

Figure 11 Pedestrianization and tourism promotion in historic areas
चित्र ११: गाडी निषेधित क्षेत्र तथा पर्यटन प्रवर्धन
स्रोत: www.virtualtourist.com

- Tourism promotion will result in economy growth and employment generation.
- पर्यटनको प्रवर्धनले आर्थिक वृद्धि र रोजगारीको सिर्जना गर्नेछ ।

Figure 12 Entertainment Parks/ Hubs will be established at different locations
चित्र १२: विभिन्न क्षेत्रमा मनोरञ्जन पार्क/केन्द्रहरु निर्माण गरिनेछन् ।
स्रोत: commons.wikimedia.org

- Entertainment parks and hubs will be established and maintained at different areas through the support from Private sector participation.
- निजी क्षेत्रको सहकार्यमा विभिन्न ठाऊँहरुमा मनोरञ्जन पार्क तथा केन्द्रहरु निर्माण गरिनेछन् ।

- The Valley will contain premium spaces for business activities and high-quality jobs in the city centre and new CBDs.
- उपत्यकामा व्यवसायिक क्रियाकलाप, उच्च तहका रोजगार र नया केन्द्रीय व्यापार जिल्ला का लागि सहरका मध्य क्षेत्रमा प्रोत्साहन क्षेत्र (Premium Space) उपलब्ध गराइनेछ ।

- Facilities with iconic representations for the Federal State Structures will be provided at different places by securing the area through land pooling.
- भूमि एकीकरणका माध्यमबाट जमिनको व्यवस्था गरी विभिन्न ठाऊँहरुमा संघीय राज्य संरचनाको प्रतिनिधित्व गर्ने प्रतिमाहरु निर्माण गरिनेछन् ।

- Social, cultural and recreational facilities will be provided to attract and retain knowledge and talent of the Valley's youth.
- उपत्यकाका युवाहरुको ज्ञान र दक्षतालाई आकर्षण गर्न र उनिहरुलाई देशमा नै धारण गर्नका लागि सामाजिक, सांस्कृतिक र मनोरञ्जनात्मक सुविधाहरु उपलब्ध गराइनेछ ।

Figure 13 Social inclusion in cultural events
चित्र १३: सांस्कृतिक कार्यक्रमहरुमा सामाजिक सहभागिता
स्रोत: www.explorehimalaya.com

- Cultural vitality will be maintained from high rates of participation in events and festivals.
- चार्ड पर्वहरुमा उच्च सहभागिता जनाउँदै सांस्कृतिक जीवन्ततालाई निरन्तरता दिइनेछ ।

- There will be no more informal settlements in vulnerable public lands.
- असुरक्षित सार्वजनिक जमिनमा अनधिकृत बसोवास हुने छैनन् ।

- A new culture of institutional housing will be developed. 10% of land will be separated in urban core for provision of such housings.
- संस्थागत हाउजिङको संस्कृतिको विकास गरिनेछ । मुख्य सहरी क्षेत्रको १०% जमिन यस्ता हाउजिङहरुका लागि छुट्याइनेछ ।

Figure 14 Affordable Institutional Housings will be provided
चित्र १४: किफायती संस्थागत घरहरु उपलब्ध गराइनेछन् ।
स्रोत:: practicalaction.org

- Relative equality will be improved through increased affordable housing and better access to community facilities, programs and services across the local area.
- किफायती आवास र सामुदायिक अवसर, सुविधा, कार्यक्रम तथा सेवाहरुमा पहुँचमा अभिवृद्धि गरी सापेक्षिक समानताको प्रवर्धन गरिनेछ ।

1. INTRODUCTION

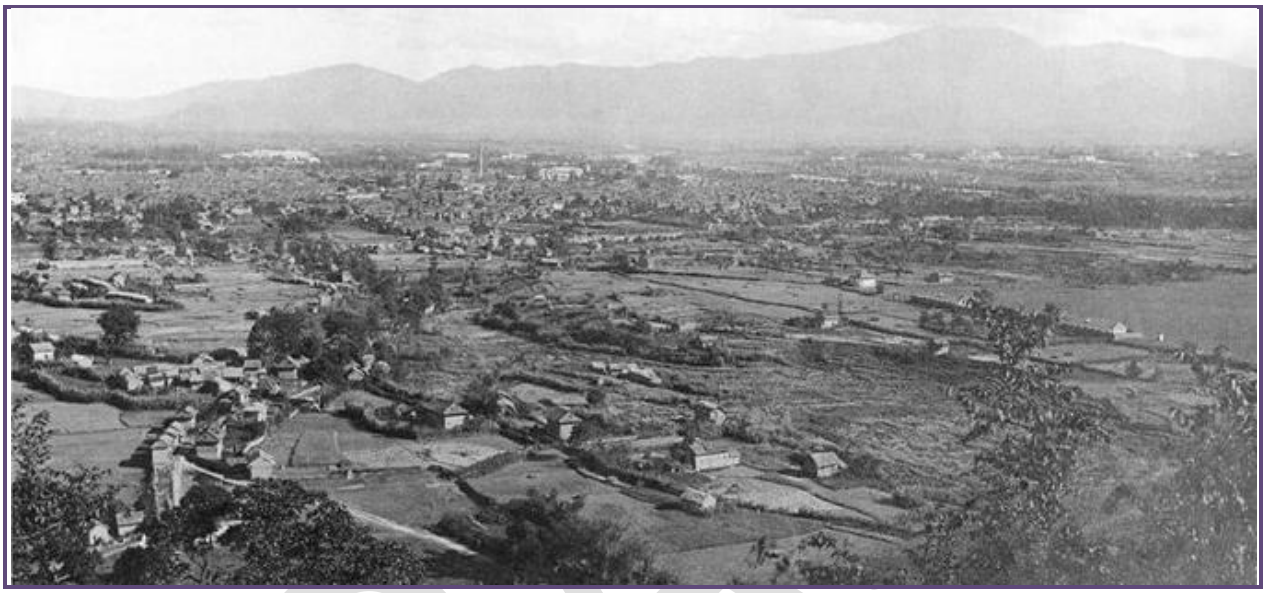


Figure 1-1 Kathmandu with Dharahara and Phulchowki as seen from Swayambhu during 1920s
Image Source: http://sajha.com/sajha/html/images/humor/ktm%20from%20swyambhunath.jpg

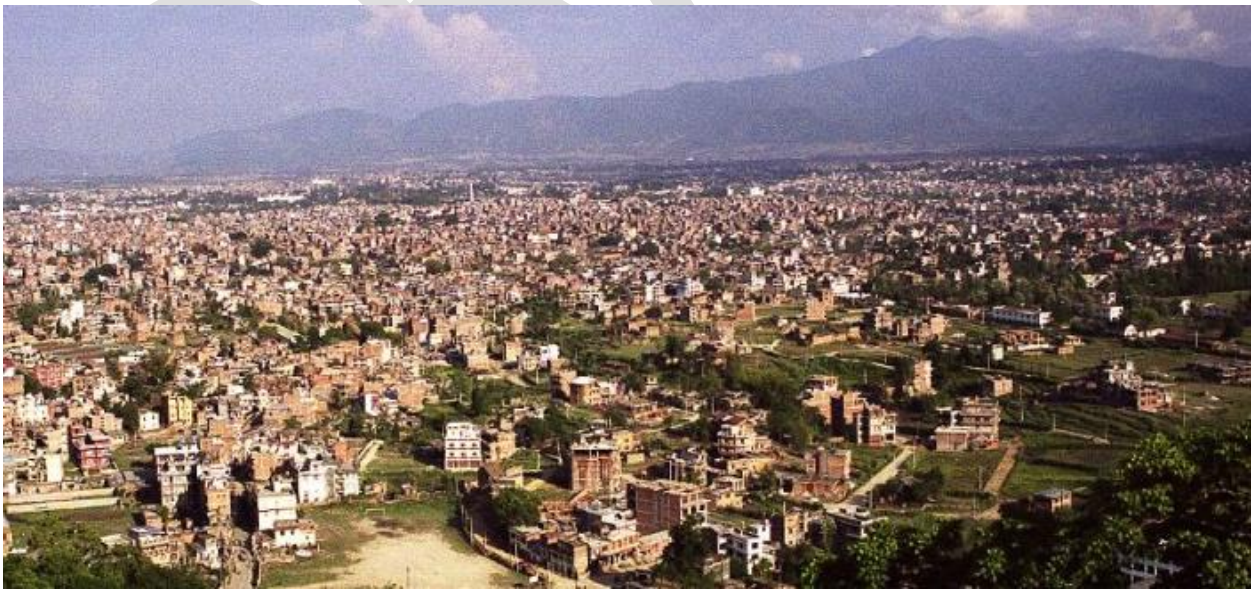


Figure 1-2 Kathmandu with Dharahara and Phulchowki as seen from Swayambhu during 2013
Image Source: http://cache2.asset-cache.net/gc/158735570-kathmandu-from-swayambhunath-gettyimages.jpg

परिच्छेद १ को सारांश

आम रूपमा स्वीकार गरिएको पौराणिक कथा र भौगर्भिक प्रमाणहरूका आधारमा काठमाडौं उपत्यकामा कुनै समयमा ठूलो ताल थियो । पौराणिक पात्र मञ्जुश्रीले आफ्नो चामत्कारिक खड्गले चोभारको गल्छी काटेर तालको पानीलाई बाहिर पठाए र काठमाडौं उपत्यकालाई मानवबस्तीका लागि योग्य बनाए । प्राप्त सबैभन्दा पुराना तथ्यहरूका आधारमा इसवीको दोस्रो शताब्दीमा काठमाडौं उपत्यकामा मानवबस्ती भएको प्रमाण पाइन्छ । त्यसपछिका विभिन्न कालखण्डमा उपत्यकाका विभिन्न ठाउँहरूमा बस्तीहरूको विकास हुँदै गयो । ७२१ वर्ग किलोमिटर क्षेत्रफलमा विस्तारित काठमाडौं उपत्यकामा उर्वर जमिन र समशीतोष्ण हावापानी छ । यिनै अद्वितीय प्राकृतिक गुणले गर्दा काठमाडौं उपत्यका धेरै मानिसहरूका लागि बसाइँ सराइको आकर्षणकेन्द्र बनिरह्यो । कालान्तरमा किराँत, मल्ल, शाह र राणावंश काठमाडौंमा शासन गर्न आइपुगे ।

तिब्बतसँग व्यपारको पहुँचका कारण सन् १२०० देखि १७६८ सम्ममा उपत्यकाको धेरै उन्नति भयो । आजसम्म काठमाडौं उपत्यकाको चिनारी दिने वास्तुकला, मन्दिरहरू र विश्व सम्पदा क्षेत्रमा सूचीकृत तीन दरबार क्षेत्रहरू सहितका मुख्य सहरहरू सबै मल्लल कालका धरोहरहरू हुन् । शाह राजाले सन् १७६८ मा उपत्यकालाई कब्जा गरिसकेपछि काठमाडौं उपत्यकालाई नेपालको राजधानी घोषणा गरियो । सन् १९५०मा प्रजातन्त्रको घोषणा पछि नेपालको जनसंख्याको ठूलो हिस्सा बसाइँ सरी काठमाडौंमा स्थानानन्तरित भयो । यसका साथै गाडीको प्रयोगको सुरुवातले कृषिमा आधारित काठमाडौं एकाएक सहरी क्षेत्रमा रूपान्तरित भयो र यहाँ आमूल परिवर्तनको हुन थाल्यो । नेपालमा अग्रगामी परिवर्तन ल्याउने उद्घोष सहित सञ्चालन गरिएको १९९६ देखि २००६ सम्म १० वर्ष चलेका सशस्त्र संघर्षका कारण सुरक्षाको खोजी गर्दै देशभरबाट काठमाडौं स्थानानन्तरण हुनेहरूको संख्या आकस्मिक रूपमा बढ्यो । काठमाडौं देशको राजधानी सहर हुनुका अतिरिक्त, आर्थिक गतिविधि र सेवाहरुको पनि केन्द्र भएका कारण आर्थिक अवसर र स्तरीय शिक्षा तथा स्वास्थ्यका लागि सेवाग्राहीहरुलाई आज पनि काठमाडौंले निरन्तर रूपमा आफूतर्फ तानिरहेकोछ ।

बसोवासका लागि उपयुक्त हुदाहुदै पनि उपत्यका भुकम्प तथा विपद्को जोखिम कारणले उत्तिकै सम्वेदनशील बनेकोछ । नेपालको धेरै जसो मध्य पहाडी क्षेत्रमा भूकम्पको जोखिममा छ तथापि, थिग्रिएको माटोको तहले बनेका कारण उपत्यका भुकम्पप्रति अझ बढी जोखिममा छ । २०७२ बैशाख १२ गते आएको भूकम्प यसको प्रमाण हो । यसले उपत्यकामा धेरै जनधन, पूर्वाधार र सांस्कृतिक धरोहरहरुको ठूलो विनाश गरायो ।

जोखिम प्रति संवेदनशील क्षेत्र हुँदा हुँदै पनि, राष्ट्रस्तरमा उपत्यकाको आर्थिक तथा जनसाङ्ख्यिक प्रभुत्व उल्लेखनीय छ । देशको कूल सहरी जनसंख्याको २४% लाई आवास दिने काठमाण्डौ उपत्यका नेपालको सशरीकरणको केन्द्र हो (सहरी विकास मन्त्रालय २०१५) । हाल १६ वटा नयाँ नगरपालिकाहरु थपिए पछि, उपत्यकामा नगरपालिकाको संख्या २१ पुगेको छ जहाँको जनसंख्या वृद्धिदर ४.५% रहेकोछ । यो दक्षिण एशियामा सबैभन्दा बढी जनघनत्व भएको र सशरीकरण हुदै गरेको सहरमा पर्छ । उपत्यकाले राष्ट्रको कूल गार्हस्थ उत्पादनमा पुऱ्याएकोको योगदानले समग्र देशभरीमा यसको आर्थिक प्रभुत्वलाई झल्काउछ । नेपाल राष्ट्र बैंकको तथ्यांक अनुसार राष्ट्रको कूल गार्हस्थ उत्पादनमा उपत्यकाले ३१% योगदान दिन्छ ।

काठमाण्डौ उपत्यकाको द्रुत गतिमा सहरीकरण हुँदै गरे तापनि, यसको सहरी विकासले गति लिन सकेको छैन । अव्यवस्थित विकास, भूमिको खण्डीकरण, अपर्याप्त भौतिक पूर्वाधार, प्रदुषण, बढ्दो गरिवी र खस्कदो सहरी वातावरण उपत्यकाले सामना गरिरहेको प्रमुख चुनौतीहरु हुन् । अव्यवस्थित विकासको प्रमुख कारण प्रभावकारी भूमि व्यवस्थापनको अभाव हो । नगरपालिकाहरुमा भू-उपयोग योजना देख्न पाईदैन, त्यस माथि विद्यमान भवन निर्माण नीति नियम तथा आचार संहितालाई राम्रोसँग पालना गरिँदैन । यसले उपत्यकाको अस्तव्यस्त सहरीकरणमा थप बल पुऱ्याएको छ । यूएन ह्याविट्याट (UNHABITAT) का अनुसार काठमाडौं उपत्यकाको समष्टिगत समृद्धिको पक्ष ज्यादै न्यून छ जुन ०.५९८ रहेको छ । तथापि, उपत्यका प्राकृतिक, समाजिक, सांस्कृतिक र धार्मिक मूल्यहरुमा धनी छ ।

जसले उपत्यकाको असीमित आर्थिक सम्भावनालाई उजागर गर्दछन् । तसर्थ, समग्र उपत्यकाको योजनाबद्ध सहरी विकासको नेतृत्व गर्नका लागि एक सशक्त प्रशासनिक निकायको आवस्यकता बोध गरिएकोछ ।

उपत्यकाको विकासलाई दिशा प्रदान गर्नका लागि ठूलो प्रयासको खाँचो रहेको मूल्यांकन गर्दै, **काठमाण्डौ उपत्यकाको दीर्घकालिन विकास योजना २००२** निर्माण गरिएको थियो । यसले इस्वी संवत् २०२० सम्ममा काठमाण्डौ उपत्यकाको विकासका लागि आवस्यक पर्ने नीति तथा नियमहरुको परिकल्पना गरेको छ । तथापि, एक दशक लामो सशस्त्र द्वन्द्व, राजनैतिक अस्थिरता, कार्यकारी निकायका बीचमा कार्यक्षेत्र बाझिनु, साझेदारहरुका बीचमा सहकार्य नहुनु, र विस्तृत कार्ययोजना नहुनुका कारणले यसको कार्यान्वयन पक्ष निकै कमजोर हुन पुग्यो ।

कालक्रम अनुरुप उपत्यकाको बदलदो परिस्थितिलाई सम्बोधन गर्न र समुन्नत भविष्यको परिकल्पना निर्माण गर्नका लागि काठमाण्डौ उपत्यका विकास प्राधिकरणले २० वर्षे (२०१५ देखि २०३५) रणनीतिक विकास गुरु योजना निर्माण गरेकोछ । यसले उपत्यकाको सहरीकरणसँग सम्बन्धित विद्यमान तथा उदीयमान प्रवृत्तिहरु, वातावरणीय सवालहरु, सामाजिक-राजनैतिक र आर्थिक परिस्थितिहरु समेटिएका 'नयाँ आवस्यकताहरु'लाई सम्बोधन गर्ने विश्वास गरिएको छ । रणनीतिक विकास गुरु योजना (२०१५-२०३५)को मुख्य उद्देश्यहरु प्रकृति, समुदाय, र संस्कृति बीचको अन्योन्याश्रित सम्बन्धको प्रवर्धन गर्दै काठमाण्डौ उपत्यकालाई सफा, सुरक्षित, व्यवस्थित, समुन्नत र मनोहर देशको राजधानी शहरका रुपमा विकास गर्नु हो । यस अभिलेखले दीर्घकालीन विकास योजना २००२ को विश्लेषण गर्दै काठमाण्डौ उपत्यकाको दीगो विकासका लागि रणनीतिक दिशा प्रदान गरेको छ ।

SUMMARY OF CHAPTER 1

This chapter gives a brief background of Kathmandu Valley in terms of its mythical creation as well as history and chronology of its urban development. The chapter emphasizes the need of Strategic Development Master Plan for the proper development of the Valley.

Geological evidences support the commonly accepted myths that Kathmandu Valley was once a huge lake. The Swoyambhu Purana adds that it was drained by a mythical figure Manjushree, who had cut the hill at Chobhar with a magical sword, to create a valley suitable for human settlement. The earliest archaeological evidences of settlement in the valley dates back to 2nd century AD, which was followed by emergence and development of many towns in various places of the valley during different time periods. The valley covers the area of 721 km^2 and is gifted with fertile soil and mild climatic condition. Agriculture, forestry, agro-forestry based cottage industries, trade and crafts specialization have characterized the urban economy of the valley from very early historical periods. As a result, it has attracted migrants to settle in this valley and has been subsequently ruled by various dynasties, namely Kirat, Lichchhavi, Malla, Shah, and Rana in due course of time. It was during the Malla Dynasty between 1200 and 1768 that the valley flourished due to its trade with Tibet. The three durbar squares, with palace courts and tiered temples forming the core of the traditional urban built form, now recognized as World Heritage for their remarkable architecture, are from this Malla period. After the takeover by the Shah King in 1768, Kathmandu was declared as the capital of Nepal and followed by declaration of democracy in 1950s, the valley underwent drastic transformation from agricultural based economy to an urban centre due to influx of migrants and introduction of vehicles. Moreover, it was during the insurgence period from 1996 to 2006, with the proclaimed aim of establishing a new democratic state, that the valley witnessed a heavy influx of migrant from all across the country for security reasons. Also, being the national capital as well as economic and service centre, it has ever since attracted people, who are in search of economic opportunities, as well as health and educational services.

However, the suitable natural living condition of the valley is also coupled with natural disaster, as it is highly vulnerable to earthquake. Though most of the mid-hill belt region of Nepal is exposed to the risk of earthquake, the soil condition of the valley as it has deposition of sedimentary layer, has amplified its vulnerability to earthquake. It was also evident in April 25, 2015 earthquake, in which the valley succumbed to massive loss of human life, physical infrastructure and cultural heritage.

Despite the prevalent vulnerability, its economic and demographic dominance in the national landscape is significant. Kathmandu Valley is the hub of Nepal's urbanization that accommodates nearly 24% of the nation's urban population (MoUD, 2015). With recent addition of 16 new municipalities, there are 21 municipalities in total and with population growth rate of 4.5%; it is one of the most populous and urbanizing cities in Southeast Asia. Its economic dominance is depicted by its contribution to the national GDP. According to Nepal Rastra Bank (NBC) 31% of the national GDP is contributed by the Valley.

Though Kathmandu has been urbanizing rapidly, its urban development has not been able to catch the pace. Haphazard development, land fragmentation, inadequate infrastructure, pollution, increasing poverty and degrading urban environment are the major issues faced by the valley. The principal reason

behind haphazard development is lack of effective land management. Land use planning of the municipalities are not available moreover building bylaws and building codes are weakly followed, which have added on to chaotic urban growth in the valley. According to UNHABITAT, the overall prosperity factor of the valley is considered weak, which is about 0.598. However, it is also rich in natural, social, cultural and religious values, which foster unlimited economic opportunities. Therefore, the valley needs a strong governing body that administers the overall planned urban development. Underscoring the need of major intervention to guide development of the valley, the Long Term development Plan of Kathmandu Valley 2002 (LTDP) was approved by the GoN, which envisaged policies and strategies for the development of Kathmandu Valley until 2020 AD. However, its weak implementation was mainly due to the decade long armed conflict, political instability, overlapping of the jurisdictions, lack of coordination between stakeholders and lack of a detailed action plan.

Therefore, to address the changing scenario of the valley in due course of time and envisage a better future, Kathmandu Valley Development Authority (KVDA) has developed the 20 year Strategic Development Master Plan (2015 - 2035) to address 'new requirements' which considers the existing and emerging trends of urbanization, environmental issues, socio-political and economical situations of the Valley. The major objective of the SDMP (2015- 2035) is – To establish Kathmandu Valley as a Safe, Clean, Organized, Prosperous and Elegant national capital – by enhancing the interdependence of Nature, Community and Culture. The document analyzes the LTDP 2002 and provides strategic direction for sustainable development of the Kathmandu Valley.

This chapter gives a brief background of Kathmandu Valley in terms of its mythical creation as well as history and chronology of its urban development. The chapter emphasizes the need of Strategic Development Master Plan for the proper development of the Valley.

1.1. Kathmandu Valley – Background

Kathmandu Valley, a part of the Middle Mountain Physiographic region, lies in the Bagmati River Watershed. It covers an area of 721.87 sq. km. covering entire Kathmandu and Bhaktapur districts and approximately 50% land area of Lalitpur district. Geographically, the Valley extends from 27°49'4" to 27°31'42" latitude and from 85°11'19" to 85°33'57" longitude in the mid-mountain physiographic region of Nepal. It comprises of 22 municipalities within the three districts: Kathmandu, Lalitpur and Bhaktapur [Refer Figure 1.3].

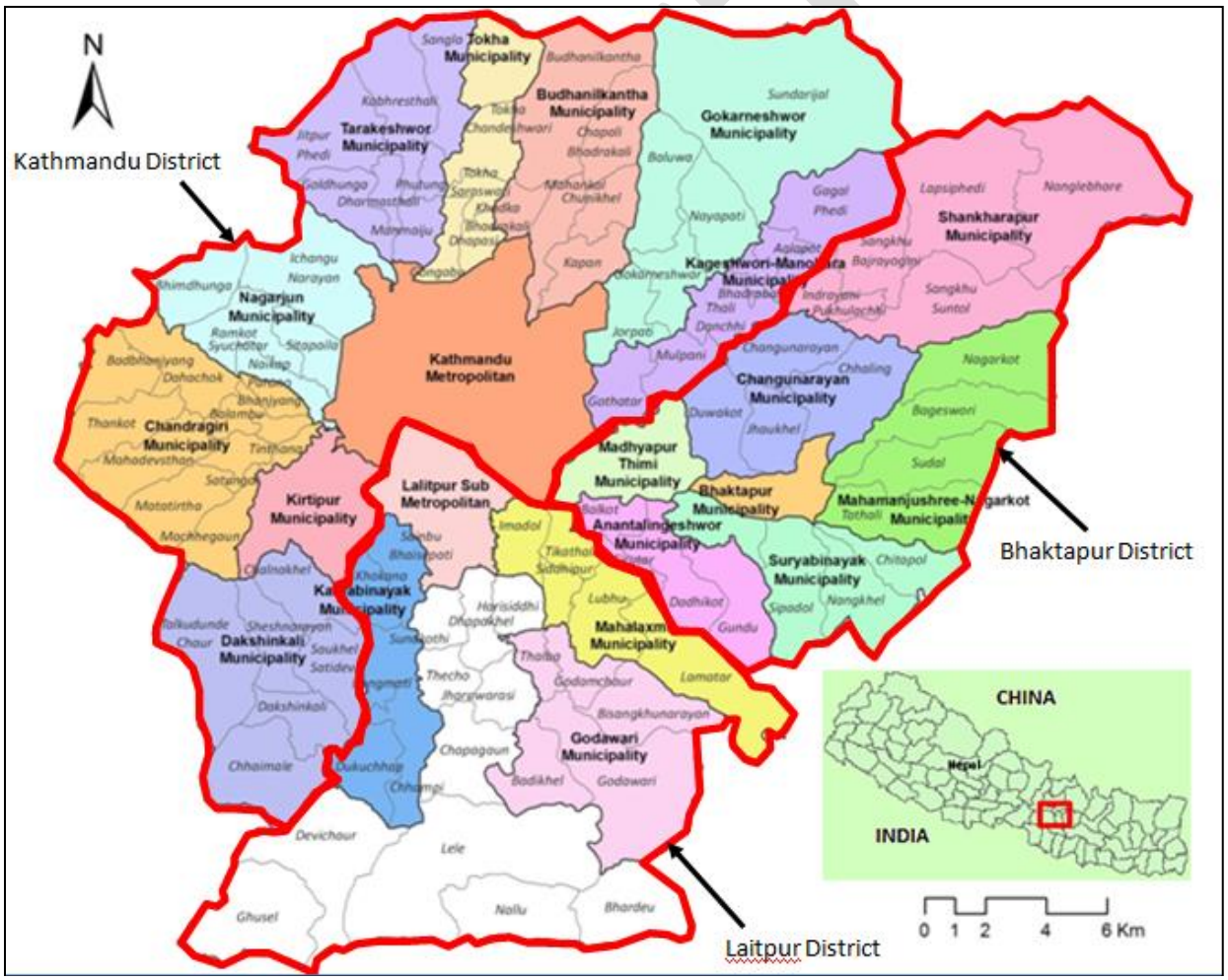


Figure 1-3 Municipalities and VDCs in the Kathmandu Valley

Historically, Kathmandu Valley has enjoyed sustainable development practice and maintained an ecological balance of urban development through various physical features; cultural practices as well sustainable opportunities for economic development. However, at present, the rapidly growing and modernizing Kathmandu Valley (KV) is facing serious problems of sustainability in all fronts: economic,

social, environmental and ecological. Various studies have indicated that the annual rate of population growth in the Kathmandu Valley is 4.3% in the past decade with the highest growth up to 6.5%, making the population growth rate in the Valley one of the highest in the sub-continent. With the current growth rate, the total population in the Valley is estimated to be 2.54 million (CBS Nepal, 2012), with an estimated projection of 4 million and 6.7 million in the years 2020 and 2030 respectively. This unprecedented population growth has put tremendous pressure on the limited resources of the valley resulting in rapid land use changes, land degradation, land fragmentation, poor environmental quality, along with ever increasing gaps between demand and supply of urban infrastructure, poor water and sanitary conditions and overall depletion of quality of life, thus bearing heavy adverse effect of urbanization in the tourism sector thus affecting the overall economy of the country.

