

Policy Implication for Green Infrastructure Development in urban Areas of Nepal

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ABSTRACT: The improvements in communication, transportation, health, education and job opportunity has resulted urban population to increase from 14.2% (2001) to 17.07% (2011) in Nepal. The urbanization in terms of increasing population and physical infrastructure is creating ever-increasing problems like climate change, waste generation, forest degradation, land use change and pressure on public utilities. The urban infrastructures are haphazardly built but the government's most important five-year plan fails to address those urban issues. Nevertheless, the 41 new cities are under the process of endorsement as new municipalities from the parliament making altogether 99 municipalities in Nepal. The additional municipalities are expected to increase the urban problems, if planned infrastructure development is not considered from the beginning. However, Ilam municipality in eastern Nepal has attempted to become the Nepal's first green city. Previously, it has declared as the first polythene bag free and second cleanest city as per the green city initiative. The municipality is heading towards green infrastructure development that has supported by the stakeholders. The present paper depicts green city initiatives of Ilam municipality and existing policies on urban development in Nepal. Besides, it provides the policy suggestion for green city development. The literature review, expert consultation, focal group discussion, field visit, and questionnaire survey were the tools of the study. The research outcome provides reference to researchers' for further study and city planners, and city corporations towards green infrastructure and sustainable city development.

1. Introduction

Nepal is a Himalayan country situated in South Asia. It is linear in shape stretching from east to west with total length of 1034 km and north-south length of approximately 350 km. The total area of Nepal is 147,181 square kilometers. It shares its northern border with Tibet Province of the People's Republic of China and its southern, eastern, western border with Republic of India. It has a total population of about 26.6 million (CBS, 2011). Ecologically, the country is divided

into three belts namely Mountains, Hills and Tarai. The first two are the hilly areas whereas the last one is plain area situated in the south of the country. Administratively, it is divided into five development regions: eastern, central, western, mid-western and far western. The country comprises five climatic zones based on altitude range from subtropical in south, to cool summers and severe winters in north.

Kathmandu, the capital of Nepal, is located in the central region and is the only metropolitan city in the country. Kathmandu Valley, popularly known by people, consists of three main districts- Kathmandu, Lalitpur and Bhaktapur, and has a geographical coverage of about 899 sq. km. It is the most important urban concentration of Nepal with highest population density. The rate of urbanization is very high as compared to the other cities of Nepal.

The country has abundant natural resources in terms of beautiful scenery, especially the spectacular Himalayan Mountains, extensive forests with wide variety of flora and fauna, Tarai plains with fertile soils in the lowlands and water.

1.1 Urbanization in Nepal

Urbanization is a process that shifts society from a rural environment to an urban one. It involves increasing numbers of people and the physical growth of urban settlements. The process is largely driven by market forces and government policies, which result in changes in land use, health and natural resources management including water, soil and forests. Besides, it is an essential part of economic growth, social and political change, technical and scientific advances and progress in various areas.

Nepal Population and Housing Census 1952/54, identified only 10 “urban centers” with population of over 5000. Among these, 5 were in Kathmandu Valley and together they represented 83 percent of the total urban population. Kathmandu was the only city with population of over 100,000. Today, different factors have caused a dramatic increase in both the number of urban settlements and urban population. As a result, the rate of urbanization in Nepal is among the highest in South Asia. The percentage of urban population increased from 3% in 1954 to 14% in 2001 and to about 17 % in 2011. According to the United Nations Human Development Report 2003, world urban population averaged at 55% and Asia averaged at 42.6%; the average urban population among the SAARC region averaged at 22.8%.

Urban areas in Nepal are referred by various names based on size and concentration of population and sometimes the functional dominance in the national and local economy. *Shahar*,

Nagar Panchayat and *Nagarpalika* are the common Nepali terms used to denote urban places. Based on the population size, annual revenue and level of infrastructure facilities available in the municipalities, they are categorized as metropolitan (*Mahanagarpalika*), sub-metropolitan (*Upa-mahanagarpalika*) and municipality (*Nagarpalika*).

The history of origin of urban settlements in Nepal is obscure. Very little is known about urban living in Nepal during the period of Kirants. According to Basnet (2011), the historical evidences on the existence of towns in the Kathmandu valley are found only for the Lichhavi period (100 BC to 1000 AD). By the eleventh century, three principle settlements in the Kathmandu valley had already started to be referred to as capital towns. After 1769, Kathmandu became the capital of unified Nepal as well as the seat of political, economic and social power. Outside the Kathmandu valley, many new settlements were developed. The spread of Newar traders and small manufactures from Kathmandu during half of the nineteenth century further contributed to the physical and economic growth of a number of settlements in the hills (Blaikie, P., et.al; 1980).

In Terai, the political, demographic and climatic reasons discouraged the growth of large permanent settlements until 1920. The trade treaty of 1923 between Nepal and British India and Industrial development during 1930 made positive impact on the growth of urban centers in Terai (Shrestha, 1981). The political change of 1951 had significant impact on the urban growth in Nepal. The malaria eradication and resettlement program in the late 1950s created the framework for long scale migration of hill people that resulted the development of cities in Terai after 1951.

The Government of Nepal declared 58 urban and semi urban areas as municipal areas comprising 53 being the municipalities, 4 sub-metropolises and 1 metropolis and they qualify as urban areas (Portnov et. al. 2007). In July 2011, the government restructured 161 Village Development Committees (VDCs) into 41 municipalities but they are under process of approval. Now, the total urban population is 17% (CBS, 2011). It is the highest value over the past 51 years, while its lowest value was 3.48 in 1960 (UN Reports). The government can declare an area with basic infrastructure like electricity, drinking water, hospital, schools, market and access to transportation (via land or air) a municipality if it can raise at least Rs one million annual revenue from internal resources. There has to be population of at least 20,000 in municipalities of the hilly and Tarai region and 10,000 in municipalities of the Mountain region.