Figure 1-4 A perspective view of urban landscape development in Kathmandu Valley
Image Source: KVDA

KV is tectonically located on the collision zone of the Indian Plate and Eurasian Plate. Due to the geological formation of its land that comprises of soft sedimentary layers; the valley is considered as one of the highest vulnerable areas to the earthquake. This greatly increases the vulnerability of population to disasters due to insufficient preparedness and lack of proper prioritization of plan to mitigate and reduce such vulnerabilities. This has been well evident with the outcome of an earthquake of 7.8 magnitude on April 25, 2015[1] and the consequent aftershocks that hit the valley and resulted in loss of human life, physical infrastructure and cultural heritage.

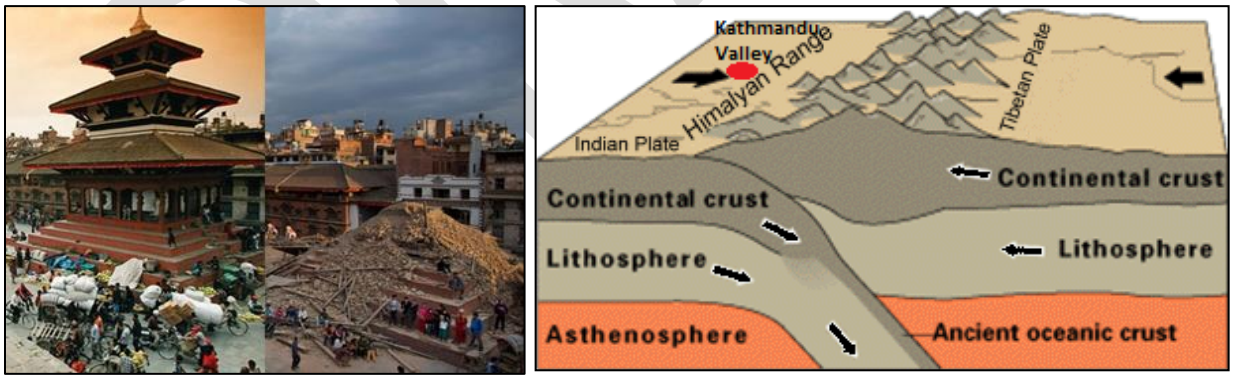


Figure 1-5 Basantapur area before and after the April 25 earthquake (Left) Right: Collision of Indian plate with Tibetan plate)
Image Source: www.theguardian.com

[1] Termed as 'The 2015 Gorkha Earthquake' in this document

Figure 1-6 Damaged buildings in Kathmandu lean to their sides due to April 25 earthquake in Sitapaila
Image Source: KVDA

Figure 1-7 Ancient sketch shows Manjushree drained the waters of the lake by cutting the ridge at Katuwaldaha;
Image Source: http://www.theinfinitemind.info/feb20143.jpg

1.2. Historical Background of the Growth of Kathmandu Valley[2]

Geological evidences support the popularly accepted mythological tales that initially Kathmandu Valley was once a huge lake. The Swoyambhu Purana adds that Manjushree drained the waters of the lake by cutting the ridge at Katuwaldaha, and then established a town around the hills of Swoyambhu and Guhyeshwari. Historians believe that the first settlers were of Tibeto-Burman descent that had expanded in north east of India. Kiratis quickly adapted themselves to the KV and began clearing the forests in the lowlands, revealing the great agricultural potential of the black soil of the valley for cultivation. The Kautilya chronicle of the 4th century B.C mentions that agriculture was highly unpopular at that time and lot of effort was made to import the grain from a distance, suggesting that the early economy of the valley was based largely upon trade and commerce. Later in the 2nd century B.C, Buddhist missionaries sent by the emperor Ashok entered the valley, along with Charumati, the daughter of Emperor Ashok to promote Buddhism and teach the inhabitants about the agricultural practices and handicraft skills.

Historical manuscripts record that Manjushree built a town between Swayambhu hill and Guhyeshwari and annexed a new town called Sankasyanagari. Later, towns like Bishalnagar and Devpatan were established on Tars[3]. Consequently, brick was soon used for building purposes as the inhabitants discovered that the black soil made a fairly strong and durable brick. During the 800 years of Licchavi reign after the Kiratis, Kathmandu Valley advanced in trade, commerce, agriculture, art and architecture and the old city of Devpatan also expanded. Towards the end of the 7th century A.D, the town of Patan is said to have been established and was probably determined by the location of four Buddhist stupas by the missionaries of Ashok in the second century B.C. Patan was enlarged and consolidated into a compact town, which is believed to have been given its circular form to resemble the "Brahmachakra" of Gautam Buddha. A Licchavi king established a town in the bank of Vishnumati River out of a rapidly growing village and it was named Kasthamandap or Kathmandu. The town was planned to resemble the sword of Manjushree. The handle of the sword is supposed to face south towards the confluence of the Baghmati and the Vishnumati River, while the blade is through to point north to Thamel.

[2] *Excerpts from* (Pruscha, 1969)
[3] *Tars: The flat highland between the two rivers in the valley; Bishalnagar lies between Rudramati and Ikshuwati Rivers and Devpatan lies between Rudramati and Bagmati River*

Figure 1-8 The four stupas as they stand today, are believed to be established by missionaries of Emperor Ashok in the 2nd century B.C., further helping to establish the town of Patan at the end of the 7th century A.D.
Image Source: Uday Sunder Shrestha

Later, Mallas came into power as the rulers of the country, who introduced irrigation schemes in the areas of the arable lands increased in the valley. Many clearings were made in the areas lying east of the Bagmati River particularly near Sankhu and Bhaktapur. Due to the prosperous trade position of Kathmandu, the Tibetan market of Lhasa had come under its commercial domination. Although safeguarded by nature, the unrest in many parts of north India resulted in a need of defense of towns in KV. This led to the development of compact settlements with narrow streets and congested courtyards. They were located on the upland terraces with fields on either side. Thimi and Nagadesh settlements were formed on the route of Bhaktapur and Kathmandu. The city of Bhaktapur was established towards the middle of the 13th century, which had by then become an important center for trade. The town was shaped in the conch-shell shape resembling the hand of Lord Vishnu. The King's palace was situated in the center of the town and streets radiated from the palace square in all the directions. It had different Toles which consisted of Nanis or Bahals. According to the social classification, castes were grouped in concentric patterns in the town, with the lowest class such as sweepers having their dwelling in the periphery of the town. The cultivators to be near their fields, lived in the next ring, while artisans and craftsmen settled in the next inner ring.

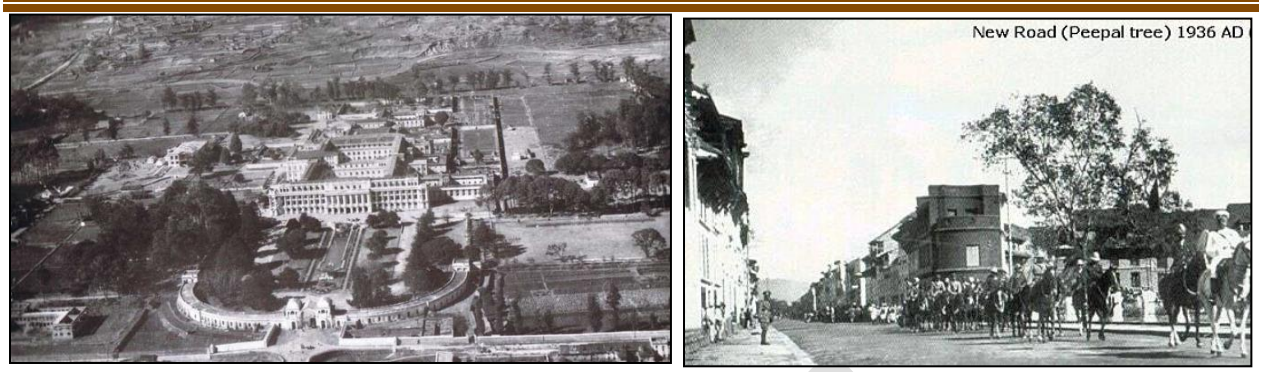


Figure 1-9 Historic photograph of Singha Durbar (Left) & New Road (Right)(1936 AD)
Image Source: (Gutschow & Kreutzmann, 2013)

The Shah regime ended the Malla dynasty after the Battle of Kathmandu in 1768, marking the beginning of its modern era. Kathmandu was adopted as the capital of Nepal. During the Rana regime, Kathmandu's inclination shifted to pro-British architecture and Western European architecture. The Rana rulers built palaces in prime agriculture land in the city periphery; around which new settlements developed since these areas provided facilities such as drinking water, electricity and good roads. Thus began the process of sub-urbanization of Kathmandu and its encroachment on productive agricultural land. With the end of Rana rule, marked the modern development of Kathmandu Valley with the drastic transformation of agricultural landscape into urban form, due to in migration and vehicular arteries (Haack & Rafter, 2006).

The most rapid population influx in Kathmandu Valley was observed in the decade of political instability, which began with the armed movement of the Maoists on 13th Feb 1996 with their proclaimed aim of establishing a new democratic state and overthrowing the multiparty parliamentary system. The armed movement in the rural part of the country caused rapid exodus of the migrants into Kathmandu Valley seeking refuge for security and livelihood reasons. The year 2001 was one of the important turning points for Nepal's political dynamics mainly because of the Royal massacre on 1 June, 2001. This caused fluidic situation and civic disturbance in the country. Eventually the King's regime was brought down in 24 April 2006, which led to the abolition of monarchy from the country, election of a constituent assembly and the process of peace and many created opportunities for socio-political transformation. The country was declared as secular and a Federal Democratic Republic by the Interim Constitution in 28 December 2007.

1.3. Urban Issues in the National Context

While a few towns such as Rajbiraj, Hetauda, Bharatpur, Butwal etc have been well planned, majority of the municipalities and emerging towns of Nepal have developed haphazardly due to lack of implementation of stringent policies on regulating and managing the growth. This unplanned growth has created a number of problems, mainly:

- Deficiencies in the basic urban services,
- Lack of sanitation and solid waste management system,
- Environmental degradation,
- Encroachment of public land, forest and river,
- Sprawl settlement development.

The National Urban Policy 2007 (2064 BS) identifies the following urbanization related key issues:

Table 1-1 Urbanization and Key related issues as per National Urban Policy 2007

Issues	Elaboration
Unbalanced Urban Structure	Economic activities primarily concentrated in city core areas; large number of municipalities still exhibit rural characteristics
Weak Rural-Urban Linkage	Small towns suffer from the minimal investment from public and private sectors resulting into inadequate development of physical infrastructure
Environmental Degradation	With the encroachment to the public land and natural resources, inefficient or inadequate road networks, shortage of drinking water, unscientific dumping of solid wastes, loss of agriculture land, squatters problems
Ambiguous National Policy	No horizontal linkage with the Ministry of Local Development, Ministry of Physical Planning and Works and National Planning Commission resulting ambiguity in the policy formulation and implementation
Urban Poverty	Resulted by the inadequate employment opportunities, high land prices, lack of accessibility of basic urban services, pressure of migration due to less employment opportunities in the rural areas
Weak Municipal Capacity	The capacity of the municipalities, with respect to administrative, technical and financial capabilities, have not developed to cope with the increasing demand for additional or improvement of services. Moreover, there has been total absence of elected body for several years.

The National Urban Policy (NUP) has put forward three main objectives to provide a framework to guide the urbanization process by giving due attention to the urban environment conservation through the involvement of central and local bodies. These are related to:

1) Balanced urban structure
2) Healthy and economically vibrant urban environment
3) Effective urban management

The first policy objective necessitates to the macro level of planning whereby a balanced urban structure could be developed by promoting investments in developing regions. The other two policies could be supported by accentuating local potentials and opportunities such as capacity development of local communities, utilization of local resources to develop an integrated approach to urban development.

1.4. Kathmandu Valley in National Context

Kathmandu Valley is the hub of Nepal's urbanization that accommodates nearly 24% of the nation's urban population (MoUD, 2015). The proportion of migrants is highest in the Kathmandu valley districts in general and Kathmandu in particular. The major reasons for migration in the Kathmandu valley districts are study (26.4%), service (21.5%), dependent (15.8%) and marriage (15.6%). Also, 56 percent of life time migrants had been in the valley districts for over 6 years.

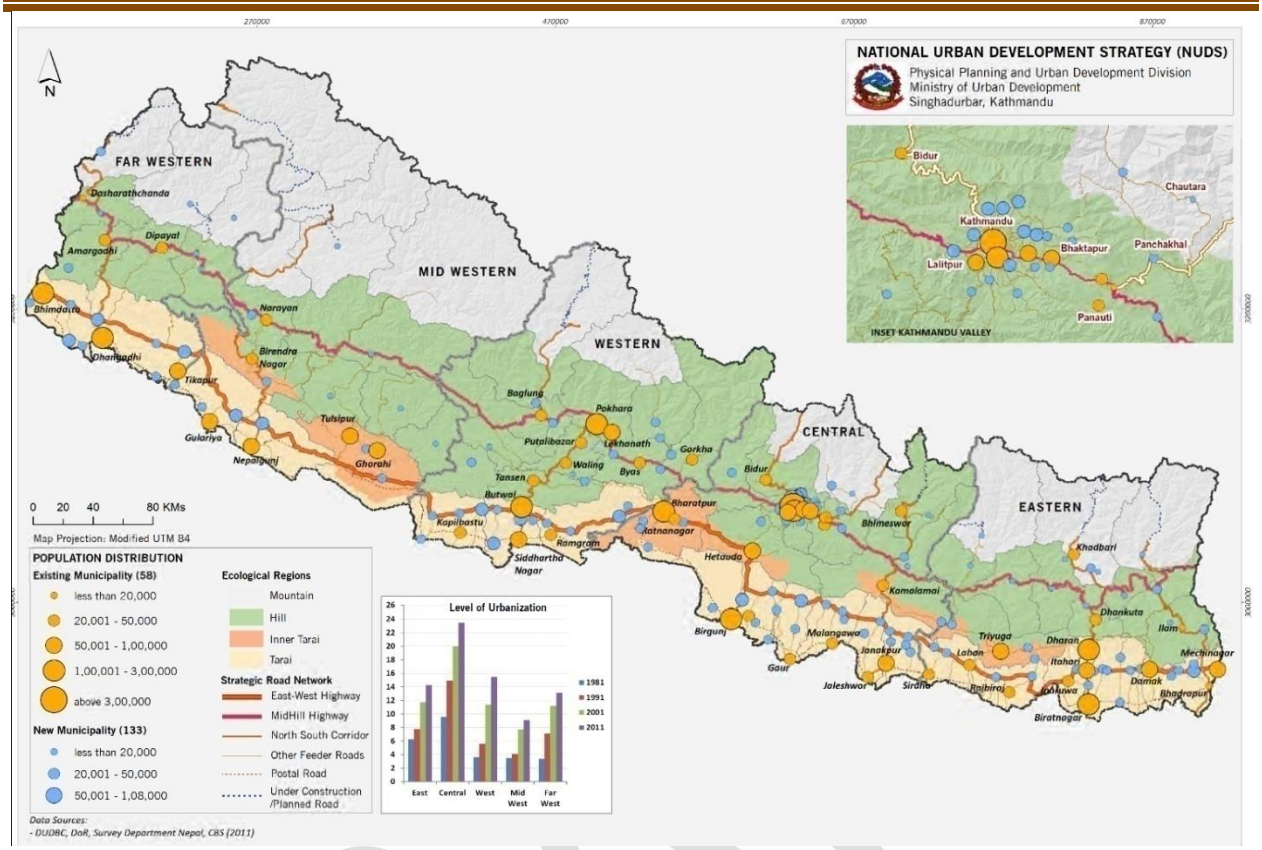


Figure 1-10 Population Distribution of Urban Settlements in Nepal
Image Source: (MoUD, 2015, p. 4)

As a result, economic and financial activities are generally concentrated in core urban areas of the Valley due to high population density, strained infrastructure facilities and concentration of Government service outlets. The 2012 survey by Nepal Rastra Bank has analyzed the overall share of Kathmandu Valley in the National Economy in two scenarios:

Table 1-2 Overall share of Kathmandu Valley in the National Economy in two scenarios (NRB, 2012)

Scenario	Contribution to National GDP	Total value of economic activities	Remarks
Reference Scenario	23.4%	NRs. 316 billion	Based on NLSS III and Census 2011
Alternate Scenario	31%	NRs. 418 billion	Based on field survey information and estimated population (4 million against the official estimated of 2.5 million population)

The contribution of Kathmandu Valley to the national GDP has been estimated by the Central Bank to be of the order of 23.4% of the national GDP under reference scenario and 31% of GDP under alternate scenario (NRB, 2012)[4].

[4] *The 'Reference scenario' is based on the published data sources and field survey while the 'Alternate Scenario' also incorporates the underestimated data (such as consumption of electricity and petroleum products) obtained*

Kathmandu is the largest recipient of the remittance in urban households. The valley accounts for 40% of urban manufacturing employment and 25% of urban non-farm employment. The valley has the highest proportion of migrants compared to other urban areas of the nation. The major reasons for migration in the Kathmandu valley districts are study (26.4%), service (21.5%), dependent (15.8%) and marriage (15.6%)(MoUD, 2015).

The economic and financial activities of the nation are considered to be highly concentrated in Kathmandu Valley. According to NUDS (National Urban Development Strategy) report, the three districts of the Kathmandu valley accounted for 42.6%of the total government revenue collected under different headings in 2009/10.

1.5. Urban Issues in the Local Context

The primary cause of haphazard development relates to the lack of effective local level land use, zoning and land sub-division policy. In most cases, inner roads are developed by widening the existing traditional foot trail by proportionate contribution of land from the landowners of adjoining plots.

Figure 1-11 Increasing land use change from Agricultural to Built-up space
Image Source: Jamie Mitchell

Houses are built without much consideration to the land use, posing difficulty in providing basic urban services. Keeping aside some exceptional cases, the municipality or the town development committee completely lacks control over the specific use of land. Nevertheless, some efforts on developing land use plan in few municipalities have been made, which could have been more successful if better regulatory provisions, including building by-laws and building codes, could have been implemented appear to have failed due to weak regulatory provisions. Moreover, the unprecedented rise of urban land price has encouraged land speculation that has led to the indiscriminate sub-division of agricultural land. The construction of buildings too have been taking place more rapidly on the periphery of municipalities, owing to reasonable low price of land and feeble by-laws.

from the field survey and takes into account the temporary population of the Valley, which is assumed to be 4 million against the official estimate of 2.5 million. This document, thus, follows the Alternate scenario, which shows that the contribution of KV to the national GDP is 31%

Figure 1-12 Large buildings for apartments, hotels, hospitals and other commercial use is a relatively new phenomenon after the relaxation on multi-storey building permits and the political instability
Image Source: Uday Sunder Shrestha

The Town Development Committees, being politically appointed bodies, are either not constituted or have become redundant due to the current political turmoil and elections have not been able to take place. Consequently, the local bodies are being administered by government employees. All urban centres of Nepal more or less depict similar characteristics and the municipalities in the Valley are not an exception. Kathmandu has witnessed tremendous growth in built up areas in the past two decades. Construction of large buildings for apartments, hotels, hospitals and other commercial use is a relatively new phenomenon, which presumably started coming up after relaxation on multi-storey building permits and the end of the political instability, since 2001.

1.6. Identification of major planning issues

- Institutional Overlapping (both territorial and functional) of agencies working in KV
- Unprecedented change in land use; Lesser Constraint Free Area in KV (35.8%)
- Disproportionate urban settlement- Haphazard Development
- Insufficient legal basis to manage and control land use in KV
- Inequitable urban infrastructure and services to accommodate the increasing population
- Increasing pollution level, vulnerability of fire, earthquake, flood hazards; decreasing open spaces
- Need to emphasize on disaster risk mitigation approach and environment in planning
- Need to preserve historic, cultural and social assets of Historic city core areas and gain access to critical facilities in settlements
- Inequality of economic opportunities to promote local economy
- Need to develop plans and incentive policies to encourage capital investment in public goods

In the same context, UN-Habitat has developed an index that measures the current status of cities, vis-à-vis the five dimensions of prosperity: productivity, urban infrastructure, quality of life, equity and environmental sustainability (UN-Habitat, 2013). As per the report, Kathmandu is considered as one of the cities with weak prosperity factors and shows following traits:

- Production of goods and services is still too low.
- Historic structural problems, chronic inequality of opportunities and widespread poverty.
- Inadequate capital investment in public goods

- Lack of pro-poor social programs.

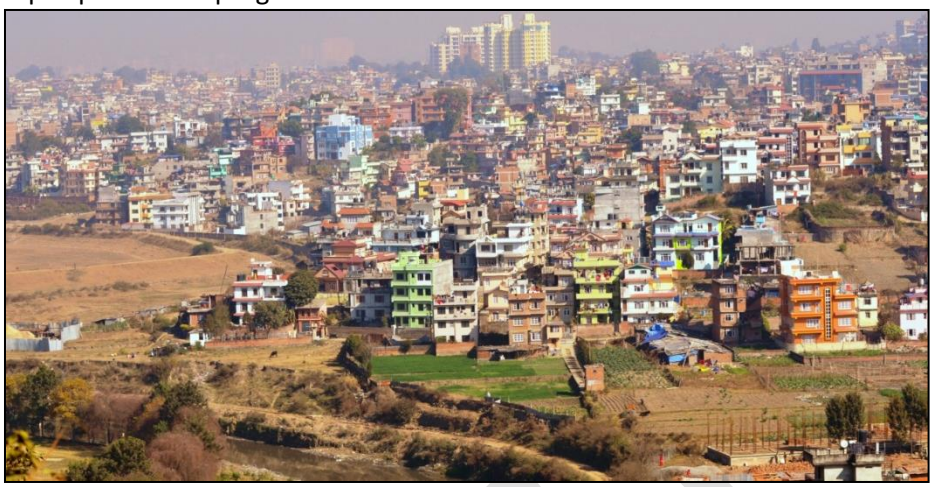


Figure 1-13 The unprecedented rise of urban land price has encouraged land speculation that has led to the indiscriminate sub division of agricultural land
Image Source: KVDA

Although Kathmandu has not yet reached to its optimum prosperity, the Valley has got many assets pertaining to nature, society and culture that could be promoted to address the issues mentioned above. Similarly, Kathmandu Valley has a rich historic-cultural background with 7 UNESCO world heritage sites, which brings the potential for economic growth through the recent intensification of global tourism. Hence, the Valley needs a strong governing body that overlooks its development, preservation and a strategic development plan with a view to achieve planned urban development.

1.7. 20 year Strategic Development Master Plan (2015 - 2035)

Dimensions of City Prosperity Index of Kathmandu Valley as per UN-Habitat

(UN-Habitat, 2013)

Productivity Index	: 0.385
Quality of Life Index	: 0.621
Infrastructure Index	: 0.740

The Long Term development Plan of Kathmandu Valley 2002 (LTDP) approved by the Government of Nepal in the year 2002 AD has envisaged policies and strategies for the development of Kathmandu Valley until 2020 AD. The strategies proposed by the plan include development initiatives in the regional context, development nodes; interrelation of land-use and transportation, efficient land use planning, conservation of agricultural areas, easy transportation based planning, accessibility to public open space, settlement expansion with infrastructural facility and improving the carrying capacity of the Valley. However, the LTDP 2002 has not yet been effectively implemented mainly due to the armed conflict, political instability, overlapping of the jurisdictions of sectoral authorities, lack of coordination between stakeholders, lack of detailed implementation actions and various other socio-political factors. As such, the socio-political scenario and the ensuing development scenario of the Kathmandu Valley has significantly changed over the last decade, hence the envisioned concept and the action plan in the LTDP 2002, perhaps may not properly comply with the requirements of the future envisioned KV.

In these context, Kathmandu Valley Development Authority (KVDA) has developed the 20 year Strategic Development Master Plan (2015 - 2035) to address the needs of a 'new' envisioned Kathmandu Valley,

considering the existing and emerging trends of urbanization, environment and the current socio-political and economical situations while considering the prospects of sustainable urban growth and vibrant economic development. The SDMP (2015-2035) has been developed through a series of interaction programs and workshops with major stakeholders including Local bodies, planning experts, policy makers, NGO/INGO representatives, Private sector representatives, politicians, students and individuals, whose works revolved around sustainable urban development of KV. During the process, a base map for the plan was prepared through preliminary inputs from planners and policymakers; and presented at various workshops to build on the initial ideas and broaden the planning horizon by incorporating expert advice from leaders in various fields. Additionally, the SDMP utilizes the studies of Urban Growth Trend, Multi-Hazard Risk Assessment, and Constraint Analysis as major basis for the study. Workshops organized by KVDA for the development of SDMP, interaction with Constituent Assembly Members, a series of 'Livable Kathmandu Forum'; Workshop by KVDA and SONA on mapping a vision for KV have been influential in developing the SDMP (2015 - 2035).

While the role of Government bodies is crucial as the major implementing body for the plan,

Vision:

The vision of SDMP 2035 is therefore outlined as:

"KATHMANDU VALLEY: A LIVABLE REGION BY ENHANCING THE INTERDEPENDENCE OF NATURE, COMMUNITY AND CULTURE"

Mission: What do we want to achieve?

"TO ESTABLISH KATHMANDU VALLEY AS A SAFE, CLEAN, ORGANIZED PROSPEROUS AND ELEGANT [SCOPE] NATIONAL CAPITAL"

SAFE	:	Safety of peoples' life, liberty and property from multi hazards
CLEAN	:	Free from noise, air, water, wastes and industrial pollution
ORGANIZED	:	Systematic approach to land use, transportation, urban infrastructure planning and housing development
PROSPEROUS	:	Economic development through the promotion of private sectors in development of infrastructure and services
ELEGANT	:	Beautiful through the conservation and maintenance of natural ecosystem, historical, religious, cultural and social assets, both tangible and intangible

1.8. Objective

The major objective of the SDMP (2015- 2035) is achieve the above stated vision and mission – To establish Kathmandu Valley as a Safe, Clean, Organized, Prosperous and Elegant national capital by enhancing the interdependence of Nature, Community and Culture. The document analyzes the LTDP 2002 and provides strategic direction for the sustainable development of the Kathmandu Valley with reference to the Urban Growth Trend and Constraint Analysis. With this background, following objectives are outlined with the defined outputs:

Table 1-3 Major Components of 20 years Strategic Development Master Plan

Stage	Works
Stage 1	▪ Critical review and analysis of LTDP 2002 ▪ Literature review of relevant previous studies of the Kathmandu Valley ▪ Identification of pros and cons of each study in relation to the present unplanned

Stage	Works
	urban growth, traffic conjunction, environmental pollution
Stage 2	▪ Study of urban growth trend and Land Use Change pattern in KV ▪ Identification of area of rapid urban growth ▪ Change analysis in the land use pattern in Kathmandu Valley using satellite imagery of 10 years interval from 1980. ▪ Organization of workshop in order to collect views from all the related stakeholders and personnel from various disciplines.
Stage 3	▪ Preparation of the Physical Development Plan of the Kathmandu Valley ▪ Identification of areas of new urban growth for various land use.
Stage 4	▪ Identification of various projects ▪ Project prioritization for implementation of PEDP for the next ten years.

1.9. Limitations of the Master Plan

Following are the limitations of this strategic development master plan:

- ❖ This is a purely strategic development plan. The implementation of this plan will depend upon the operational plan that will be prepared after the approval of this plan.
- ❖ This plan depends upon the studies done in 2013 under "Comprehensive Disaster Risk Management Program" by KVDA with the support of UNDP. The current trend analysis has considered that federal states will be established and growth in Kathmandu Valley will be affected by this.

1.10. Organization of the Report

This report is arranged in sequence of seven chapters as outlined hereunder.

Chapter 1 presents the background of the study and general context of the study.
Chapter 2 presents the review of existing plans and planning policies relevant to the undertaken study.
Chapter 3 presents the Urban Growth Trend in context of population and land use in the Kathmandu Valley. It further analyses the drivers of urban growth and existing development conditions.
Chapter 4 presents the present scenario of physical infrastructure, social infrastructure, environment, economy and governance. It further presents a thorough analysis of the current situation.
Chapter 5 presents the projected scenario for the year 2035 in context of population and land demand in context of 'no planning intervention scenario'. It further presents a thorough analysis of the restricting factors and constraints in urban development.
Chapter 6 provides major urban development strategies, objectives and action plans required to address the main issues.
Chapter 7 provides points out and analyzes the implementation aspects of the strategies and actions to address the main issues. It further explains the monitoring and evaluation for the effective implementation of the 20 years Strategic Development Master Plan.

2. REVIEW OF EXISTING PLANS AND POLICIES

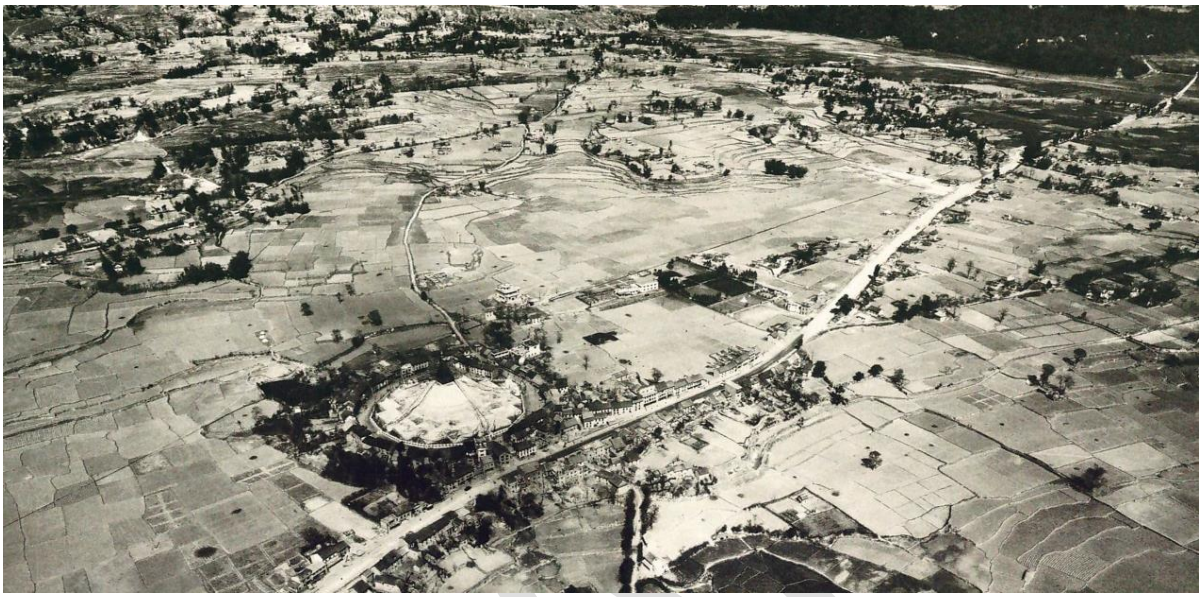


Figure 2-1 Old image of Boudhanath area by Erwin Schneider (March 1972)
Image Source: (Gutschow & Kreutzmann, 2013, p. 32)

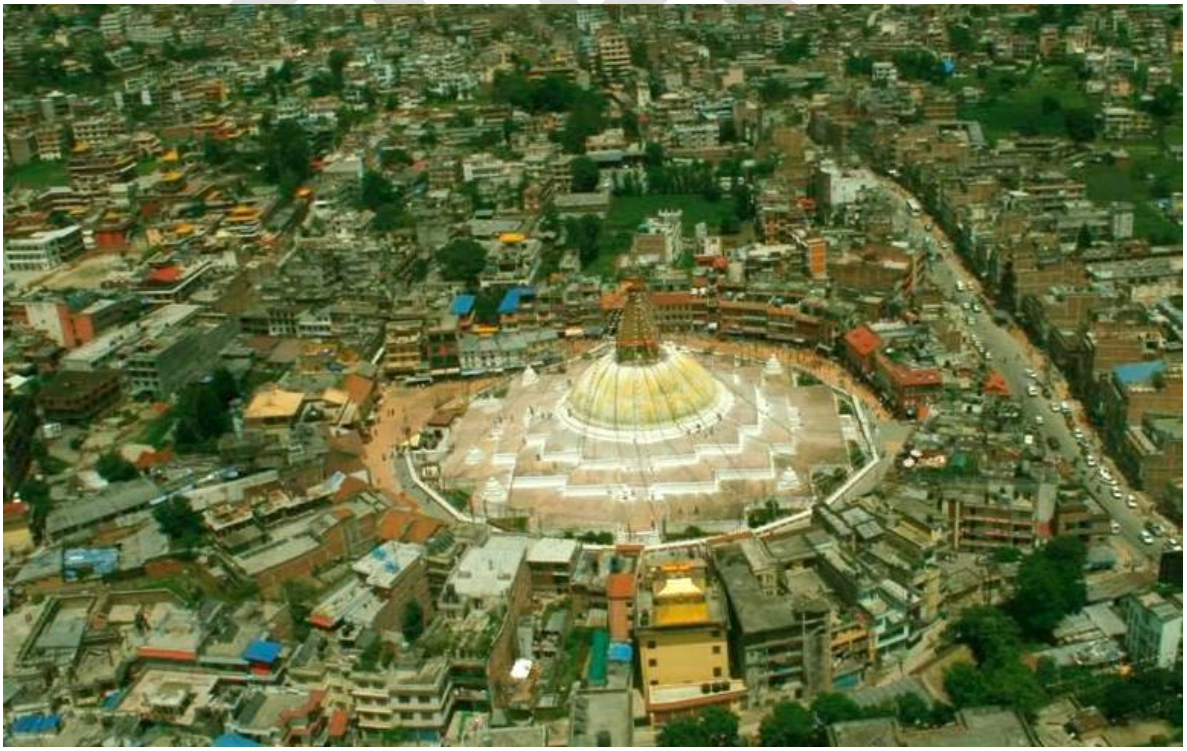


Figure 2-2 Aerial view of the Boudhanath area in 2013
Image Source: http://www.explorehimalaya.com/gallery/Nepal-helicopter-sightseeing/Bouddhanath-night%20(Large).JPG

परिच्छेद- २ को सारांश

काठमाडौं उपत्यत्यकाको प्रभावकारी विकासका लागि विभिन्न समयमा अनेकौं योजनाहरू निर्माण गरिएका छन् । तिनीहरू मध्ये केही योजनाहरू कार्यान्वयन गरिए भने अरू केही अझै कार्यान्वयनको पर्खाइमा छन् ।

योजनाकार तथा नीति निर्माताहरू काठमाडौं उपत्यकाको सहरीकरणका बारेमा सचेत रहेको तथ्य यस अघि निर्मित विभिन्न योजना तथानीतिका दस्तावेजहरूबाट देख्न सकिन्छ । सन् १९६९ माकाठमाडौं उपत्यकाको भौतिक विकास योजना तयार गरी उपत्यकाको दक्षिणी भागमा सहरी विकास गर्नका लागि सुझाव प्रदान गरिएको थियो । काठमाडौं उपत्यका भौतिक विकास योजना, १९७२ ?? ले उच्चा समतल भूभागहरू (टारहरू)मा सहरी विकास गर्न र होचा चिस्यानयुक्त(डोल) क्षेत्र को संरक्षण गर्न सिफारिस गरेको थियो । १९७६ माकाठमाडौं उपत्यकाको भूमि उपयोग योजना आरम्भ गरियो जसले केवल जग्गा उपायोगको योजना तयार गर्ने काम मात्र नगरी भवन निर्माणको मापदण्ड पनि तयार गऱ्यो । उपत्यकाव्यापी विकासको अवधारणालाई कार्यान्वयन गर्ने उद्देश्यले काठमाडौं उपत्यका नगर विकास समिति स्थापना गरियो । यस अन्तर्गत काठमाडौं, भक्तपुर र ललितपुरमा जिल्ला कार्यालय पनि यससँगै स्थापना गरिए । उपत्यकाको भौतिक विकास योजना कार्यान्वयन सजिलो होस् भन्ने हेतुले उपत्यकालाई तीन बेग्ला बेग्लै वर्गमा विभाजन गरिएको थियो जसमा भित्री मुख्य बस्ती क्षेत्र र यसका नजिकका बस्तीहरूलाई "क" र "ख" तथा अव्यवस्थित रूपमा फैलिँदै गरेको विस्तारित क्षेत्रलाई "ग"मा वर्गीकृत गरिएको थियो । सन् १९८६ मा, काठमाडौं उपत्यका सहरी भूमि नीति अध्ययन आरम्भ गरियो । यस अध्ययनले काठमाडौं उपत्यकाको भौगर्भिक अवस्था, धरातलीय स्थिति, जमिनको उपयोग र त्यस माथिको स्वामित्वका सम्बन्धमा विस्तृत तथ्यांक सङ्कलन गऱ्यो । उक्त अध्ययनले सहरी भू-उपयोग तथा विकासका सम्बन्धमा समेत नीति निर्माण गरी उपलब्ध गराएको थियो तर सो नीति कार्यान्वयनमा भने आउन सकेन ।

सन् २०१२ मा काठमाडौं उपत्यका विकास प्राधिकरणको स्थापना भइसकेपछि, काठमाडौं उपत्यका विकास प्राधिकरण ऐन, १९८८ लागु गरियो । यस ऐन अन्तर्गत, योजना निर्माण गर्ने, विकास गर्ने, अनुगमन गर्ने, नियन्त्रण गर्ने र निषेध गर्ने निकायका रूपमा काठमाडौं उपत्यका विकास प्राधिकरणको भूमिका निर्धारण गरिएको थियो । सहरी विकास र संरक्षण योजना,१९८८ ले सिमसार तथा नदी किनारहरूको संरक्षण गर्ने कार्यक्रमहरू सञ्चालन गऱ्यो । काठमाडौं उपत्यका सहरी विकास योजना तथा कार्यक्रम, १९९१ ले काठमाडौं उपत्यकालाई काठमाडौं सहरको विस्तारित स्वरूप मानिनु पर्छ भन्ने सिफारिस गर्दै यसलाई विकसित क्षेत्रका साथै आधारभूत रूपमा प्रशासनिक, सांस्कृतिक, पर्यटकीय एवं प्राचीन ऐतिहासिक स्मारक संरक्षण केन्द्रका रूपमा लिइनुपर्छ र सोही अनुरूप विकास गरिनुपर्छ भन्ने मान्यतालाई स्थापित गऱ्यो । यस योजनाले काठमाडौं उपत्यका भित्रका सिमसार क्षेत्र तथा नदीहरूको संरक्षण, खासगरी भित्री चक्रपथको यातायात सञ्जालको सुधार र विस्तारित सहरी क्षेत्रको बढ्दो जनघनत्वका बारेमा गहन रूपले विचार विमर्श गरेकोछ ।

सहरी विकास ऐन, १९९८द्वारा "सहरी योजना क्षेत्र" भनी किटान गरिएका कुनै पनि क्षेत्रमा सहरी विकास गर्न सक्ने गरी विशेष कानूनी आधार प्रदान गरेकोछ । सहरी योजना आधारभूत रूपमा जग्गा एकीकरण (LandPooling) अथवा निर्देशित जग्गा विकास (Guided Land Development)मा केन्द्रित छ । तथापि, समग्र सहर वा काठामाडौं उपत्यका भित्र विस्तृत भू-उपयोग योजनाको कार्यान्वयनका लागि सशक्त वैधानिक आधार प्रदान गर्ने दिशामा यो ऐन अपर्याप्त नै मानिन्छ । काठमाडौं उपत्यकाको वातावरणीय योजना र व्यवस्थापन, १९९९ खासगरी वातावरणीय एवं पर्यावरणीय विषय र उपत्यकाको दीगो विकासमा सम्बन्धित थियो । यस योजनाले वातावरणीय दृष्टिले अत्यन्त संवेदनशील क्षेत्रमा विकासका क्रियाकलाप लाई निषेध गर्दै उपत्यकाव्यापी भू-उपयोग योजनाको निर्माण गर्नका लागि परामर्श दिएको थियो । यस योजनाले पर्यावरणमैत्री सहरको विकास, ढल निकास सञ्जाल निर्माणका लागि गुरुयोजनाको विकास र काठमाडौं उपत्यकाका परम्परागत बस्तीहरूको सुव्यवस्थापनका लागि समेत सुझाव दिएकको थियो । त्यसै गरी स्थानीय स्वायत्त शासन ऐन तथा नियमावली,१९९९ले स्थानीय निकायहरू जस्तै- जिल्ला विकास समिति, गाउँ विकास समिति तथा नगरपालिकाहरूलाई भू-उपयोग योजना निर्माणको कानूनी आधार प्रदान गरेकोछ । यसले स्थनीय निकायलाई वार्षिक तथा आवधिक योजनाहरूको

निर्माणका लागि पनि कार्यात्मक भूमिकाहरू निर्दिष्ट गरेकोछ । यसले आवश्यकता अनुसार नीति, नियमको निर्माणका लागि पनि स्थानीय निकायलाई सशक्त बनायो । यसले आवश्यकता अनुसार नीति, नियमको निर्माणका लागि पनि स्थानीय निकायलाई सशक्त बनायो ।

राष्ट्रिय सहरी नीति, २००७ले दीगो सहरी वातावरणीय विकासलाई प्रवर्धन गर्ने कार्यमा जोड दिएकोछ । यस नीतिले वातावरणीय दृष्टिले अति संवेदनशील मानिएका क्षेत्रमा विकासका कार्यहरू सञ्चालन नगर्न स्पष्ट निर्देश गरेकोछ । यसले नेपालमा विपद् जोखिम न्यूनीकरण तथा निराकरणका योजनाको निर्माणमा समेत जोड दिएकोछ । यसका अतिरिक्त यस नीतिले स्थानीय निकायलाई भूकम्प, पहिरो र आगलागी जस्ता प्राकृतिक वा अन्य आकस्मिक विपत्तिका समयमा हुने विनाश वा क्षतिबाट बच्नका लागि आफ्नै किसिमका कार्ययोजना र रणनीति निर्माण गर्न र तिनको कार्यान्वयन गर्न पनि प्रोत्साहित गरेकोछ । साथै यसले स्थानीय निकायलाई सुरक्षित, किफायती, वातावरणीय दृष्टिले उपयुक्त भवनको निर्माण गर्ने प्रविधिको विकास गर्न तथा स्थानीय रूपमा उपलब्ध परंपरागत ज्ञान र सीपको उपयोग गर्ने नीतिलाई अङ्गीकार गर्न पनि प्रोत्साहित गरेकोछ । समय परिवर्तन सँगै आवधिक रूपमा विद्यमान भवन निर्माण आचार संहितालाई अद्यावधिक गर्न र सरकारी तथा निजी सेवा प्रदायक भवनहरूको निर्माणका समयमा सो आचार संहितालाई कडाइका साथ लागु गराउन पनि यस नीतिले सुझाव दिएकोछ ।

काठमाडौं उपत्यका विकास प्राधिकारणद्वारा तयार पारिएको काठमाडौं उपत्यकाको दीर्घकालीन विकास अवधारणा योजना, २००२ ले सन् २०२० सम्म मा काठमाण्डौं उपत्यकालाई ऐतिहासिक, सांस्कृतिक, पर्यटकीय र देशको राजधानी क्षेत्रका रूपमा विकास गर्नका लागि आवश्यक रणनीतिहरू तयार गरेकोछ । ती मध्येका दुई व्यापक रणनीतिहरूमा पहिलो, आर्थिक अवसरहरू तथा पुँजी लगानीलाई देशका अरू सम्भाव्य क्षेत्रहरूमा विकेन्द्रीकृत गर्ने थियो भने दोस्रो, जनसंख्याको वृद्धि र त्यसलाई धान्न सक्ने क्षमताका आधारमा विस्तार गर्न सकिने क्षेत्रहरूको पहिचान गर्नु थियो । काठमाडौं उपत्यका दीर्घकालीन विकास अवधारणा योजना, २००२ले अङ्गीकार गरेका अन्य योजनात्मक रणनीतिहरूमा निम्नलिखित पक्षहरू मुख्य थिए-

क) क्षेत्रीय पहुँचको दृष्टिकोण,
ख) विकासकार्यको साझेदारीमा कार्यात्मक पदसोपान (Hierarchy),
ग) भू-उपयोग तथा यातायात सम्बन्ध,
घ) भू-उपयोग प्रभावकारिता,
ङ) सम्भाव्यता र पहुँचमा आधारित योजना,
च) उपयोग योग्य खुला स्थानमा पहुँच,
छ) आवास योग्य समुदाय र
ज) धान्न सक्ने क्षमता ।

उत्पादनको वृद्धिलाई विनियोजन गर्ने चारवटा विशिष्ट सिद्धान्तहरू-समतामूलक वितरण, भौतिक पूर्वाधारको क्षमतामा आधारित सहरी विस्तार, (पहिचान सहितका) निर्दिष्ट क्षेत्रमा विकास र जोखिम संवेदन शील क्षेत्रको पहिचानमा आधारित भई यी रणनीतिहरू निर्धारित गरिएका थिए । त्यसै गरी सहरी विस्तार व्यवस्थापनलाई निम्नानुसार कार्यान्वयन गर्ने परिकल्पना गरिएको थियो-

क) सहरी उपयोगका लागि ग्रामीण खुल्ला क्षेत्र तर्फको व्यवस्थित सङ्क्रमण,
ख) सहरी तथा ग्रामीण सीमाको प्रस्ट नक्साङ्कन,
ग) कृषियोग्य भूमिको संरक्षण र
घ) सहरी विस्तारका लागि भूमिको संरक्षण

उपर्युक्त सबै प्रकारका नीतिहरूमा समेटिएका अवधारणा, रणनीति र सिद्धान्तहरूलाई राम्रोसँग ग्रहण गरिएको छ र मत भिन्नताका लागि कुनै ठाउँ छोडिएको छैन । जे भए पनि ती योजना तथा नीतिहरू कागजमा सीमित रहे र कार्यान्वयन हुन सकेनन् । संस्थागत अधिकार बाझिन जानु (Overlapping) र काठमाडौं उपत्यका विकास प्राधिकरण जस्तो छुट्टै संस्थाको अभावका कारण लामो समय सम्म,दीर्घकालीन विकास अवधारणा योजना(LTDP), २००२ जस्ता नीतिहरूले काठमाडौं उपत्यकालाई एक सिङ्गो योजना एकाइका रूपमा ग्रहण गरिनुपर्छ भनी सुझाएका अवधारणालाई उपेक्षा गरियो । राष्ट्रिय सहरी विकास नीति, २००७ र दीर्घकालीन विकास अवधारणा योजना, २००२लाई समर्थन गर्नका लागि भवन निर्माण आचार संहिता र नीति,नियमलाई आवधिक रूपमा संशोधन गर्न सकिएन । धेरै जसो योजना तथा नीतिहरू अन्तर्गतका सूक्ष्म स्तरीय योजना तथा नीतिहरू तयार गर्न सकिएन जसले गर्दा ती नीति र योजना अझ बढी अस्पष्ट वा सन्दिग्ध नै बनिरहे । दीर्घकालीन विकास अवधारणा योजना, २००२ ले सिफारिस गरेका रणनीतिक परियोजनाहरू कि त पूरै त्यागिएका छन् कि त भने कार्यान्वयनको प्रारम्भिक अवस्थामा नै रहिरहेका छन् ।

SUMMARY OF CHAPTER 2

This chapter summarizes various past plans that were formulated for guiding development of Kathmandu Valley, either with the resources from the Government of Nepal or with grants and assistance from donor agencies. While some of the plans were implemented, others have been less effective on their implementation aspects. Synopsis of the reviewed plans and policies are briefly presented here under.

Past planning efforts

Beginning from 1969, various plans have been formulated at different times for efficient development of Kathmandu Valley. Some plans were implemented, whereas others still seek implementation. The chronological development of such policies and planning documents and their central objectives are listed below.

- In 1969, **Physical Development Plan of KV** was prepared that recommended promotion of urban development in the southern part of the valley.
- The **KV Physical Development Plan**, 1972 recommended development in the plain land area and conservation of wetland area.
- Similarly in 1976, **Land Use Plan of the KV**was prepared along with Building Construction Standards. Also, Kathmandu Valley Town Development Committee was established with its 3 district offices.
- In 1986, **KV Urban Land Policy Study** was initiated. The study provided detailed information on geographical situation, land use and ownership and proposed policy for urban land use development.
- The **Urban Development and Conservation Scheme**, 1988 launched programs for conservation of wetlands and riverbanks of the Kathmandu Valley.
- In 1988, a major Act was introduced as the **KV Development Authority Act**, which stressed on establishment of KVDA. Under this act, function of KVDA was stated as an authoritative agency for Planning, Developing, Monitoring, Regulating and Prohibiting activities in the Kathmandu Valley. It was only in 2012, after the establishment of KVDA, that this Act was operationalized.
- Similarly, **KV Urban Development Plan and Program** in 1991 recommended Kathmandu Valley to be an extended form of Kathmandu City. Therefore, the valley should be regarded as the primary administrative, cultural, tourism, and ancient monuments conservation centre and developed likewise.
- **Town development Act,** 1998 provided the legal basis for town planning in any areas designated as a “Town Planning Area”, which is still a strong document for Town Development Committee to conduct any land pooling or guided land development projects.
- **Environmental Plan and Management of KV**, 1999 mainly dealt withenvironmental and ecological issues and sustainable development of the valley. It recommended formulation of valley wide land use plan, restriction of development in environmentally sensitive areas, establishment of Eco-Town, development of the master plan for sewerage network and conservation of traditional settlements in the Valley.
- **Local Self-Governance Act and Regulation,** 1999 provided the legal basis for local bodies to prepare and implement plans and programs. It stated different functional roles for local bodies, like DDCs VDCs and Municipalities, in preparation of annual and periodic plans and empowered them to prepare land use plans, by-laws and master plan of infrastructures, as well as their

construction and maintenance.

- The **National Urban Policy,** 2007 focused on promoting sustainable urban environmental. The policy restricted development in environmentally sensitive areas, with emphasis on disaster risk reduction and mitigation. It encouraged the local bodies to develop action plans to mitigate vulnerability imposed by disasters such as earthquake, landslide and fire. It also encouraged local bodies to develop methodology for construction of safe, affordable and environmentally viable buildings and adoption of locally available traditional knowledge and skills. The policy suggested periodic updating of the existing building codes and its strict enforcement.
- The **Long Term Development Concept Plan of KV**, 2002 prepared by KVDA envisaged the strategies for development of the valley as a historical, cultural, tourism hub and the capital region of the country by 2020. The planning strategies adopted by LTDP were:
  a) Regional Approach
  b) Functional Hierarchy of Development Nodes
  c) Land Use - Transportation Linkage
  d) Land Use Efficiency
  e) Proximity and Accessibility based Planning
  f) Access to Functional Open Space
  g) Liveable Community
  h) Carrying Capacity

  The strategies were developed based on the four specific Growth Allocating Principles

  a) Equitable Growth Distribution
  b) Infrastructure Capacity based Urban Expansion
  c) Development in the Designated Area
  d) Identification of the Risk Sensitive Areas

  The management of urban expansion was envisaged to be carried out through
  a) Orderly transition of rural space to urban use
  b) Delineation of urban and rural boundaries
  c) Preservation of agriculture potential land
  d) Reservation of land for urban expansion.

This chapter summarizes various past plans that were formulated for guiding development of Kathmandu Valley, either with the resources from the Government of Nepal or with grants and assistance from donor agencies. While some of the plans were implemented, others have been less effective on their implementation aspects. Synopsis of the reviewed plans and policies are briefly presented here under.

2.1. Physical Development Plan of Kathmandu Valley, 1969

This plan incorporated several aspects of planning such as regional development plan, urban design, settlement development plans and others. The plan envisaged the future development up to twenty and thirty years for balanced development of Kathmandu Valley and formulated short term and long term planning attempt. It raised the critical issues related to continuing population pressure in Kathmandu Valley, unplanned urban development, loss of agricultural land and forest; and disturbance to the ecology as well as encroachment into historical and cultural sites of the valley. The plan recommended the interventions such as promoting development in west and south west of the existed urban area in Kathmandu Valley to ease the population pressure in urban areas; promoting development in south and south east direction of Bhaktapur municipality; construction of road to link the southern part of Patan with south-western part of Bhaktapur and promoting the development in southern part of the valley.

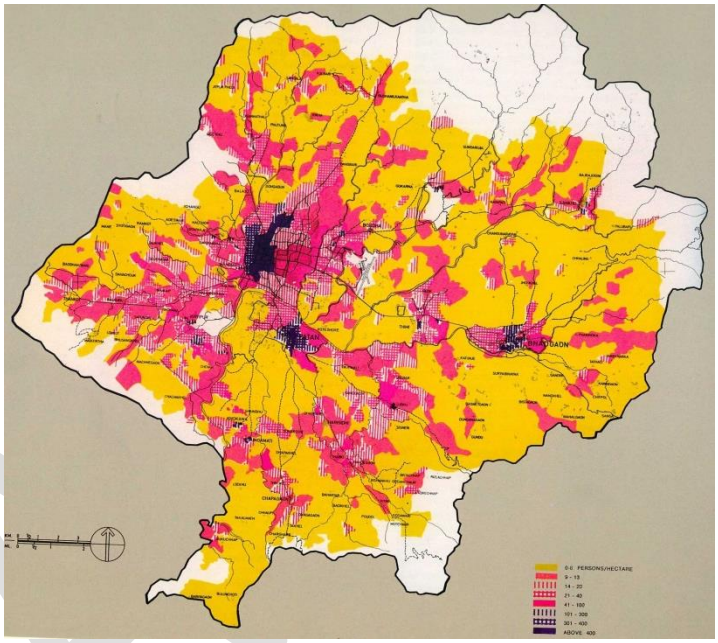


Figure 2-3 Population Density Map of Kathmandu Valley as presented in the Physical Development Plan of KV

2.2. Kathmandu Valley Physical Development Plan -1972 (2028 BS)

The Plan prepared by a team of native and expatriate planners with initiation of the United Nations urban planning expert was published by the Department of Housing and Physical Planning in 1972 (2028 BS). In preparing the Plan, the previous as well as the current condition of the Valley was studied and strategies and programs were proposed for the future. It recommended the development of settlement in the arable land area *(tar - तर)*and maintenance of greenery in wetland area as per the geographical structure of the Valley.

2.3. Land Use Plan of Kathmandu Valley 1976 (2033 BS)

The Department of Housing and Physical Planning formed a team to prepare a land use plan based on the Physical Development Plan prepared in 1972 (2028 BS). The team prepared not only an extensive Land Use Plan but also Building Bye laws and Standards. The Kathmandu Valley Town Development Committee was established in order to enforce the plan; and the offices of the Committee were also set

up in Kathmandu, Lalitpur and Bhaktapur. In addition, a planning team was formed to render regular technical assistance to the Committee. Development of inner and outer ring road, various residential and protection zones were proposed in the plan. The plan recommended the land use zoning and regulations for coordinated development of Kathmandu Valley. For physical development planning it divided the area of Kathmandu Valley into broadly three different categories in which inner core settlement of Kathmandu and Lalitpur belonged to category "Ka", the settlements adjacent to the existing core settlements of Kathmandu and Lalitpur was termed as category "Kha" and the spread and sparse settlements of Kathmandu Valley which has to be compacted were termed as category "Ga". However, the effectiveness of this Land Use Plan was diminished due a rapidly changing ground scenario.

2.4. Kathmandu Valley Urban Land Policy Study 1986 (2043 BS)

The Study was carried out with technical assistance of USAID. This Study provided detailed information on matters such as geographical situation, landscape, land use and ownership in the Kathmandu Valley and also prepared policies on the use of available land for urban development. The designs prepared in the course of study were used for various purposes but this policy also could not be implemented.

2.5. Kathmandu Development Authority Act 1988

This Act was approved by the Legislation in 1988 but it was enforced in 2012, when KVTDC was dissolved to form Kathmandu Valley Development Authority. This Act concerns the establishment of the Kathmandu Valley Development Authority, whose functions shall pertain to land use planning, development in land-use areas and the prescription of methods of construction works, formulation and implementation for the development and maintenance of cultural heritage, and protection and conservation of the environment and natural resources. Subsequent sections establish all the powers given to the Authority in connection with its functions.

The Kathmandu Valley Development Authority has the power to:

a) Impose moratorium through the public notice on any type of physical change in any property within the area prescribed for a period not exceeding three years;
b) Stop any action taken without prior approval or in violation of the given terms and conditions;
c) Undertake land development programs for planned and organized urban development;
d) Mobilize financial resources, upon approval of the Government in order to meet necessary expenses.

Organs of the Kathmandu Valley Development Authority include:

- The Physical Development Committee, chaired by the Minister of Urban Development, whose functions pertain to the decisions, policy making and the evaluation of the progress achieved in the implementation of the plan,
- The KVDA Management Committee, chaired by the Development Commissioner of KVDA, is responsible for the direction, supervision and management of the operations of the Kathmandu Valley Development Authority.

Furthermore, the Act states the composition and rules of procedures of said organs. Final provisions concern the settlement of disputes, the powers of the Government and the penalties to be enforced in case of contravention.

2.6. Urban Development and Conservation Scheme 1988 (2045 BS)

Under the leadership of Ministry of Housing and Physical Planning, the plan launched programs such as conservation of wetlands and river banks of the Kathmandu Valley. Similarly the Land Pooling and the Guided Land Development programs were launched under this Scheme.

2.7. Kathmandu Valley Urban Development Plan and Program 1991 (2048 BS)

Kathmandu Valley Urban Development Plan and Program was prepared by Department of Housing and Urban Development, with the technical assistance of ADB. The plan analyzed causes and effects of the urbanization of the Kathmandu Valley. The plan recommended that KV should be regarded as the primary administrative, cultural, tourism, ancient monuments conservation centre and developed likewise. Similarly it stressed on KV to be regarded as extended form of Kathmandu City and it should not be the centre of industrial activities. The plan aimed at densification of Kathmandu and Lalitpur settlement and thereby reducing the urban sprawl in the valley and conservation of ecology and agricultural lands in rural part of the valley by developing agricultural economy. Similarly it suggested development of inner ring road area of Kathmandu Valley and restricting development in wetland and adjacent to the rivers and conservation of Phulchoki and Chandagiri watershed as wildlife reserve. Only some of the recommendations were implemented by MIIP and KV.

2.8. Town Development Act 1998

The Act provides the legal basis for town planning in any designated "Town planning area". Town planning focuses on a particular area, to achieve an end result, through land pooling or guided land development. As such, the Act is the means for a Town Development Committee to carry out the function of "town planning" within a designated area. However, it is not designed to support town planning as a process, applicable to a wider area, such as Kathmandu Valley. Act is effective and many municipalities elsewhere have established Town Development Committees to tackle urban issues, and third amendment to the Act (Paragraph 3A) enabled municipalities to use the Act providing that activities were approved by the concerned Town Development Committee (or the then Department of Housing and Urban Development in the event that there was no committee). Despite the provisions contained in the paragraph 3, *"the committee may formulate town planning to carry physical development of a town in an integrated manner, in any part of Nepal, and to determine land uses in a (designated) area"*, the Act is considered less robust to enable comprehensive land use planning within an entire town or valley.

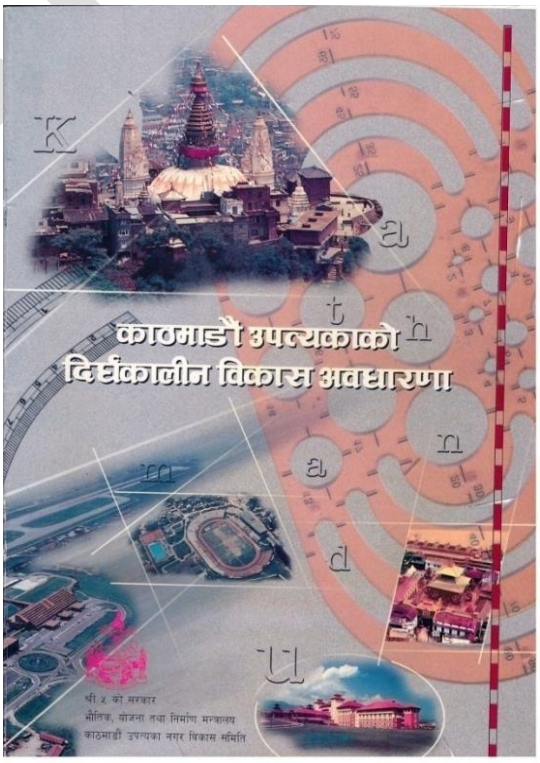
2.9. Environmental Plan and Management of Kathmandu Valley 1999

The study dealt with the environmental and ecological issues in Kathmandu Valley for sustainable ways to develop the valley. The plan identified population growth, loss of agricultural land, location of industries and existing institutional setup as well as weak implementation of plans and policies as the main reason for the degradation of ecology in the valley. The plan suggested that the valley-wide programs should be developed with the development slogan as "well managed, healthy and convenient valley". Similarly, the plan recommended that the valley wise land use plan should be developed, restricting development in high agricultural potential areas, river bank, slope area, environmentally sensitive areas. The plan also recommended the establishment of Eco-town in the Kathmandu Valley, merging urbanizing VDCs in the existing municipal areas and re-defining the urban boundaries. Improving the road access, developing the master plan for sewerage network and conserving the entity of traditional settlements in Kathmandu Valley were some of the major interventions proposed by the plan.

2.10. Local Self Governance Act 1999 (2055 BS) (LSGA)

Local Self-Governance Act and Regulation provides legal basis for land use planning by local bodies, i.e., DDCs, VDCs and Municipalities. It stated different functional roles for local bodies in preparation of annual and periodic plans. The functions and duties of VDCs include reference to physical development in order to prepare criteria for houses, buildings, roads and other physical infrastructures, etc. to be constructed within the village development area, and to grant approval as prescribed for the construction of them. The Act also formulates land-utilization plans of the village, for which VDCs are empowered to prepare by-laws as required. The roles of municipality relating to physical development plan include to frame land-use map of the Municipality area and specify and implement or cause to be implemented, the industrial, residential, agricultural, recreational areas, etc. Develop green zones, parks and recreational areas in various places in the Municipality area and approve or cause to be approved designs of houses, buildings, etc. to be constructed in the areas of the Municipality. In addition to the functions, the Municipality may also perform the optional functions such as to control unplanned settlement within the Municipality area and to make the structure and development of the town well-planned through the implementation of GLD and land pooling schemes. With respect to land use planning, the three DDCs within the Valley have to prepare district level subject-wise programmes to be operated in the VDCs and prepare a master plan of district-level roads, paths and bridges as well as construct and maintain them.

2.11. Long Term Development Concept Plan of Kathmandu Valley 2002 (2059 BS)



Kathmandu Valley 2002 (2059 BS)

The Long Term Development Concept Plan of Kathmandu Valley was prepared by Kathmandu Valley Town Development Committee in July 2000 and was approved by the GoN in 2002 through the publication in the gazette upon ratification by the GoN. This plan envisaged the strategies for development of Kathmandu Valley in 2020 and also analyzed the drawbacks of past plans and policies of to promote the Kathmandu Valley as historical, cultural, tourism and capital region of the country. To achieve this, the plan put forward two basic strategies. Firstly, it planned to decentralize the economic opportunities and capital investments to other potential regions of the country. This was felt inevitable as there had been significant growth in population of the valley that posed serious threat on the land uses. Besides, there is a great challenge to preserve the natural, historical and cultural resources for which tourism could play a major role in not only preserving these resources but could also create sufficient employment and income generation opportunities. Hence, the first strategy was to relocate the polluting industries like cement, bricks, carpet outside the valley and prohibit the new ones within the valley area. Secondly, it identified the expansion area based on the potential increase in population and carrying capacity. This strategy had to be adopted owing to the rapid conversion of agriculture land and potential open spaces into the built up areas. The plan highlights that the situation may get alarming as majority of potential agriculture land in the valley would be converted into urban sprawl within decades, if appropriate policy

measures were not introduced timely. Apparently the plan was not implemented due to it being developed only in conceptual level and the lack of operational plan.

2.11.1 Planning Strategies

The other planning strategies adopted by LTDP 2002 were:

a) **Regional Approach:** The need to view the Kathmandu Valley as one planning unit is not only because it is composed of homogeneous cultural-geographical landscape but also because of the geographical limitation that the valley possesses. This posits a difficult challenge as to how best the land resource of the valley can be used for its balanced urban growth. Moreover, the urban problems and issues of regional nature such as air quality, traffic congestion and protection of river system cannot be resolved by isolated efforts of the municipalities or VDCs. Hence, a collective approach to correspond to the common issues was envisaged.
b) **Functional Hierarchy of Development Nodes:** The hierarchy of central city, sub-city and neighborhood centers was envisaged for the fair distribution of population, economic opportunities and urban services. Such hierarchical town or neighborhood centers, which can follow the naturally developing and economically potential nodes may have profound impact in reducing the growth pressure in the central city, thereby making the city vibrant and livable.
c) **Land Use - Transportation Linkage:** The efficient transportation linkage and the allied services not only help to create the improved accessibility but also guide the growth and land use activities. The LTDP 2002 hence intended to link land use and transportation to match the accessibility to the institutions, businesses, firms and other land use activities thereby reducing the traffic congestion and improving the air and noise pollution.
d) **Land Use Efficiency:** The land use efficiency could be increased by infill development through densification policies. The contiguous development incorporating idle or derelict urban land was envisaged to be planned to discourage urban sprawl and preservation of agricultural land.
e) **Proximity and Accessibility based Planning:** The proximity and accessibility based planning were expected to have implications ranging from influencing compact urban form to enhancing social justice. The close proximity of employment opportunities or urban services to the residential area or mixed land use is believed to discourage the traffic movement and conversely encourage the non-motorized vehicles.
f) **Access to Functional Open Space:** LTDP 2002 envisaged having the provision of functional open space within the neighborhood, community or town so as to enhance social interaction and protect environmentally sensitive area.
g) **Livable Community:**It encompassed i) reasonable provision of basic infrastructure services such as road, drinking water, drainage and sewer; ii) proximity to community facilities such as school, playground, hospitals, police post, market place and public transit; iii) access to natural environment and rural agricultural land
h) **Carrying Capacity:** The carrying capacity was defined as the ability of the valley to accommodate maximum population without irreparably degrading its natural eco-system. The plan proposed to keep at least 300 ppha population density with optimal 500 ppha.

2.11.2 Growth Allocating Principles

The above strategies were developed based on the four specific principles, briefed as:

a) **Equitable Growth Distribution:** This principle aims at relieving the pressure in KMC by promoting nearby areas for the residential and commercial use. Similarly, the adjoining areas were also envisaged to develop to accommodate the growth.

b) **Infrastructure Capacity based Urban Expansion:** The urban expansion would be based on the capacity of the existing infrastructure and their extension in the future. The expansion was discouraged in the areas where the improvement of infrastructure was difficult to achieve and where the infrastructure provision was extremely low.

c) **Development in the Designated Area:** This principle aims at promoting specific areas that are feasible for the development in terms of technical, social and environmental aspects. The infrastructure provision would be made in a phased manner. The investment by the private sector in the infrastructure development would be promoted.

d) **Identification of the Risk Sensitive Areas:** The risks sensitive areas in terms of landslides, flood and liquefaction would be identified to discourage growth of settlements. This also calls for the preservation of forest, watershed, wetlands and the water bodies to conserve the bio-diversity.

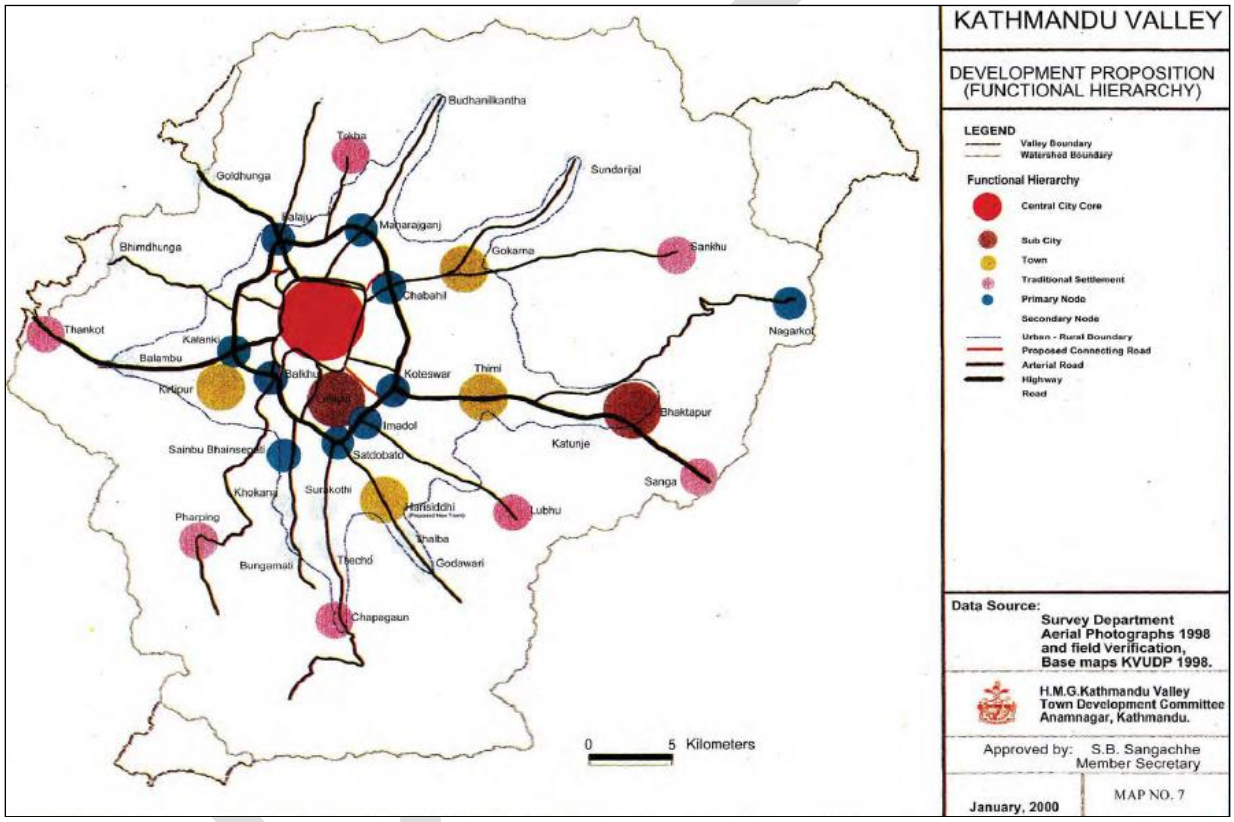


Figure 2-5 Development proposition made by LTDP-2002

2.11.3 Management of Urban Expansion

The management of urban expansion was envisaged to carry out through:

a) **Orderly transition of rural space to urban use:** The provision of urban reserves, separation of urban and rural land and preservation of agricultural land were identified as key instruments to make orderly transition of rural space into urban use.

b) **Delineation of urban and rural boundaries:** The rapid depletion of agricultural land, declining accessibility to job places, the deteriorating environmental quality or infrastructure services are some of the conspicuous examples of growth externalities that are besieging the Kathmandu Valley. The urban and rural land is expected to act as important policy intervention in order to contain the current urban sprawl and manage the growth of the valley.

c) **Preservation of agriculture potential land:** The preservation of agricultural land has paramount importance to maintain the function of open space that is necessary to provide the life support system through filtration of polluted air and recharging the underground aquifers, maintain the production and supply of food and vegetables, contain sprawl by disallowing urban proliferation in the agricultural land.

d) **Reservation of land for urban expansion:** The future urban expansion was planned to encourage those areas, which are clearly designated as urban reserves. Those areas would preferably have less potential of agriculture productivity. The desirability of urban reserves must also be evaluated from cost-effectiveness of future infrastructure service provisions.

2.11.4 Long Term Working Policies for Urban Development

Until 70's, the urban development in Kathmandu Valley was limited to the periphery of the old settlements. Besides Kathmandu, Lalitpur and Bhaktapur, there were a number of small settlements around the valley bearing the cultural and religious significance. Abundant land in between those settlements was being used for the agriculture region as the demand of land for the commercial and residential use was not enough. Kathmandu had a very limited transportation linkage to the mountain and Terai and the people had to rely completely on the production from the valley. The scenario started to change after construction of the ring road in mid-70s, which influenced urban sprawl much beyond the municipality boundary. Though the government later declared the VDCs adjacent to the municipalities as urbanizing VDCs, its positive effect were not visible due to absence of specific planning guidelines. This gave rise to the need of clear demarcation of urban and rural land uses for the preservation of agriculture land. Another policy intervention proposed in the LTDP 2002 was to confine the capital investment to the designated areas and to allocate sufficient land for the development of sub-municipalities to accommodate the future population.

The long term working policies for the urban development include:

a) Capital intensive and socially influential projects to obtain prior approval and Environmental Impact Assessment to be made mandatory
b) Tourism related service industries to be encouraged and the polluting industries to be gradually relocated
c) Alternativesto be explored to increase the agricultural productivity
d) Bhaktapur tobe developed as the cultural city
e) Kathmandu Valley to be developed as a singular administrative unit
f) District planning and development units of the government to be converted into valley units
g) Public gardens and greeneriesto be promoted and developed
h) Cottage and handicraft industriesto be preserved and promoted
i) Army and police barracks to be relocatedin the periphery

2.11.5 Strategic Projects identified by LTDP 2002 and their Current Status

a) Harisiddhi Town Development Program: To develop 713 ha (14,000 ropani) of land for residential lot to accommodate 150,000 people, with the density of 210 ppha, by taking Harisiddhi, Imadol, Siddhipur and Thaiba VDC.

Current Status: *Feasibility study was carried out by the Institute of Engineering. No further initiation towards implementation of the project has been observed.*

b) Conservation of Rivers: The right of way of the rivers flowing through Kathmandu was delineated on the basis of 100 years return flows. To environmentally protect the rivers, activities such as sand extractions, solid waste dumping, sewer connections, squatter settlements along river were

proposed to be strictly prohibited. The master plan of river improvement of Bagmati, Vishnumati and Dhobikhola has already been completed by UN Park Development Committee. Further plans were proposed to take into considerations of other rivers.

Current Status:*HPCIDBC for the Protection of Bagmati River has been constituted which prepared the Bagmati Action Plan. Detail design regarding conservation is being carried out. The squatter settlements have been evacuated at various places; most recently in Thapathali area. The physical improvement works tobe started soon.*

c) Conservation of Forest and Watersheds: The forest and natural water sources within 20 km. range from Kathmandu was proposed to be protected against landslides and to develop the areas for tourism attractions.

Current Status: *No specific project is proposed for the protection of forest areas like Shivapuri, which is aprominent part of the landscape of Kathmandu Valley.*

d) Melamchi Water Supply Project: The project aims to supply 170 mld of water in the Kathmandu Valley from Melamchi river through 27 km tunnel and transmission system.

Current Status: *Construction works is underway in a slow pace. The opportunity of linking Melamchi with KV's planned development, i.e. planning led infrastructure was hardly considered.*

e) Conservation of Cultural Heritage and Historic Settlements: Programs was proposed to develop and conserve the cultural, religious and tourist sites.

Current Status: *No specific program is proposed. However, Kathmandu Sustainable Urban Transport Project (KSUTP) has some component for the promotion of pedestrian zone in the core city and for the protection of tourist areas.*

f) Improvement and Extension of Ring Road and Highways: Service roads beside the ring road was proposed to be developed together with development of adequate parking lots and pedestrianization in the core city area with widening and improvement of the arterial roads.

Current Status: *Kathmandu Sustainable Urban Transport Project (KSUTP) plans to improve the traffic, public transport and the vehicular emissions. Similarly, improvement of the footpath, drainage, and courtyards in the inner city core has also started under KSUTP as a separate package. KVDA has been widening the internal roads in a massive scale.*

g) Chapagaon-Budhanilkantha Link Road: In order to provide additional access linking southern part of the city to the north, Chapagaon-Budhanilkantha road via Harisiddhi, Lubhu, Dadhikot, Thimi and Gokarna, was proposed to be developed. This would help relieve traffic in Satodobato - Koteshwor-Chabahil-Maharajgunj section of the ring road. This road would also benefit the people living in the urban fringes in the south-east part of Kathmandu. The road may be extended further east to connect to proposed fast track to Terai.

Current Status: *An Outer Ring Road (ORR) has later been proposed to compliment the program. The ORR, 72 km in length, has been proposed to pass through the old settlements near foothills around the valley. The area for the ring road (50m wide) is proposed to get through land pooling, and 250m strip on the both sides of the road is proposed for residential/ commercial lots development. The detailed design of most of the ORR is complete. Currently, process to obtain Landowners' consensus to implement the project is being carried out.*

h) Wastewater Management: Domestic wastewater was proposed tobe collected and conveyed through the trunk sewers and would be taken to the treatment plant before discharging into the river and direct discharge to the rivers wouldbe strictly prohibited.

Current Status:*There is no progress in this proposed intervention, except for Bagmati Conservation Program.*

2.11.6 Probable reasons for lack of implementation of LTDP 2002

The concept, strategies and principles of LTDP 2002 have been conceived well and there is hardly any space for disagreement. The plan, however, remained on paper and could not be implemented. The reasons, as gathered by the consultants through a number of discussions with the concerned officials, canbe outlined as below:

a) The very first strategy of making the valley as one single planning unit got defied for long time due to institutional overlapping.
b) The revision of bye laws to support the spirit of the LTDP 2002 was hardly considered.
c) The local area plan based on the LTDP 2002 could not be prepared, which made the plan ambiguous. The micro level planning could have been initiated immediately after the approval of the plan to pinpoint exactly what is going to be developed and where.
d) The strategic projects proposed by LTDP 2002 are either shelved or at very initial stage of their implementation. The Melamchi Water Supply Project has been in existence since more than two decade and is not complete yet. The Outer Ring Road project, currently under KVDA, isnot fully commenced despite completion of the design of major portion. The consensus from the local community seems crucial for the successful implementation of the project.
e) Although the stakeholders were consulted during the plan formulation process, the plan hardly defined their role during the implementation process.

2.12. National Urban Policy 2007 (2064 BS)

National Urban Policy aims to promote a balanced urban structure, sustainable urban environment and effective urban management. The policy views urban centres as catalysts for economic development and places the role of the local governments at the core of urban development agenda, recognizing that investments has not been meeting the pace of rapid urban growth.

The policy has significantly emphasized disaster risk reduction and mitigation planning in Nepal. In its Clause 4.2.9 related to the strategy 3.2.9 deals with the mitigation of loss due to natural disasters by adopting the trend of developing disaster management plan at local level and states the responsibility of local bodies to prepare the disaster management plan to mitigate the loss during the natural hazards. Similarly article “Ka” under the same clause deals with the role of the local body to develop the methodology for construction of safe, affordable and environmentally viable buildings. Article “kha” states the role of local body to foster the locally available traditional knowledge and skills in relation to alternative building construction materials and alternative technologies. Article “Ga” deals with updating the existing building codes in periodic manner and implementing it for the construction of governmental, private and public service buildings. Article “Gha” states the role of local body to restrict development in environmentally sensitive areas and article “Kna” states the role of municipality to encourage and direct all the local bodies for developing their own action plan and implementation of the plan against vulnerability due to disasters such as earthquake, landslide and fire. Finally article “Cha” states about community mobilization and raising awareness in local level in relation to mitigation of natural hazards in local level through the initiation of local bodies.

2.13. National Land Use Policy 2012 (2069 BS)

The need for national land use policy was envisaged for the following:

a) Optimum use of land, land classification and development of country in social, environment and economic aspects through land use planning,
b) Identification of safe areas for residential, agricultural and industrial activities with infrastructural facilities with proper consideration to sustainability of the environment,
c) Conservation of water recharge areas, forest areas, water sources and eco-diversity areas,
d) Identification of potential environmentally sensitive areas for landslide, flood prone areas and act towards mitigating the adverse impacts.

The policy has a vision for optimum use of the land resource for sustainable development of country through social, economic and environmental development. The National Land Use Policy has set the goal for ten years to classify all the land units in Nepal according to topography, capacity, utility and need, and five years goal for completing the same for municipal area, district headquarters, urbanizing VDCs and land adjacent to major roads. Similarly, the policy has a goal for establishing new institutional setup for monitoring, management and regularization of land units according to the aforementioned classification within two years of time.

The National Land Use Policy has put forward seven policies such as classification of land according to agricultural areas, residential areas, commercial areas, industrial areas, forest area, public utility area and others. The use of land should strictly follow the land classification system and work to restore 40 % of the total land as forest, so that the Government land will be conserved. Government has the power to acquire any land for expansion of infrastructure. In order to limit the fragmentation of land and to promote the coordinated urban development, the land development schemes like land pooling will be implemented. To maintain the balance between development and environment, land in urban areas will be declared as open space and green areas. The environmental sensitive areas will be identified and conserved. The projects will be launched with due consideration to sustainable development approaches development of settlement areas in hazard prone areas will be de-motivated. The sites related to culturally, historically and religiously important areas and tourism destination will be conserved and maintained. Land use planning will be implemented in coordination with the land use policy and hierarchy based land use planning will be launched. The land use classification will correspond to the land taxation system and minimum land valuation. The land use will be considered for its optimum use and vacant and barren land will be converted to other uses.

3. URBAN GROWTH TREND

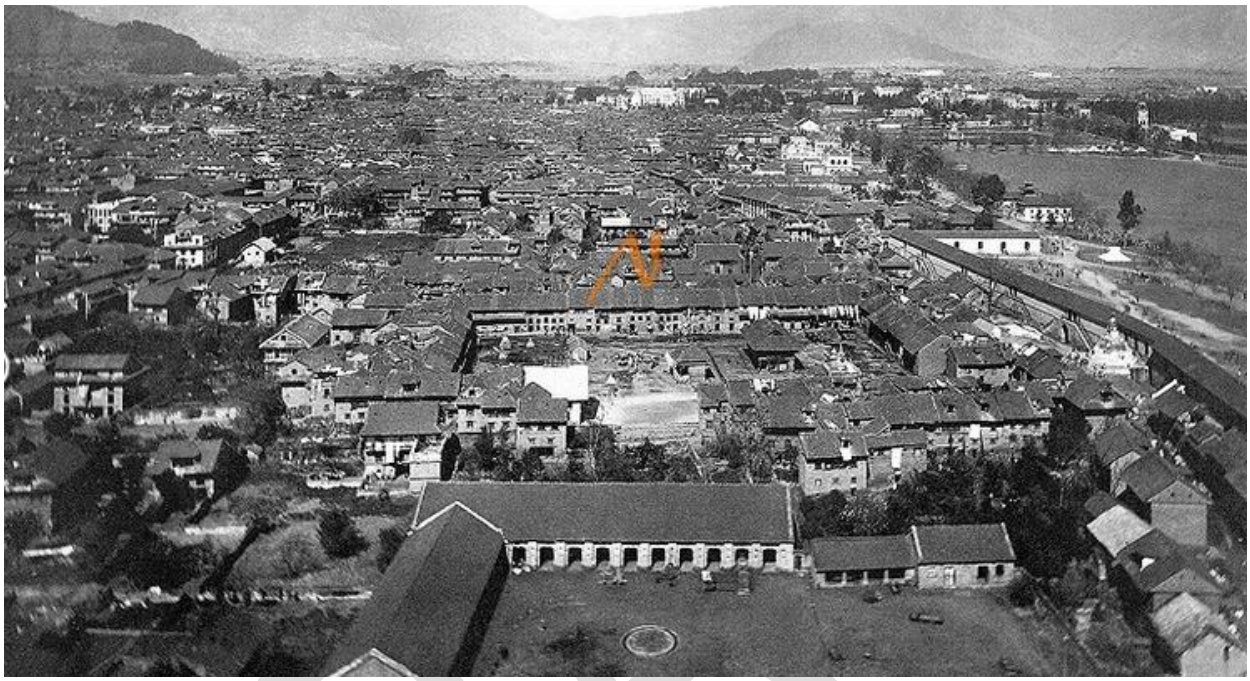


Figure 3-1 Northern view of Central Kathmandu and the Tudikhel from a top Dharahara in 1920s
Image Source: (GTZ, 1997)

Figure 3-2 Northern View of Central Kathmandu as seen from the same spot in 2014
Image Source: KVDA

परिच्छेद ३ को सारांश

नेपाल एशियामा सबैभन्दा कम सहरीकरण भएको देश हो तर विगत केही दशक देखि जैविक तथा भौतिक कारणहरू(जस्तै- धरातल, भू-आकृति र प्राकृतिक स्रोत साधनहरूको उपलब्धता), सामाजिक आर्थिक प्रेरकहरू (जनसांख्यिकीय, सामाजिक, आर्थिक, राजनीतिक र संस्थागत पक्षहरू)ले गर्दा काठमाडौं उपत्यकाको सहरीकरणको गति झन् तीव्र बन्न पुगेकोछ । सन् २०११ को जनगणना अनुसार जनसंख्या वृद्धिदर ४.६३% रहेको काठमाडौंमा पच्चीस लाख जनसंख्या रहेकोछ । जनसंख्या वृद्धिको प्रवृत्ति यही रहने हो भने सामान्य ज्यामितीय वृद्धि विधिका आधारमा हिसाब गर्दा काठमाडौं उपत्यकाको जनसंख्या सन् २०२० सम्ममा सैतीस लाख नब्बे हजार पुग्नेछ भने सन् २०३५ सम्ममा साठी लाख पचास हजार पुग्नेछ ।

काडमाण्डौ उपत्यकामा भू-उपयोगको स्वरुपमा परिवर्तन आउनुमा जनसंख्याको बढ्दो प्रवृत्ति र विस्तारित क्षेत्रको कम जनघनत्वको प्रत्यक्ष प्रभाव परेको छ । १९९० देखि २०१० सम्ममा काठमाण्डौ उपत्यकाको भु-उपयोगमा जनसंख्या वृद्धिले ल्याएको परिवर्तनको लेखाजोखा गर्नका लागि गरिएको वृहत् अध्ययनले शहरी जनसंख्याको स्वरुपमा आमूल परिवर्तन आएको चित्रण गरेकोछ । खास गरी सहरी विस्तारित क्षेत्रका कारण यस्तो परिवर्तन आएको छ । सन् १९९०मा ३८ वर्ग किलोमिटरमा सीमित रहेको सहरी क्षेत्र सन् २०१२ मा आइपुग्दा २११%ले बढेर ११९ वर्ग किलोमिटरमा फैलिएको छ । सन् १९९० देखि सन् २०१० सम्मको समयावधिमा आवास र व्यवसायको प्रयोजनका लागि संयुक्त रूपमा भू-उपयोगको क्षेत्र ५२४% ले बढ्यो जबकि आवास क्षेत्र मात्र ३३१%ले बढ्यो । यसले गर्दा काठमाडौं उपत्यकामा विद्यमान जलाधार तथा कृषिक्षेत्र उल्लेखनीय रूपमा खुम्चिन पुग्यो ।

बढ्दो जनसंख्या सँगै मध्य सहरी क्षेत्रमा निर्मित क्षेत्र (Built Up Area) बढेको छ भने, मध्य सहरका आसपासका क्षेत्रहरु जस्तै गंगबु, जोरपाटी, धापासी, सीतापाईला र मनमैजुमा पनि द्रुत गतिमा निर्मित क्षेत्र बेढेको देख्न सकिन्छ । सहरी वृद्धिमा पार्ने सकारात्मक वा नकारात्मक प्रभावका आधारमा सहरी वृद्धिका प्रेरकहरुलाई दुई भागमा विभाजन गरिएकोछ । सकारात्मक प्रभाव पार्ने प्रमुख तत्वहरु: आर्थिक अवसरहरु, जैविक तथा भौतिक अवस्था (Biophysical Condition), छिमेकका विषेशता र पूर्वाधार तथा सेवाको पहुँच हुन् । यसको ठीक उल्टो, नकारात्मक प्रभाव पार्ने तत्वहरु भने राजनैतिक अशान्ति र केन्द्रीकृत विकास हुन् ।

SUMMARY OF CHAPTER 3

Nepal is one of the least urbanized countries of Asia but the pace of urbanization of the Kathmandu Valley in the last few decades has been faster mainly due to bio-physical factors (e.g.- Landforms, Topography and availability of Natural resources) and socio-economic drivers (e.g.- Demographic, Social, Economic, Political and Institutional Factors). As the national hub, the Valley accommodated approximately 2.5 million population in Census year 2011 with the annual growth rate of 4.63%. If the same trend continues, the population would reach 4.288 million in the year 2025 and 6.048 million in the year 2035. The census data analysis from 1981 to 2011 highlights that there is an increasing trend of population growth in the newly declared 17 municipalities in the peripheral region and slightly lower annual population rate in city core areas.

The increasing population growth trend and low-density urban sprawl in Kathmandu Valley have direct impact on the trend of land use change in the area. The macro level study done to assess the influence of population growth on the land use of Kathmandu Valley from the year 1990 to 2010 depicts a drastic change in urban morphology of the area. The change has been further accelerated by urban sprawl as the built up area increased from 38 sq. km. in 1990 to 119 sq.km. in 2012, with a staggering raise of 211%. During 1990-2010 timeframe, mixed use (residential cum commercial) land area increased by 524% while residential area grew by 331%, thereby compromising the area left for agricultural purpose as well as area covered by water bodies.

While the built up areas in the city core have increased with the increasing population, the peripheral region, such as Gongabu, Jorpati, Dhapasi, Sitapaila and Manmaiju, have also witnessed rapid growth in built-up areas. The major drivers for urban growth have been categorized into two sections as per their positive or negative influence on urban growth. Major factors with positive influence are Economic opportunities, Biophysical condition, Neighbourhood characteristics and Access to infrastructure and services. Conversely, factors with negative influence are Political turmoil and Centralized development.

Urban growth is recognized as physical and functional changes due to the transition of rural landscape to urban forms. It occurs when the population distribution changes from being village to town and city. Socio-economic and bio-physical factors/drivers are often the contributions of the urban growth. Bio-physical drivers include characteristics and processes of the natural environment such as weather and climate variations, landforms, topography, geomorphic processes, volcanic eruptions, soil types and processes, drainage patterns and availability of natural resources (Verburg, Van Eck, de Nijs, Dijst, & Schot, 2004)&(Thapa & Murayama, 2010). The socio-economic drivers comprise of demographic, social, economic, political, institutional factors and often is the result of processes such as population and its change, industrial structure and its development, and technology and technological changes, including infrastructure developments those which have local and regional impacts.

3.1 Population Growth Trend

The population trend of the Kathmandu Valley was analyzed using the population census of different chronological year i.e. (Census years 1981, 1991, 2001 and 2011). The Ward wise population trend analysis was done for the five municipal regions inside valley, 17 newly declared municipality level analysis was done as per the data availability. The total population of Kathmandu Valley in the census year 2011 was 2,468,316 with the annual growth rate of 4.63%. The population growth trend in overall Kathmandu Valley is presented in Figure 3.3.

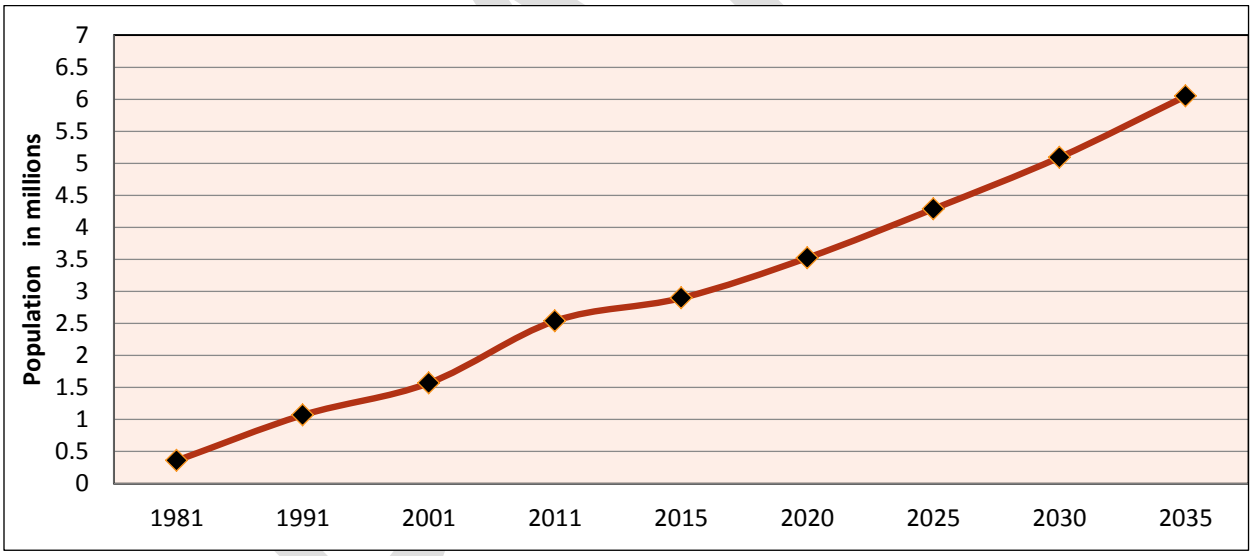


Figure 3-3 Population growth trend of Kathmandu Valley

More than 12 years have elapsed since the preparation of LTDP 2002. The urban growth in the past decade happened to be more severe than the previous decades. LTDP 2002 envisaged the population increase of 0.51 million during 2001-11 and 0.58 million during 2011-21. The total expected increase was about 1.1 million. However, in reality, the growth was much more than envisaged with the increase of 0.86 million. The built up area was increased by 5,211 ha as compared to the envisaged 3,614 ha which is 1.44 times than planned. As a result, environmental degradation has become more severe and conspicuous in the past decade.

Regarding the population growth rate, maximum annual growth rate of 5.7% with the increasing trend was observed in the urbanizing areas inside the valley. The decreasing trend of annual population growth was observed in the Kathmandu metropolitan city, Lalitpur Sub-metropolitan City and Bhaktapur

Municipality while comparing the consecutive year census data from 1981 to 2011. Increasing growth trend was observed for Kirtipur Municipality with annual growth from 2.7 to 5.1%; and Madhyapur Thimi Municipality with annual growth from 4.1% to 5.8%. The population for 2025 and 2035 for Kathmandu Valley, projected using geometric growth method[5] indicates 4,288,209 and 6,048,942 respectively.

3.1.1 Kathmandu Metropolitan City:

The distribution and projection of KMC shows that Ward 35 has the maximum growth rate of 8.1% in the year 2001-2011 with the density of 176 ppha, followed by Wards 16, 29 and 3 respectively with the average annual growth rate of approximately 6%, similarly 5% growth rate was observed in the Wards 14, 10, 4 and 1. The negative growth trend was observed in the Wards 2, 27, 23, 30 and 24, with Ward no 24 having maximum negative growth rate of -4.1%. Ward 24 has the population density of 442 ppha. The Ward 28 was found to have the highest population density of 1195 and Ward 8 was found to have the least densely populated ward with population density of 75 ppha. The highest population was observed in Ward 16 with total population of 86,993 which was projected as 156,041 and 298,669 for years 2020 and 2030 respectively. The distribution of population in KMC is presented in Figure 3.4.

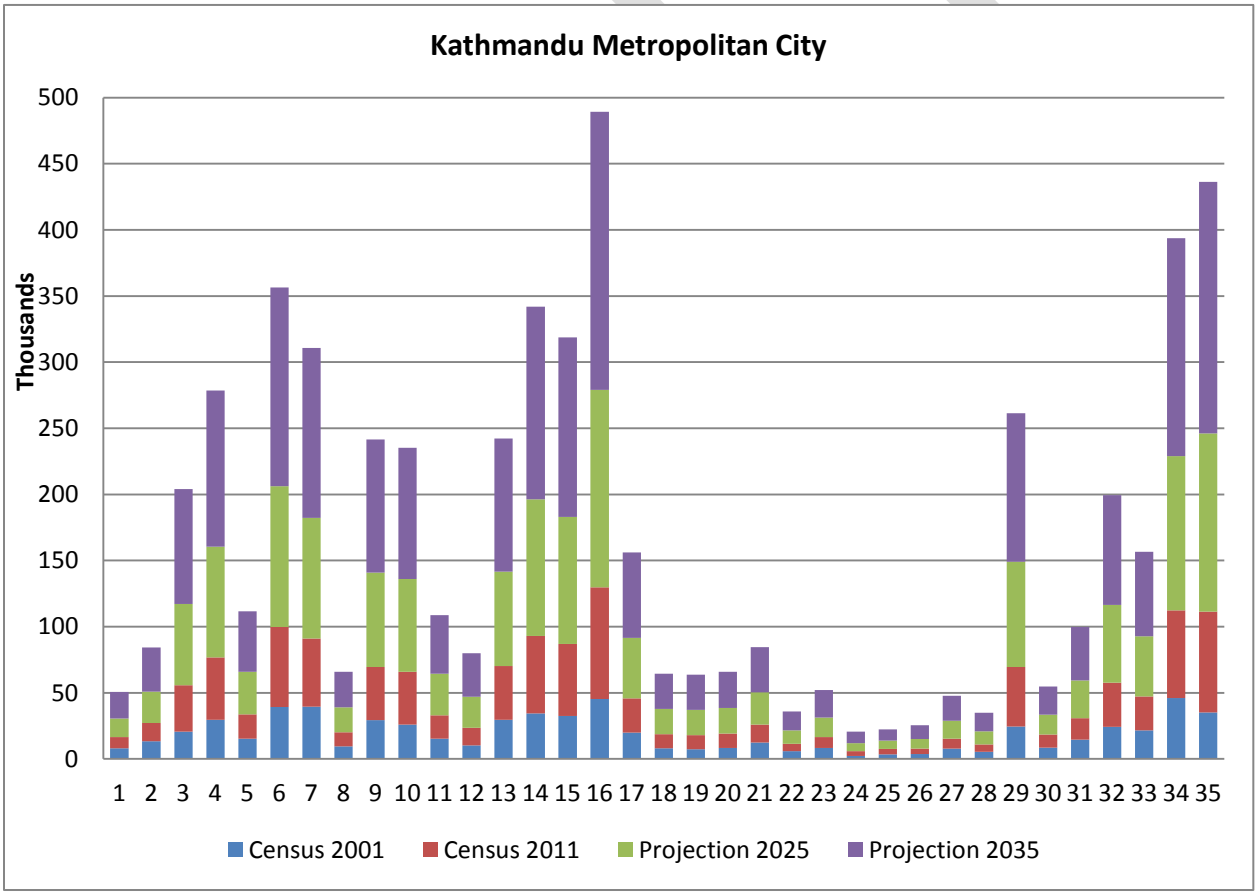


Figure 3-4 Population distribution of KMC

[5] $[P_t = P_0 (1+r)^t]$, where P_t is latter year population, P_0 is Earlier year population , r is the rate of annual increase of population and t is the time interval.

3.1.2 Lalitpur Sub-metropolitan City:

Lalitpur SMC comprises of 22 Wards with the total area of 1,515.4 hectares. In LSMC the maximum annual growth rate of 8.3% was observed for Ward 13, with the density of 194 ppha. This was followed by Wards 2 and 14 with average growth rate of 6.5% and Ward 9 with the growth rate of 5%. Wards 16 and 18 of LSMC were found to have the negative annual growth rates with -2.3% and -1.9% respectively. The most densely populated Ward was Ward 21 with 704 persons per unit hectare and least populated Ward was Ward 15 with 65 persons per unit hectare. Ward 14 of LSMC has the highest population of 21,145 which was projected to years 2020 and 2030 as 36,496 and 66,931 respectively. The population distribution of LSMC is presented in Figure 3.5.

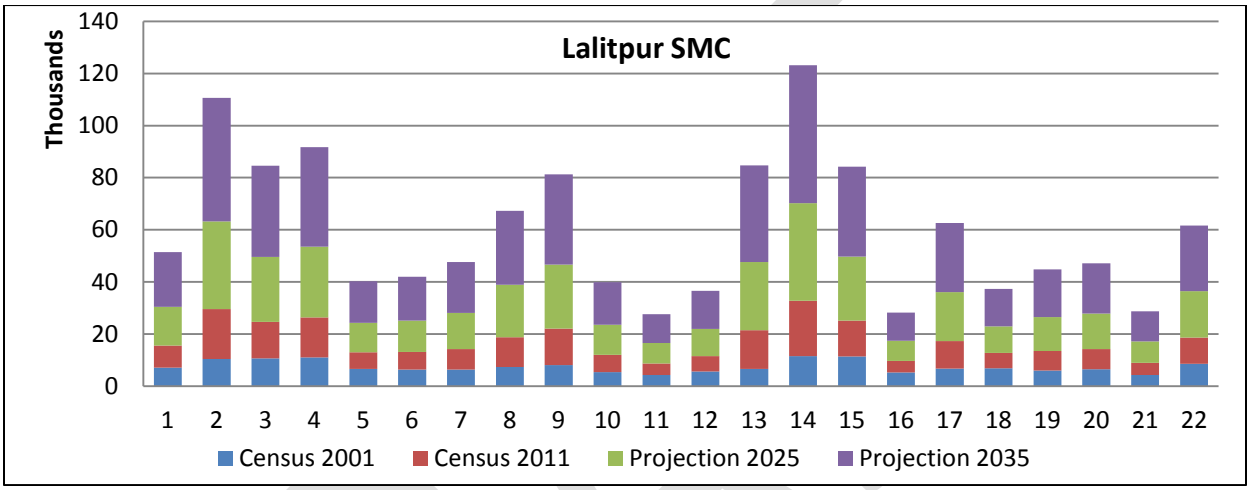


Figure 3-5 Population distribution in LSMC

Figure 3-6 Increasing population and housing density in Lalitpur Sub-Metropolitan City
Image Source: http://www.explorehimalaya.com/gallery/Nepal-helicopter-sightseeing/Patan%20(Large).JPG

3.1.3 Bhaktapur Municipality

Bhaktapur Municipality consists of 12 Wards with total area of 655.7 hectares. In BM, the average of 5% growth was observed in Wards 2, 4 and 17.with Ward 2 being Ward with highest annual growth rate of 5.9%. In BM, eight Wards was found to have the negative growth rate, Wards 13,1,9,14,8,7,11 and 12 are the Wards with growth rates ranging from -1.6% to -0.6%. Other remaining Wards in BM were found to have mild growth rates of about 1% annual growth. The highest population was found in Ward 17 with 11,471 populations which were projected as 17,913 and 29,391 for the year 2020 and 2030. The most densely populated Ward was found to be Ward 9 with density of 1039 ppha and least densely populated area was found in Ward 17 with population density of 72. The population distribution of BM was presented in Figure 3.7.

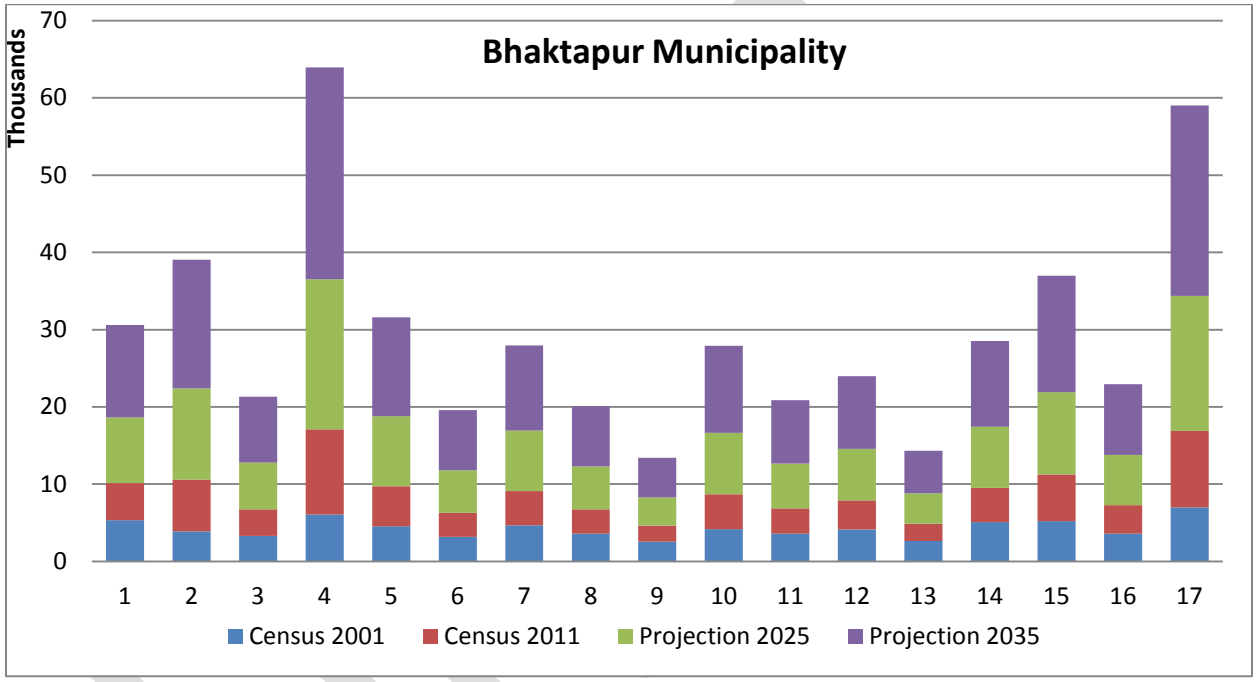


Figure 3-7 Population distribution of Bhaktapur Municipality

3.1.4 Madhyapur Thimi Municipality

Madhyapur Thimi Municipality is divided into 17 Wards with total area of 1111.2 hectares of area. The consecutive census years of 1991, 2001 and 2011 reveals the total population of municipality as 31,919, 47,751 and 84,142 respectively. The municipality has the average density of 76 ppha and maximum density was found in Wards 8 and 14. The largest annual growth rate of 12% was found for Ward 16 followed by growth rate of 9% for Wards 15 and 17. Similarly Wards 3 and 5 have the growth rates of 8.6% and 5.9% respectively. Negative annual growth rates are observed for Wards 2, 12 and 10 ranging from -0.3% to -1.4%. The population distribution is presented in Figure 3.8.

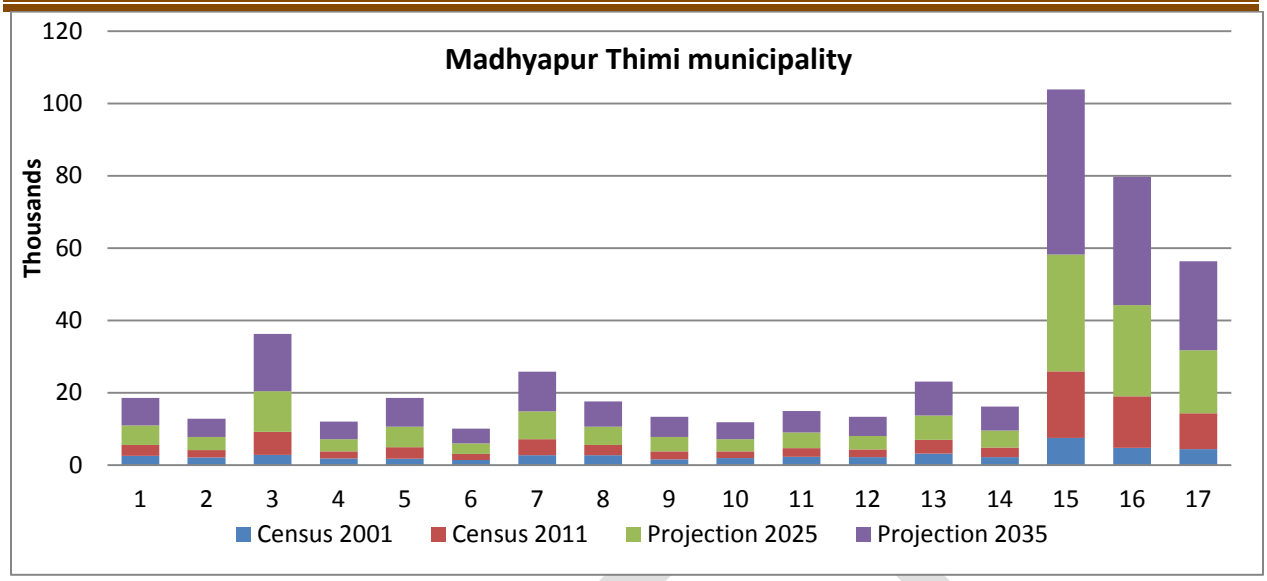


Figure 3-8 Population distribution of Madhyapur Thimi municipality

3.1.5 Kirtipur Municipality

Kirtipur Municipality is divided into 19 Wards and has a total area of 1476 hectares. The consecutive census years of 1991, 2001 and 2011 reveals the total population of municipality as 31,338, 40,835 and 67,171 respectively. The average annual growth rate of Kirtipur municipality in the census year 1991-2001 was 2.7%, which was increased to 4.9% in the year 2001-2011. The municipality has the average density of 45 ppha with most densely populated Ward being Ward 10 with 919 persons per unit hectare and least dense Ward being 19 with only 12 persons per unit hectare. The highest annual growth rate of 11.3 was found for Ward 2, followed by Wards 1, 18 and 10 with respective growth rates of 9.3%, 7.4% and 6.4%. The only Ward with the negative growth rate was Ward 13 with annual growth rate of -0.4 % annual growth. The population distribution of Kirtipur is presented in Figure 3.9.

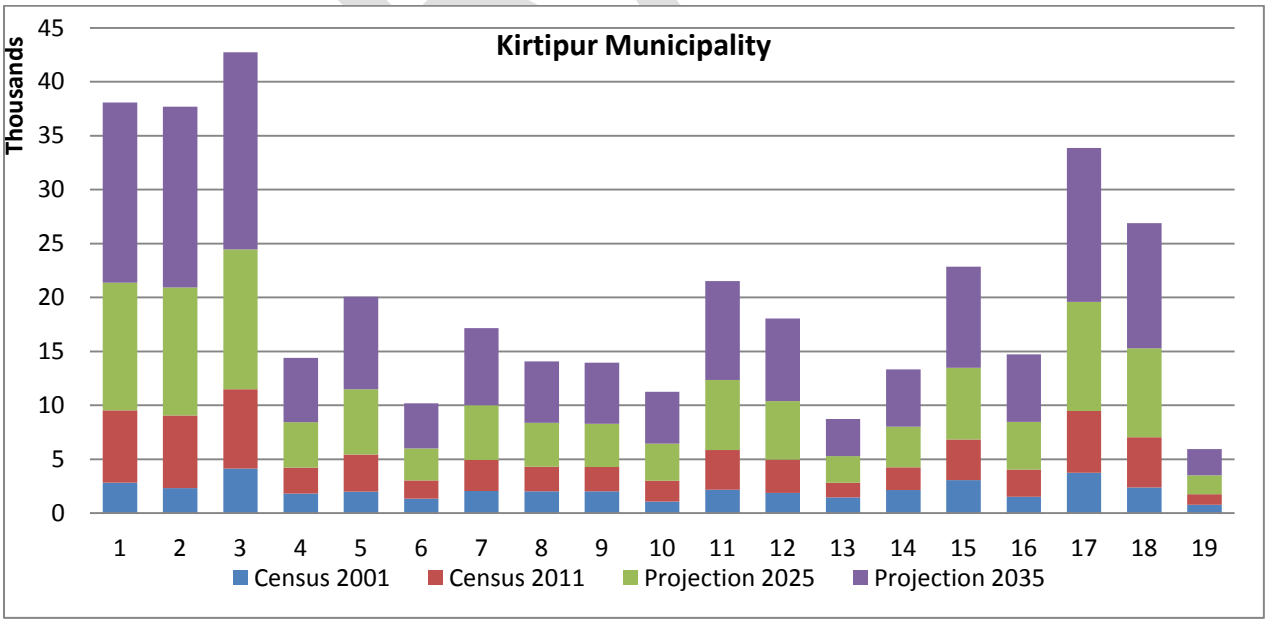


Figure 3-9 Population distribution of Kirtipur Municipality

3.1.6 Newly Declared Municipalities in Lalitpur District

In context of Lalitpur District, Dhapakhel, Sunakothi and Harisiddhi have been included within the Lalitpur Sub Metropolitan City. The District includes 5 new municipalities: Godavari Municipality, Karyabinayak Municipality, Bajrabarahi Municipality, Chapagaun Municipality and Mahalaxmi Municipality. Godavari is the largest among the 3 new municipalities with area of 3474.60 hectares. As per the census 2011, the population of Godavari Municipality is 28,793; Karyabinayak Municipality is 38,036 and Mahalaxmi Municipality is 62172. Among these areas, Imadol and Sainbu have the largest growth rates of 11.01% and 8.99% respectively. The negative annual growth rates are observed for Bisankhunarayan and Ghusel with growth rates ranging from -0.5% to -0.09%. The population distribution of municipalities inside Lalitpur District is presented in Figure 3.10.

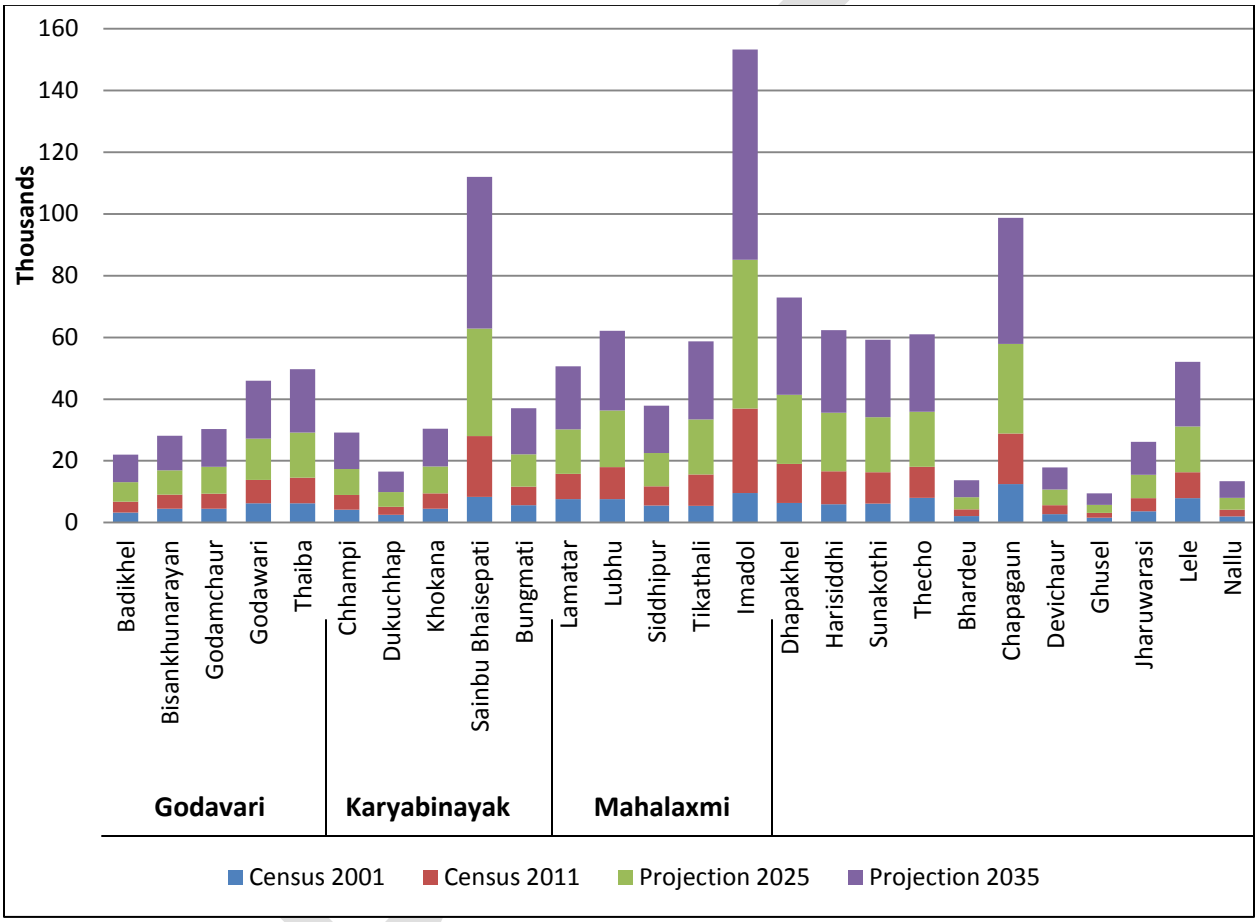


Figure 3-10 Population Distribution for municipalities in Lalitpur District

3.1.7 Newly Declared Municipalities in Kathmandu District

The 57 VDCs inside the Kathmandu District have been combined into 9 municipalities. These include Gokarneshwor, Dakshinkali, Tarkeshwor, Shankarapur, Chandragiri, Kageshwori Manohara, Tokha, Nagarjun and Budhanilkantha Municipality. Manamaiju, Ichangu Narayan, Gothatar, Kapan, Dhapasi, Mahankal and Gongabu has the staggering annual growth rates of 13.94%, 12.25%, 12.21%, 12.19%, 10.46%, 10.21% and 10.07% respectively. Satikhel, Pukhulachhi, and Naglebhare were found to have the negative population growth rates ranging from -0.19 to -0.30%. The population distribution of newly declared municipalities inside Kathmandu District is presented in Fig. 3.11.

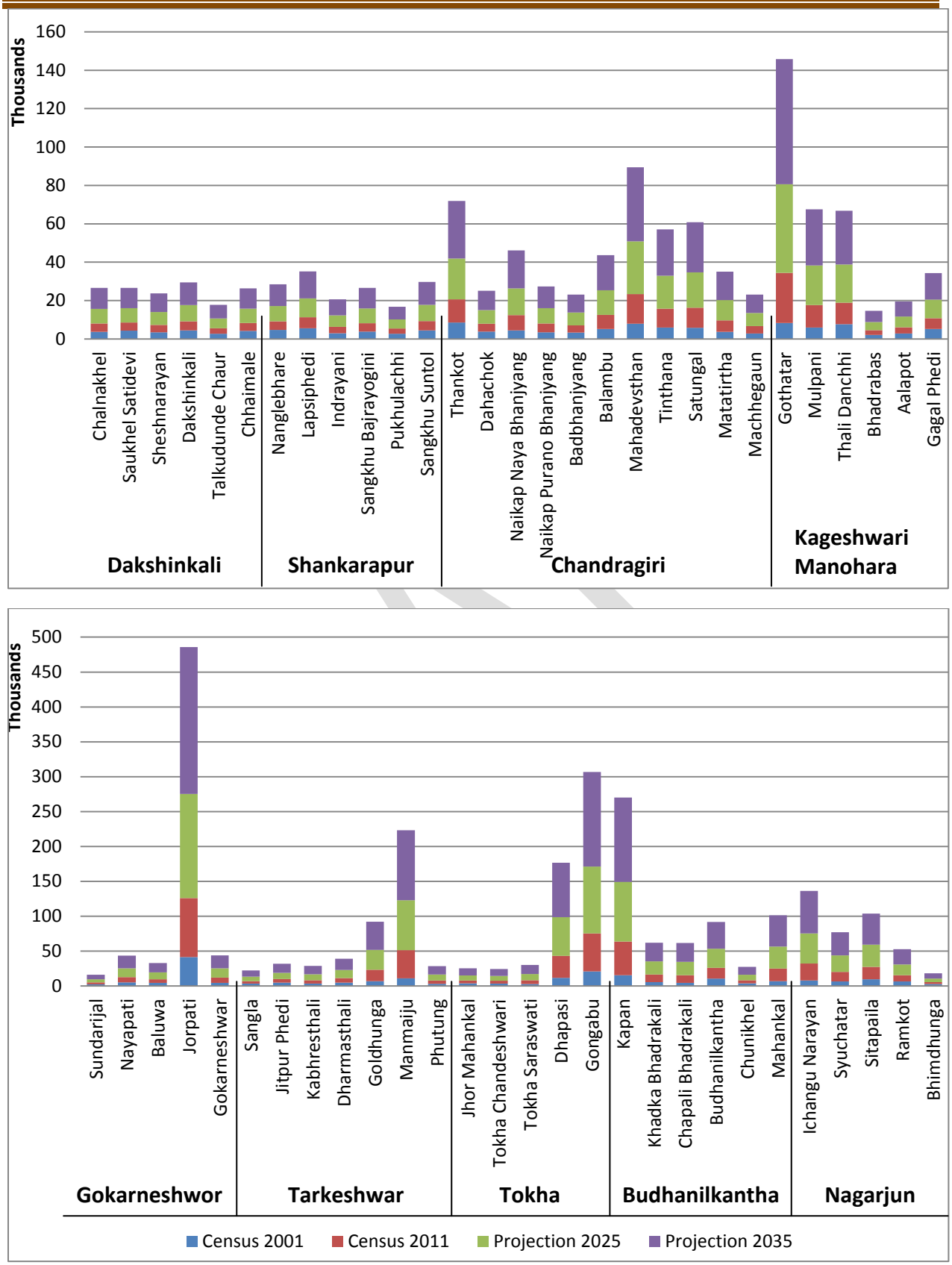


Figure 3-11 Population distribution of newly declared municipalities in Kathmandu District

3.1.8 Newly Declared Municipalities in Bhaktapur District

Four new municipalities have been declared in Bhaktapur District. 4 VDCs each have been combined to form a municipality. Mahamanjushree Nagarkot Municipality has the largest land area with 3505.71 hectare, followed by Changunarayan with 2792.37 hectare, Sipadol with 2432.25 hectare and Ananta Lingeshwor with 1813.53 hectare. Balkot, Sirutar and Kautunje were found to have the highest population densities of 56, 35, 45 ppha respectively. Only Gundu has the negative growth rate of -0.12%. The areas with high growth rates are Kautunje, Sipadol and Jhaukhel with growth rates of 11.00%, 10.71% and 8.74% respectively. Figure 29 shows the population distribution of municipalities inside Bhaktapur District.

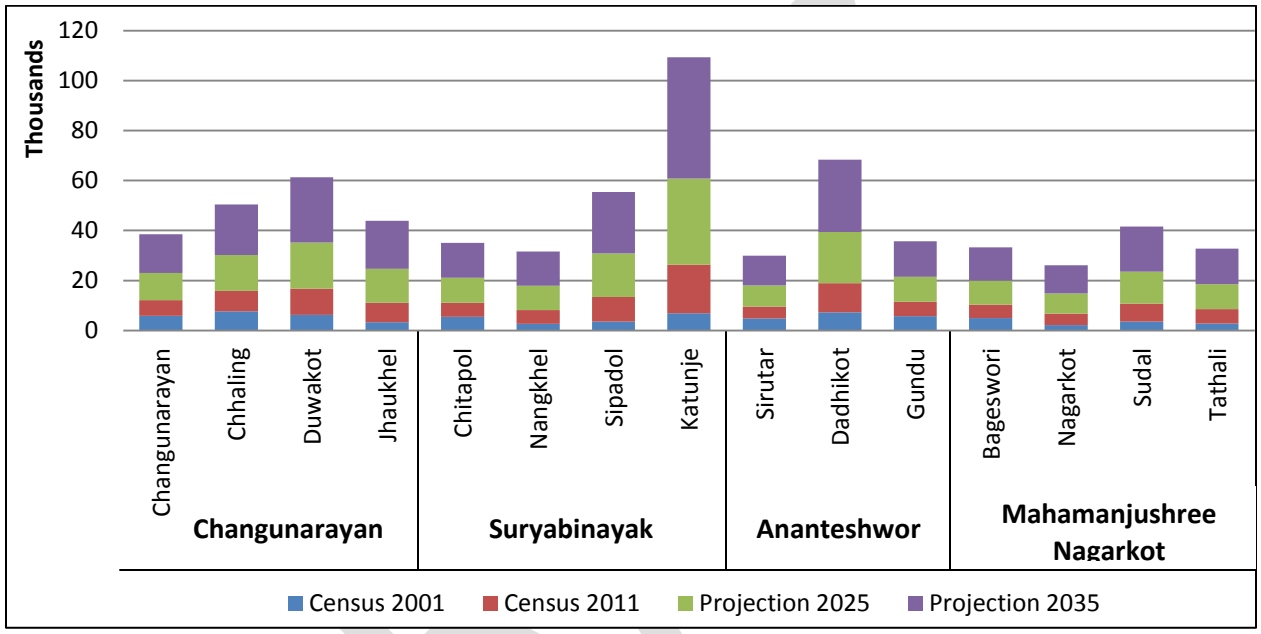


Figure 3-12 Population distribution of municipalities in Bhaktapur District

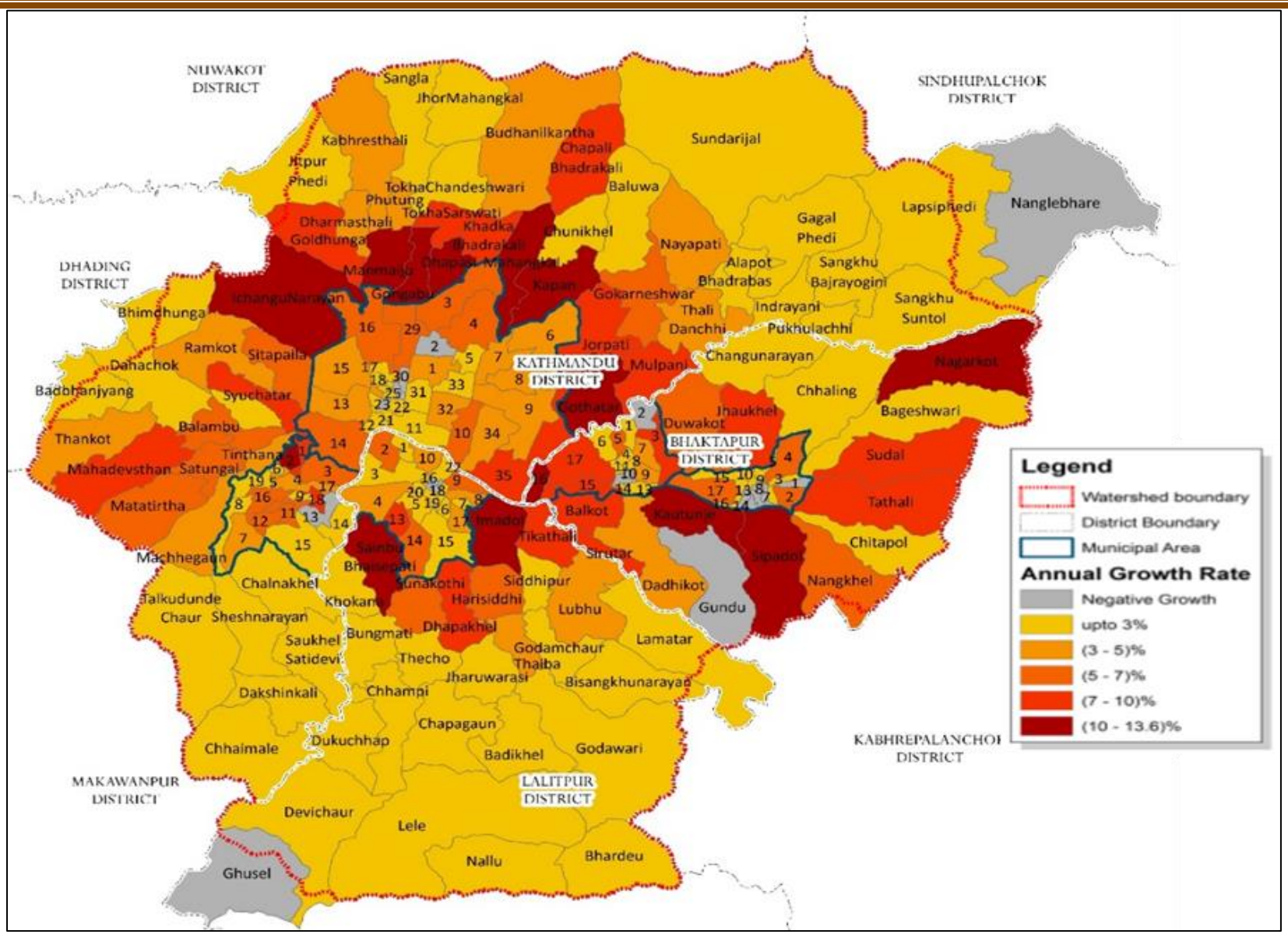


Figure 3-13 Population Growth rate of areas in the Kathmandu Valley

3.2 Land Use Change Trend

Changes of land, primarily agriculture and vegetation to built-up, are the most apparent sign of urban growth. These changes are attributed to the aforementioned drivers or factors. To assess the drivers and the processes influencing the changes in land use morphology and resulting in urban growth in the Kathmandu Valley, a macro level study of land use changes has been done at this initial stage. A detailed micro level study will be done based on the pattern and trend shown by the micro level study. This chapter presents the preliminary results of the land use change modeling and analysis over the last two decades (years 1990/2000 and 2000/2010).

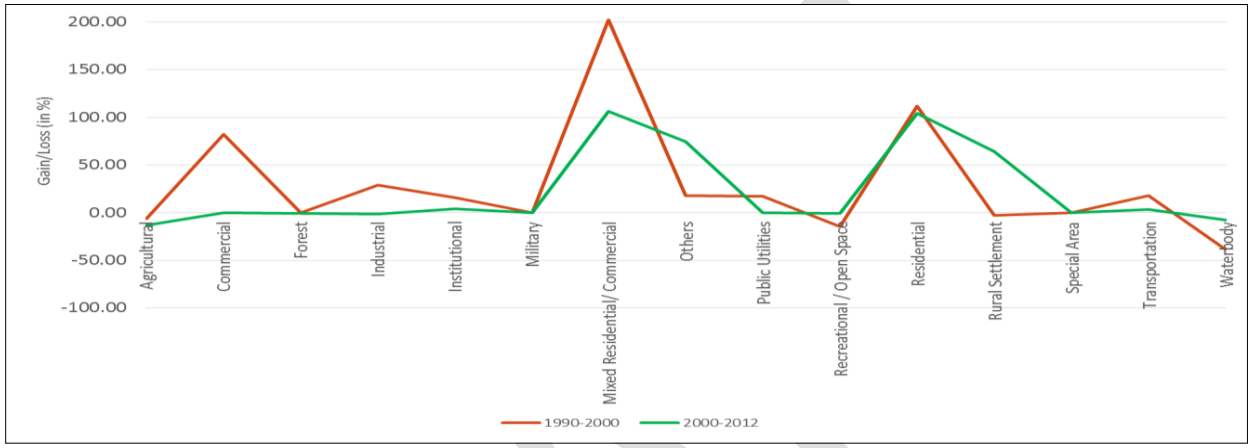


Figure 3-14 Land Use Gain-Loss in KV (1990-2000 & 2000-2012)

Figure 3-15 Land Use Change in Boudhanath Area since 1967

Image Source: (Thapa & Murayama, Drivers of urban growth in the Kathmandu Valley, Nepal: Examining the efficacy of the analytic hierarchy process, 2010)

Over the period of 20 years (1990-2010), urban morphology has drastically changed in KV. This change can be attributed to various socio-political and economic factors. Influenced by these factors and accelerated by haphazard and unplanned development, the built-up area of Kathmandu valley has increased from 38 sq. km in 1990 to 119 sq. km in 2012 over the period of 22 years, with a staggering 211 % increase. Consequently, cultivated land has changed from 421 sq km to 342 sq km, a decrease of 19% over the period of 22 years. Within the built-up category, the proportion of mixed residential/commercial has increased by 524 % and that of residential has increased by 331 % over the last two decades (1990-2012) [Figure 3.14 & Figure 3.15].

Table 3-1 Different land use zone classifications according to their predominant use in Kathmandu Valley

Municipalities	Land Use Zones	Area
KMC, LSMC, Kirtipur Municipality and	1) Cultural Heritage Conservation Zone	1) Old Palace, Cultural Heritage, Old Residential Areas
	2) Residential Zone	2) Commercial, Dense Mixed Residential, Other Residential and Planned Residential
	3) Institutional Zone	3) Health, Education, Administrative, Police and Army barracks
	4) Industrial Zone	4) Industrial Estate in Kathmandu, Lalitpur and Bhaktapur
	5) Preserved Zone	5) Gardens, forest and Parks
	6) Surface Vehicle Zone	6) Bus Park, Truck Park, Car Park, Road
	7) Airport Zone	7) Airport and Periphery
	8) Sports Zone	8) Stadium, Swimming Pool, Covered Halls
17 newly declared municipalities	Urban Expansion Zone	All areas of newly declared municipalities
Madhyapur Thimi Municipality	1) Traditional Residential Zone	1) Old traditional settlements
	2) Institutional Zone	2) Public Institutions
	3) Developing Zone	3) New Residential, commercial, industrial and Special Planning Zone
	4) Preserved Zone	4) Designated agriculture area
	5) Green Zone	5) River banks and forests
Bhaktapur Municipality	1) Traditional Cultural Residential Zone	1) Old Palace, Cultural Heritage, Old Residential Areas, Area adjacent to old settlements
	2) Developing Zone	2) All other areas within the municipality (residential, special planned, industrial, commercial)
	3) Green Zone	3) River banks and forests

By and large, three types of land use zones are observed in the valley; Bhaktapur and Madhyapur Thimi more or less follow similar land use zone patterns whereas the other three municipalities follow more specific land use zones. In the absence of separate building bye-laws, and newly declared municipalities have a singular land use zone. The land use zones in the rural areas could hence be considered as non-existent. The municipalities are independent to define their own land use zones on the basis of their area under jurisdiction, densification criteria, available open spaces and the preservation needs. Among which, the densification criteria seems to have been ignored by the municipalities while delineating the zones.

The National Land Use Policy (NLUP), 2015, has identified seven land use zones to be made applicable in the entire nation. These are:

a) Agriculture
b) Residential
c) Commercial
d) Industrial
e) Forests
f) Public Use
g) Cultural sites
h) Others

Table 3-2 Land Use of KV (1990, 2000 & 2012)

Land Use Classes	Area (sq.km)			Acreage (%)		
	1990	2000	2012	1990	2000	2012
Agricultural	**421.60**	**394.12**	**342.08**	**58.40**	**54.60**	**47.39**
Built-up	**38.09**	**66.54**	**118.65**	**5.28**	**9.22**	**16.44**
Commercial	0.20	0.37	0.37	0.03	0.05	0.05
Industrial	0.79	1.01	1.00	0.11	0.14	0.14
Institutional	3.70	4.29	4.45	0.51	0.59	0.62
Military	1.21	1.21	1.20	0.17	0.17	0.17
Mixed Residential/ Commercial	0.91	2.76	5.69	0.13	0.38	0.79
Public Utilities	0.26	0.30	0.30	0.04	0.04	0.04
Residential	21.83	46.18	94.19	3.02	6.40	13.05
Rural Settlement	1.17	1.13	1.86	0.16	0.16	0.26
Special Area	0.87	0.87	0.87	0.12	0.12	0.12
Transportation	7.15	8.41	8.71	0.99	1.17	1.21
Forest	**253.34**	**253.56**	**251.08**	**35.10**	**35.12**	**34.78**
Others	**2.96**	**3.48**	**6.07**	**0.41**	**0.48**	**0.84**
Recreational / Open Space	**2.39**	**2.03**	**2.01**	**0.33**	**0.28**	**0.28**
Water body	**3.50**	**2.14**	**1.98**	**0.48**	**0.30**	**0.27**
Total	**721.87**	**721.87**	**721.87**	**100.00**	**100.00**	**100.00**

Table 3.2 shows the land use acreages from 1990, 2000 and 2012 based on aerial photographs (1992), IKONOS image (2001) and GeoEye image (2012). These land use categories have been used from the LTDP 2002 land use classification and definitions. It can be observed that there is a decreasing trend of agricultural land use and an increasing trend of built up areas [Fig 34]. In 1990, agricultural land use covered 58.40% of total area of the Kathmandu Valley, which decreased to 54.60% in 2000 and 47.39% in 2012. Similarly, built up areas covered 5.28% of the total space in 1990, which gradually increased to 9.22% in 2000 and 16.44% in 2012 respectively. A major change has been observed in case of area covered by water bodies. The area coverage was 0.48% in 1990, which gradually decreased to 0.30% in 2000 and 0.27% in 2012. This highlights the decreasing ground water table of the Kathmandu Valley particularly due to population growth, excessive ground water extraction and climatic factors.

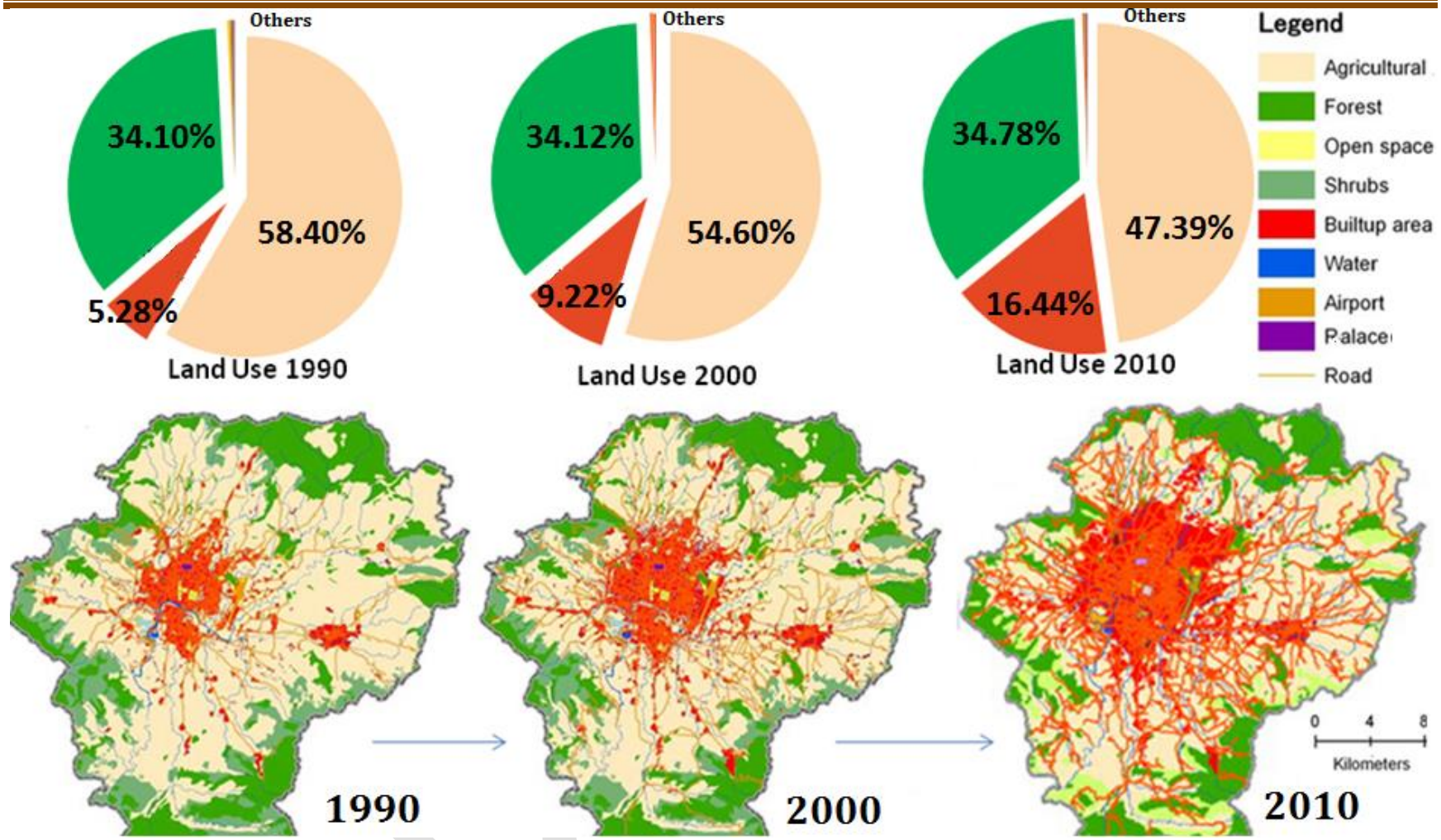


Figure 3-16 Trend of Land use change in KV (1991-2010)

Image Source: (Thapa & Murayama, Drivers of urban growth in the Kathmandu Valley, Nepal: Examining the efficacy of the analytic hierarchy process, 2010)

3.3. Built-up Trend and Areas of Rapid Urban Growth

Looking at the trend of change in built-up area of Kathmandu Valley, it is apparent that the rate was higher in the central parts of the urban areas during the earlier decades. In the later decades the rate of urban growth is found to have increased in peripheral regions, protruding to the newly declared municipalities.

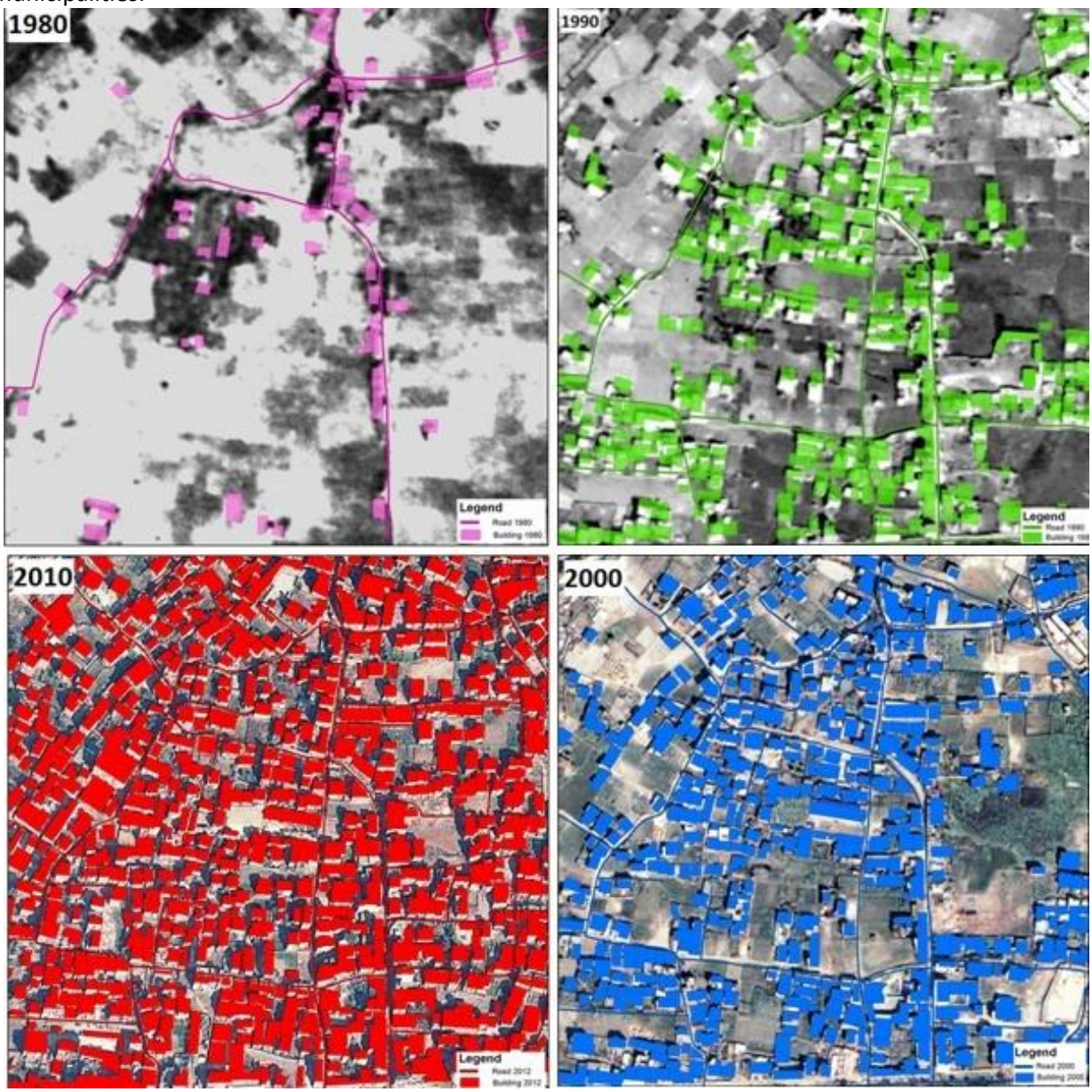


Figure 3-17 Built up trend of Gongabu Area (Clockwise order: 1980, 1990, 2000, 2010)
Image Source: Saroj Basnet

The decade of 1990s showed a significant increase in built-up (51%) in ward number 20 of Lalitpur sub metropolitan city, which was closely followed by ward numbers 12 and 5 of Lalitpur and 2 and 10 of Kathmandu, which were within the range of 40 to 50%. Gongabu showed highest built-up rate (12%), closely followed by Jorpati, Dhapasi, Sitapaila and Manamaiju.

In addition to the ward numbers 3, 5, 6 and 7 of Kathmandu metropolitan city, Dhapasi and Gongabu also showed an increase in built-up above 50%. Ward numbers 10 of Kirtipur, 3, 7 and 8 of Lalitpur, 5 and 7 of Madhyapur Thimi also showed remarkable built-up growth, well above 30%. Built-up growth of Jorpati, Mahankal and Manamaiju were also above 30%. Satungal, Sitapaila, Kapan, Gothatar, Tinthana and Imadol showed remarkable change in built-up areas, which were in the range of 20 to 30%. It is lucidly noticeable that the growth in the urban built-up tends to be spilling over towards the sub-urban areas in the later decades.

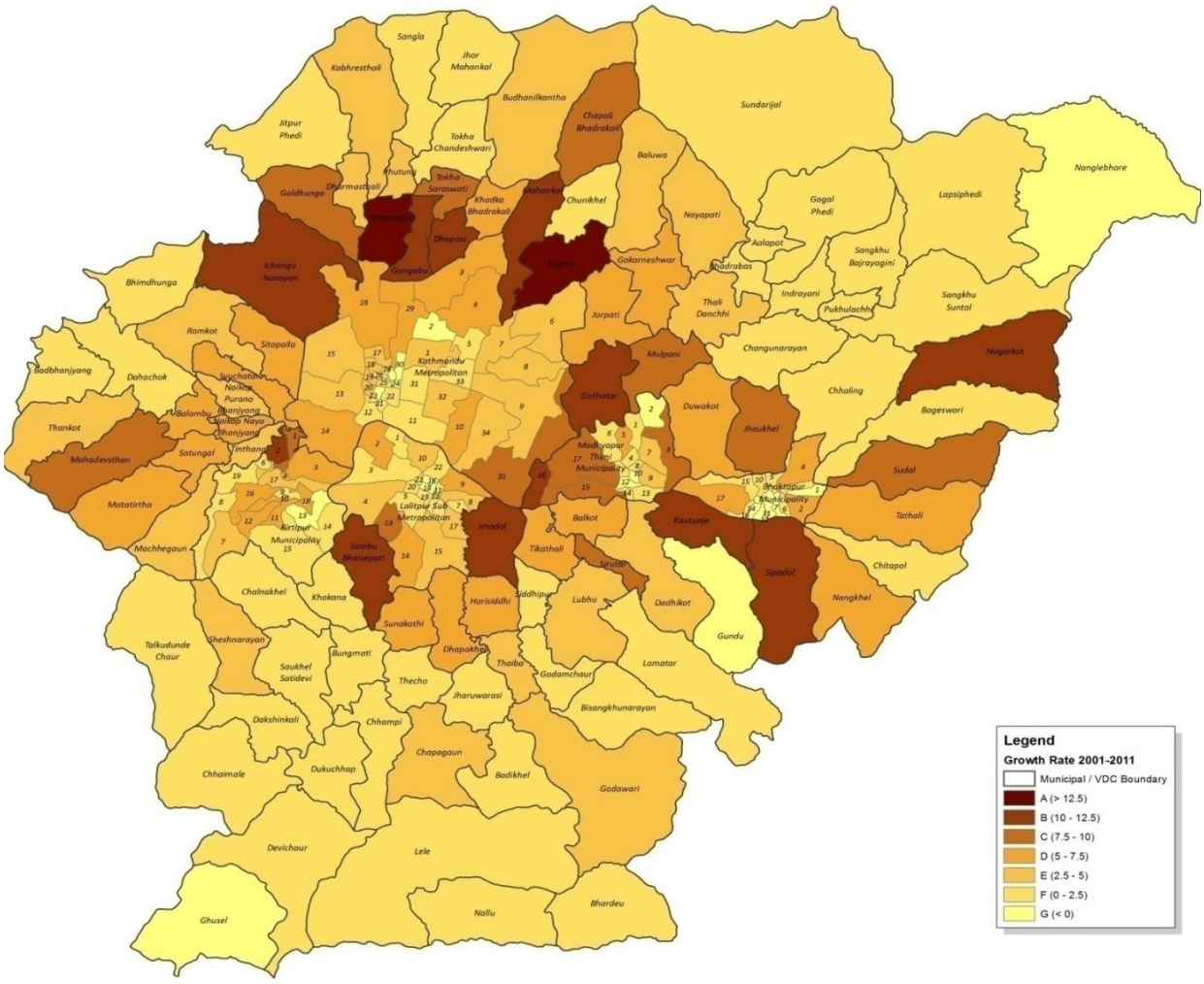
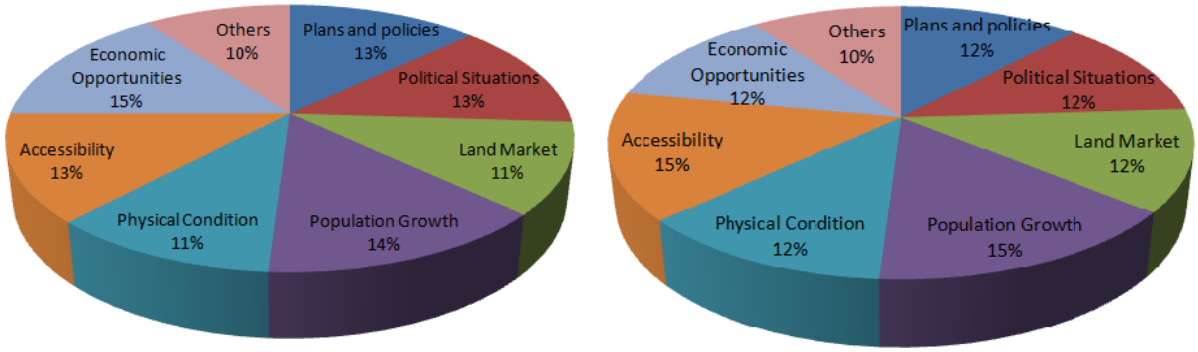


Figure 3-18 Urban Growth Rate 2001- 2011

3.4 Drivers of Urban Growth

The rapid urban growth discussed in the previous sections is attributed to various socio-political, economic and development factors, the so called "the drivers" of changes. In the context of KV, these drivers have had significant influences since 1970, as being the capital city and the economical hub of the country. The in-migration of the population from surrounding and remote districts seeking economic opportunities, the political and conflict situation during the decade of 1996-2006 and the ensuing political turmoil after 2006 has somehow directly or indirectly influenced the socio-economic and development trends of the KV. Hence, the urbanizing trend has also changed significantly, characterized by haphazard and unplanned development due to lack of effective planning and its implementation.

Various factors pertaining to socio-economy, demography and development have influenced this growth trend. These factors are multi-dimensional in nature and are catalysts to the other factors, as well as influence the impacts of other factors. For instance, economic opportunities give rise to the population growth, which in-turn influence increase in building constructions and infrastructure development, while specifically road construction leads to increase in built-up densities along the road. There are positive factors or drivers, which influence urban growth and negative drivers which inhibit the growth.



Impact of driving factors for Central Business District (Core Area) ***Impact of driving factors for newly declared municipalities***

Figure 3-19 Impact of driving factors for Central Business District and newly declared municipalities

The following sub-sections present the possible driving factors and their definitions, specific to KV. These drivers have been derived based on the decadal land use change study of the KV from 1990-2012 and Key Informant Interviews. Analysis of the influence of these driving factors has been done using *Spatial Logistic Regression Model* as well as through discussions with the experts of the urban planning and development field.

3.4.1 Economic Opportunities

Economic opportunities include wide varieties of economic activities like- job and business opportunities, industries, land value etc. (Priyanto, 2010)& (Thapa & Murayama, 2011). Spatially representing economical factor may be ambiguous in the absence of economic aspects of the activities going in a certain spatial context. The survey conducted by Nepal Rastra Bank (2012) estimates that the total value of the economic activities taking in the valley is Rs. 418 billion which accounts 31% of total GDP. This suggests that about one-third of the country's economic activities are concentrated in Kathmandu valley alone.

Central Business District (CBD): a place where commercial and financial activities occur providing opportunities for extended businesses and trade.

The high population concentration and economic activities in the valley are assumed to occur primarily in the Central Business District (CBD), mainly due to the centralization of the commercial and financial activities, providing jobs in formal financial and banking sectors, opportunities for extended businesses and trade, as well as providing opportunities in informal sectors to support and sustain the formal sector activities. Further, the central administrative services are also located within the CBD in the context of KV. Due to these pull factors, urban development is considered to be concentrated around and spreading outwards from the CBD. In this study, proximity to CBD and other market places are taken as major economic factor which drives the growth of the valley. Hence, the CBD, attracts the major workforce, therefore the built-up densities around the CBD is higher. This factor however seems to inhibit the urban growth around the CBD as there may not be available growth space due to already present dense built-up spaces.

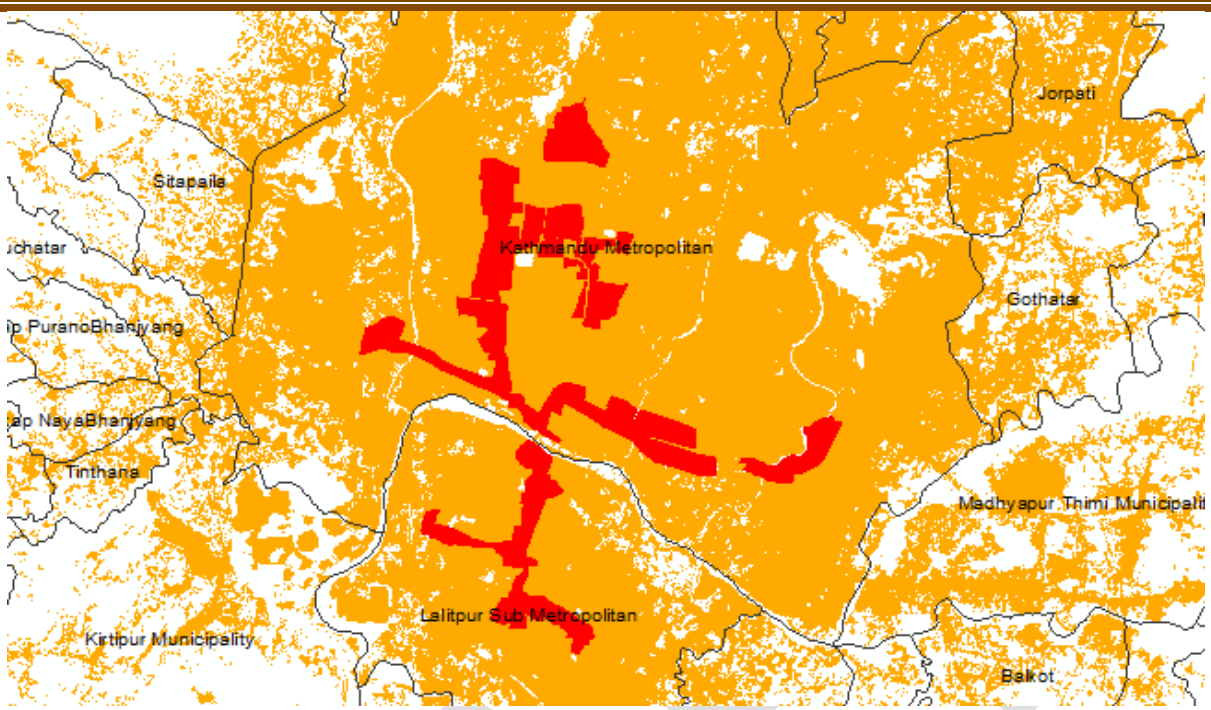


Figure 3-20 Central Business District within the Kathmandu Valley

Similarly, population growth is taken as one of the major driving forces that lead to urban expansion in many urban growth studies(Fang S. , Gertner, Sun, & Anderson, 2005)&(Priyanto, 2010). Population growth is a direct indicator of economic opportunities and other factors such as political and security issues, which has speeded up the rural – urban migration into Kathmandu Valley. 25% of non-farm employment (Service & Manufacturing) equivalent to 631,000 employees in Kathmandu Valley shows that it is the center of economic opportunities which has been pulling huge proportion of migrants. The rural inhabitants moved to the capital in search of employment, government aid, security, shelter and economic opportunities. This huge in-migration created more economic opportunities in the Kathmandu Valley, along with it resulted in huge gap between demand and supply of basic infrastructures.

Due to the population growth, the built-up and population densities within the existing urban area has significantly increased. In 2001 lifetime migrants made up 38.4% of the urban population. In 2011, the valley had a total of 46% inter-district migrant population, 74% of which were born in rural areas. Kathmandu district had the highest percent (54.2%) of life-time migrants in Nepal. As such, to accommodate the increasing population, there is an increasing trend of horizontal outward growth. This has led to a formation of urban agglomeration within the KV, spatially joining the designated development/growth nodes with the urban municipalities. In this case of spatial agglomeration, the concept of growth nodes and development focusing around such growth nodes may not be relevant in future as these nodes are likely to be agglomerated into one urban footprint. Therefore, concept of “metro city”, one continuous urban agglomeration within KV may be relevant.

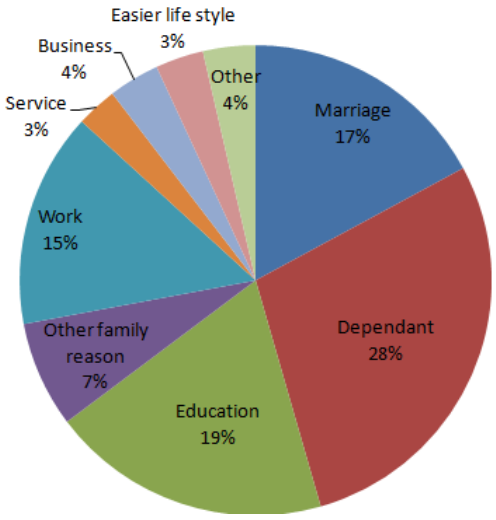


Figure 3-21 Main reasons for Migration in KV

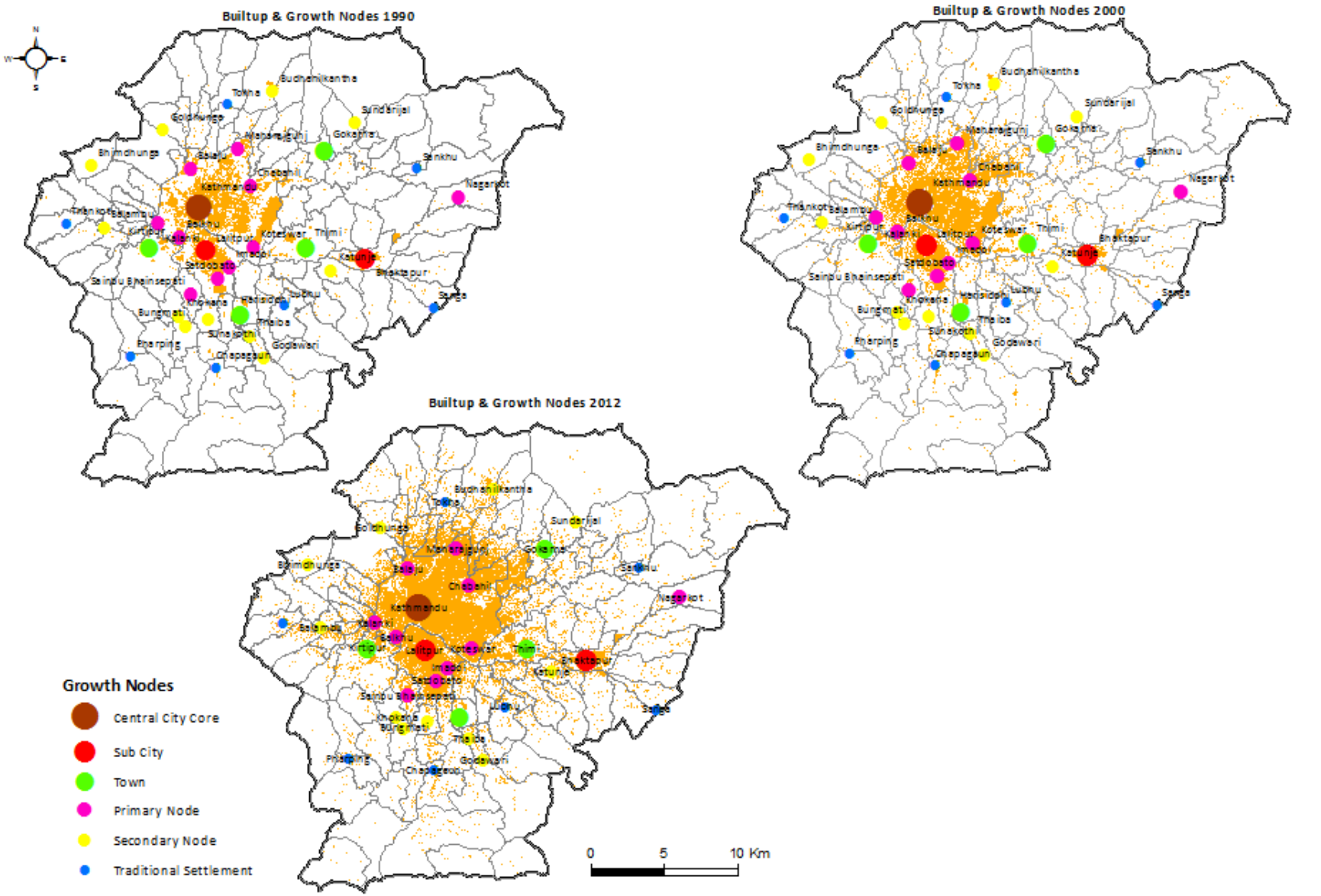


Figure 3-22 Urban growth nodes and built-up (1990, 2000, 2012)

3.4.2 Bio-physical Conditions

Bio-physical characteristics refer to characteristics and process of the natural environment such as landforms, topography, soil type, natural resources and drainage pattern. These characteristics usually affect urban growth pattern based on the suitability of land for specific purpose. Parameters such as slope, reserved forest and water bodies are taken as site specific characteristics which can either restrict or accelerate the growth of valley. Built-ups are generally discouraged in the slope, however, development of housing, hotels and resorts etc. are encouraged in the hillocks and on top of the hills as evident from on-going developments around the hills of KV. Unregulated developments have been on-going along the Bagmati, Vishnumati, Dhobi Khola and other rivers in KV. The corridors of these rivers should be preserved as restricted zones considering potential flooding events and conservation of these drainage systems. Other areas susceptible to liquefaction, landslides and other natural hazards also restrict the development, and hence should be considered as inhibiting factors for the growth.

Figure 3-23 Development on hillocks surrounding KV
Image Source: KVDA

Figure 3-24 Increasing encroachment of riverbeds and green spaces in the Kathmandu Valley
Image Source: Kashish Das Shrestha

3.4.3 Road Networks and Planned Major Developments

It is assumed that whether a place is urban or not is highly correlated to accessibility of that place (Huang, 2008). Therefore transport related variables such as Major Road, Minor Road, Ring Road, Major Nodes are included as predictors of urban growth. These variables are widely mentioned in most of the literatures because of the fact that the area which is at closer proximity to transport related variables have greater tendency to grow in future due to potential benefits such as ease of access, economic opportunities, social services etc. The growth of the road network in valley in the 70s and 80s was 62% and 50% respectively. Growth phenomenally picked up in the 90s with a record of 154 % and it slowed down in between 2001 to 2012 with an average of 31%.

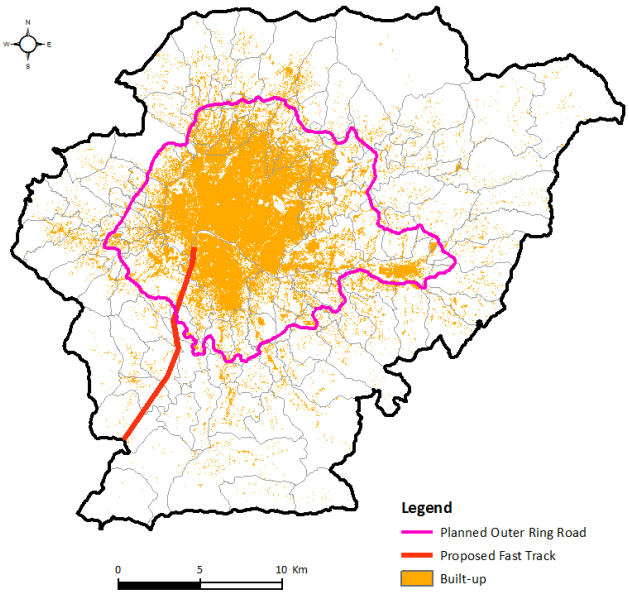


Figure 3-25 Planned Outer Ring Road and Proposed Fast Track

3.4.4 Access to Infrastructures and Services

The level of urbanization and level of development is closely related with accessibility to infrastructure and services such as clean drinking water, electricity, education, health facilities and sanitation. Besides, it is also likely to affect the future growth pattern of the city because it enhances the thrust towards urbanization of rural-urban fringes which eventually increase the built-up areas at their proximity. Therefore, this study has considered educational and health facilities as driving factors of urban growth in Kathmandu Valley. Other facilities such as drinking water provision and electricity are not considered, considering the piped drinking water connectivity is not available throughout the KV, and as this urban amenity is provisioned only after the development occurs, in case of unregulated development.

3.4.5 Land Market

The value of land is one of the major parameters to induce land use change. Most often, the increase in land value is directly proportional to the increase in density. The land gets converted into more profitable use as its value increases. The value of agriculture land is determined by its productivity. However, the determinants of the value of urban land are the width and status of the frontal road, availability of utilities, proximity to the city center or business opportunities, shape of the land, direction, width-depth ratio etc. The factors deterrent to the land value are the land having a steep slope, drainage constraints, adjacent to the river, high tension line or electric sub-stations and solid waste dumping site, etc. The valuators of Nepal appear to have implicitly considered these factors while valuating the land. However, there's a complete absence of officially approved scientific approach of valuating the land. Most popular method in practice is to consider the type of front road and the location. This method is adopted by the government while assessing the value of land for tax purpose. The land with no public access gets the lowest value.

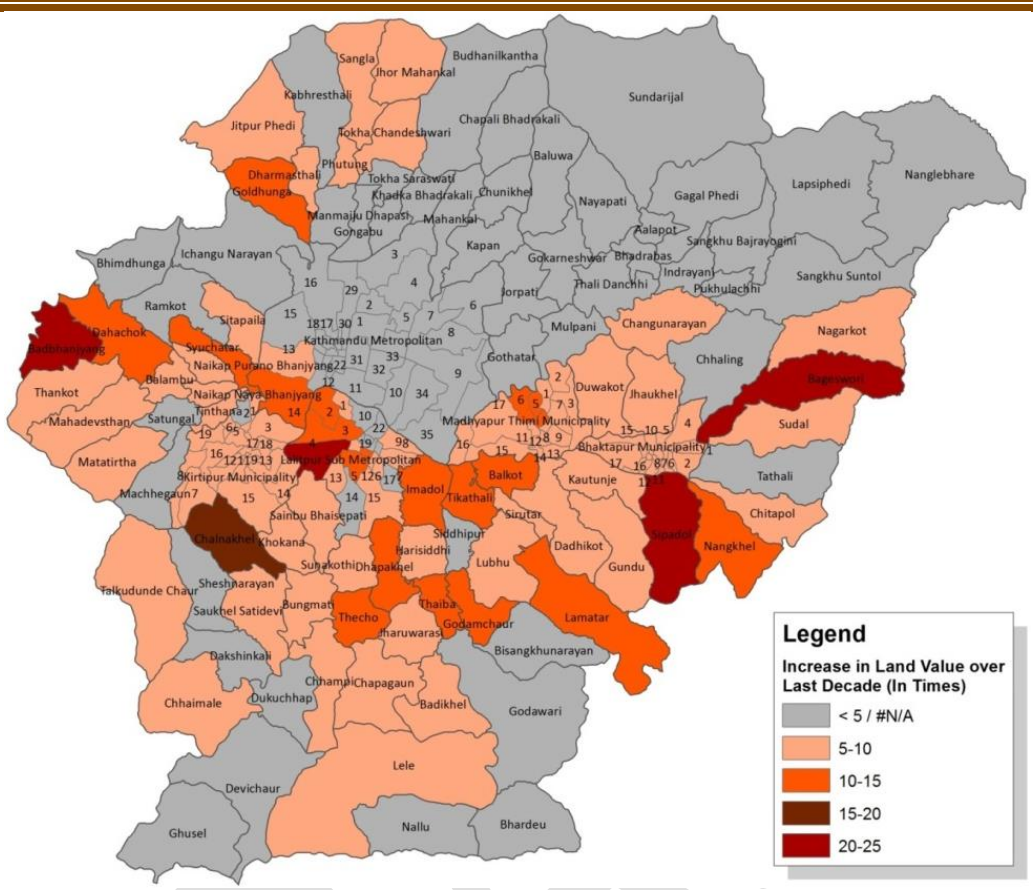


Figure 3-26 Increase in Land Value Index over the last decade

However, it is the situation of demand and supply that governs the most for transaction of the land which are influenced by the factors like the lending policy, economic situation, political stability and peace. The market value of land is generally higher than the rate fixed by the government. The extent of difference however varies from place to place. The banks normally arrive at the value of land by aggregating market rate and government rate with the weightage of 70:30.

In the absence of official land index, the government rates for different areas in the past several years have been compiled to analyse the growth pattern. Such rates are fixed by the land revenue office based on the type of roads, i.e., metalled, gravel or earthen and the location of such roads. The valuation is basically used for the taxation during land transfer. The government rates differ from the market value and hardly provide a fair approximation on the trend of increase of land value. In the past one decade, the land value increased as high as 25 times. Such high increment has been observed in the urban fringe rather than the municipalities owing to the fact that the land price of the municipality has already attained to a threshold limit and the geometric growth could no longer be continued. The urban growth in terms of price was therefore limited to less than 5 times.

The land prices remained high within the ring road and the periphery. The adjoining areas or (formerly the urbanizing VDCs) also had high land prices. The most expensive land, as valued by the government, are the parcels adjoining to Kopundol, Jawalakhel and Lagankhel.

3.4.6 Building Construction Patterns

The average permits issued annually for the construction of buildings in the municipalities is about 5,700. The two prominent municipalities, KMC and LSMC, had the retardation of 35% and 31%

respectively last year as compared to the building permits issued five years ago. Bhaktapur, Kirtipur and Madhyapur Thimi municipalities had the positive growth of 3%, 15% and 20% respectively. The five years' average of the building permits in KMC was 3,549, which constituted about 63% of the total permits issued in five municipalities.

There could be a number of reasons for the retardation of the building construction in Kathmandu and Lalitpur. One of which could be the changes in lending policy as imposed by Nepal Rastra Bank. The other reason could be the expansion of the buildings outside the municipal boundaries. The data of the building permits issued by the new municipalities could not be obtained and hence it became difficult to arrive at the conclusion whether the construction has actually gone down or shifted from urban area to the fringes.

3.4.7 Implementation of Plan and Policies

Implementation of plan and policies such as land use zoning, transportation policy, development control and investment plans have high capabilities to direct future urban growth. Due to absence of master plan and land use plan of the valley, policies related to land use restrictions and environmental constraints are considered as the driver of urban change. While land pooling has been utilized as a major tool for the development and control of urban land in the present context, it does not meet the growing demand for developed land. Hence, there is a need to develop relevant planning tools in order to meet the land demand.

3.4.8 Political Situations

Political situation of the country in the past 2 decades has played a vital role for rapid urbanization of the KV. During the period of 1995-2005, internal migration to KV drastically increased for safety and security reason which ultimately increased the rental units and housing units in the city. The city felt a tremendous urban growth at the expense of prime agriculture land around ring road during the period. However this factor is not included in urban growth model due to complexity of modeling political situation into a spatial form.

3.4.9 Neighborhood Characteristics

Proportion of urban area around certain place affects the growth of that place. This is called spatial interaction effect which principally comes from spatial agglomerations (Cheng & Masser, 2003). To incorporate the influence of this effect factor maps showing proportion of urban land and agricultural land were prepared separately for each time series. Similarly, map of road density and distance to existing urban cluster were also prepared.

3.5 Quantifying Drivers and their Influences in Urban Growth

Different indicators representing the drivers are derived and spatially modeled. These spatially modeled variables are checked for multi-collinearity and spatial autocorrelation to further analyse the variables using logistic regression. To quantify the indicators of the drivers, various spatial variables were used in Logistic Regression (LR) model [See Table 3.3].

From this method, following observations were found:

The major determinants with negative effects on the urban growth are

1. Distance to existing urban cluster (coefficient value -21.6)
2. Distance to minor roads (coefficient value -19.2.)

This indicates that probability of urban growth is higher in the areas closer to these variables. The strong negative relation between urban growth and these factors seems logical in Kathmandu Valley because most of the new settlements are growing at the proximity to the existing urban cluster which is due to human nature to live in cluster rather than in isolated region for the sake of safety or communication. Similarly, most of the growths are observed along the minor roads which are serving as local or service roads rather than along the major road which is one of the interesting findings from this study. It means to construct a house; the household would select the area with road facilities which may serve them for commuting from one place to other. Therefore the model shows that urban growth of the valley has been controlled by road accessibility which is contributing to the spatial pattern of linear urban development along the road networks.

Table 3-3 Spatial variables for the drivers of urban growth in KV for logistic regression

Categories	Driving factors (Stimuli)	Driving Factors (Constraints)
Biophysical condition		Slope
		Forest
		Rivers and ponds
Economic opportunities	Distance to CBD	
Population growth	Population density	
Road networks and planned major development	Distance to major road	
	Distance to minor road	
	Distance to Ring road	
	Distance to major nodes	
Access to infrastructure and services	Distance to educational facilities	
	Distance to hospitals	
		Institutions
Plan and policies		Cultural Heritage sites
		Restricted Open spaces
		Airport
		Reserved forest
		Municipal boundary
Neighborhood characteristics	Proportion of built-up area neighborhood	
	Proportion of Agricultural land around neighborhood	
	Road density in a 200m circular neighborhood	
	Distance to existing urban cluster	
	Distance to rural settlements	

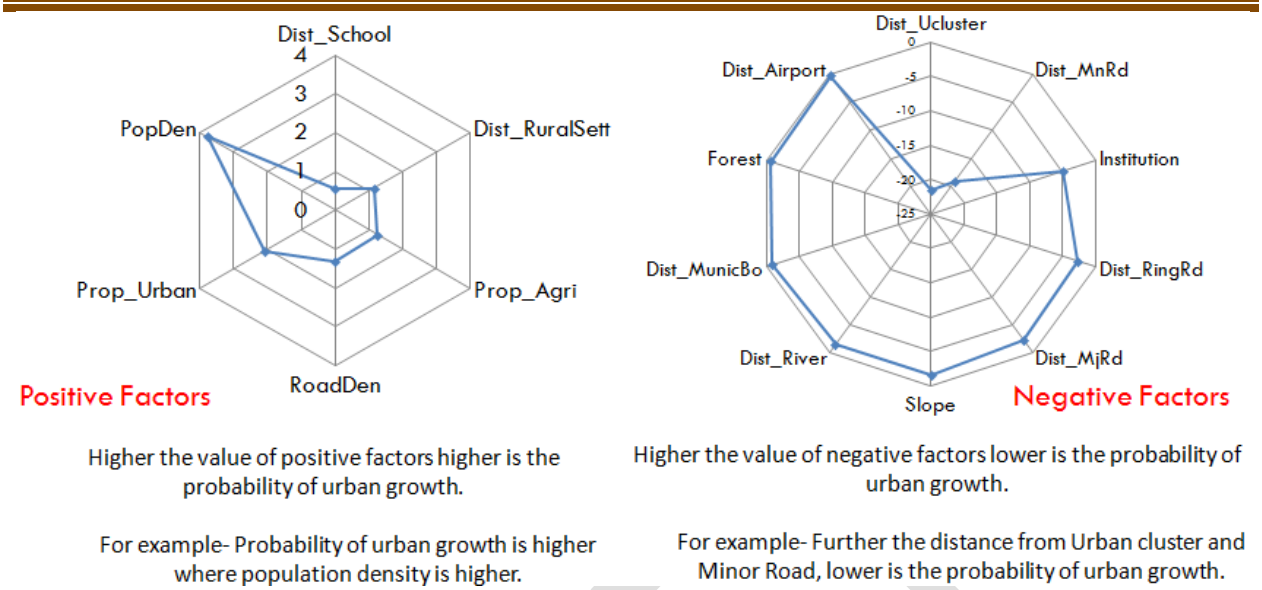


Figure 3-27 Influence of negative and positive driving factors for urban growth

Another interesting finding from the study is the negative relationship between presence of institutions and urban growth [Figure 3-27]. An area tends to have higher probability of urban growth if there is no institution which seems logical as urban growth in institutional area is very low or almost nil. Degree of slope has also a negative influence on the growth of settlement which is because of the fact that most of the urban growth is occurring in relatively flat area than in surrounding elevated lands. Similarly other distance related factors such as- distance to ring road, distance to major road, distance to river, distance to municipal boundary, forest and distance to airport have also negative association with urban growth.

Among the factors which have positive influence in urban growth, population density seems to be major determinant with an odds rate (OR) of 43.9 and coefficient 3.78 [Figure 3-27 Right]. This indicates that the probability of urban growth is 43.9 times larger when the population density is increased by one unit. In other word, probability of urban growth is higher in areas with higher population density. There is also a significant positive relation between proportion of urban area in a neighborhood and probability of urban growth. This can be easily observed from the land cover map of 2010 where built-up area in the urban fringe of the valley is mostly clustered around the existing urban areas which indicates that areas with higher proportion of urban areas and higher tendency to develop than areas which have less urban proportion in the surrounding. Similarly, the positive spatial interaction between road density and urban growth reflects that urbanization trend in Kathmandu Valley is highly dependent on road accessibility. The probability of urban development is increased by 3.8 times for every unit increase in road density in a particular area. Thus accessibility to road networks is an important determinant of urban growth. Both formally developed housing units and unregulated residential developments are occurring along the road network which is evident for the significant positive relationship between these components. Other factors like- proportion of agricultural land in a neighborhood, distance to rural settlement and distance to school are also positively associated with urban growth.