The rate of urbanization is 4.76% p.a in Kathmandu. It accounts for approximately one third of total Nepal's urban population and is one of the fastest growing metropolitan city in South Asia (World Bank 2012). The population of Kathmandu district alone increased from 1.08 million in 2001 to 1.74 million in 2011. The decadal population growth of Kathmandu is 60.93% compared to the growth of Nepal as whole (14.98%). The table below shows the percentage of population change over a decade in Nepal.

Table 1.1: Population of Nepal

	Census 2001	Census 2011	% Change
Total Country	23,151,423	26,620,809	14.98
Kathmandu District	1,081,845	1,740,977	60.93
Lalitpur	337,785	466,784	38.19
Bhaktapur	225,461	303,027	34.40
Kathmandu valley	1,645,091	2,510,788	52.62
Urban	3,227,879 (13%)	4,525,787 (17%)	40.20
Rural	19,923,544 (86.1%)	22,095,022 (83%)	10.90
Terai	11,212,453 (48.4%)	13,350,454 (50%)	19.07
Hill	10,251,111 (44.3%)	11,475,001 (43.1%)	11.94
Mountain	1,687,859 (7.3%)	1,795,345 (6.7%)	6.37

1.2 Factors of urbanization in Nepal

In 1981, twenty three municipalities accommodated 6% of the nation's population. Later, the number reached to 58 by accommodating 14% of the nation's population or 3.3 million people and, with an average annual urban growth rate of 6.65% (CBS, 2001). Today, the total population of Nepal stands at 26.6 million, which had grown at an annual rate of 1.6 %. The urban population accommodates about 17% of the total population.

Table 1.2: Trends of urbanization in Nepal

S.N.	Census Year	Number of Towns	Urban population (Million)	% of urban population	Annual urban growth rate
1	1954	10	0.238	2.9	-
2	1961	16	0.336	3.6	5.9
3	1971	16	0.462	4.1	3.6
4	1981	23	0.957	6.3	8.4
5	1991	33	1.696	9.2	6.6
6	2001	58	3.28	13.9	7.4
7	2011	99	4.53	17.0	3.8

Source: Sharma, 2003 & CBS, 2011

Data collected in 12 municipalities indicated that the population growth rate had increased from an average of 3.6 percent to 5.2 percent per year. In some towns (Dhankuta, Nepalgunj, Birendranagar, Tansen, and Tribhuvannagar) the growth rate was found to be higher than 7 percent (GTZ, 2003). Municipal Association of Nepal (MuAN) predicts that the Terai region, Kathmandu Valley and Pokhara will continue to see maximum urbanization in the foreseeable future (Brownell and Rai, 2002).

The major factors for the rapid urbanization are natural population growth and migration. Every year 54,000 rural people migrate to urban areas of Nepal. Half of them move to Kathmandu Valley and rest half to major Tarai Towns (Urban Development through Local Efforts, 1998). Another significant reason is the conversion of rural areas into urban. In the F.Y 1991-2001 reclassification alone accounted for 50% of total urban growth while the decadal urban population in the same period grew by 3% (World Bank, 2012). Further, the rate of urbanization increased because of the internal displacement due to violence and insurgency that began in 1996. According to Ghimire (2006), the rapid population growth in urban areas of Nepal includes:

- High levels of rural to urban migration;
- High level of insecurity caused by the "people's war" (after 1996);
- A high population growth rate;
- Extension of existing municipal boundaries;
- Designation of new municipalities;
- Lack of job opportunity due to limited farm jobs; and
- Lack of basic infrastructure including education and health facilities.

1.3 Challenges of Urbanization

By 2030, 60% of all people are expected to reside in cities and towns (Töpfer 2001). Urbanization is no longer an industrialized-world phenomenon. In developing countries, urban areas will account for nearly 90% of the projected world population increase between 1995 and 2030. Besides population growth, the ongoing urbanization has brought about a wide range of challenges across the globe. More land is needed for urban areas to provide inputs and outputs of resources and energy, with a detrimental effect on forests and other green areas. The most emerging cities are located in the developing world. Their management for urban population will be one the main challenges of our time.

Urbanization in the developing world, including Nepal, has led to major problems in terms of health and sanitation; solid waste management; electricity outage; inadequate infrastructure; hunger; poverty; social segregation; unemployment; pollution of water, soil, and atmosphere; and so forth. Kathmandu faces the problem of water deficit throughout the year. The water demand is over 200 million liters per day (MLD), but the Nepal Water Supply Corporation is able to supply only about 90 MLD during the rainy season, and even this is irregular. As a result, people are forced to dig up the deep wells and depend on the tanker water supply as an alternate source (*Nepal CEA*, 2007). The productive land in the Kathmandu has converted for big apartments.

The insurgency period during the people's war led to the highest increase in urban poverty, where people from rural areas started migrating to Kathmandu to secure their lives and property. Over 30 percent of the people living in cities are migrants (CBS, 2001). According to National Living Standard Survey 2008-09, about 25.16% of Nepalese are still living below the poverty line. The poverty level in Kathmandu is 11.47%. The main source of livelihood for the urban poor is the informal sector, where people work as laborers, domestic helpers, waste collectors, public transportation, etc.

1.4 Green City initiative

In recent years, the urban environment is unexpectedly deteriorating due to haphazard building construction, higher population density and high volume of wastes release. Besides, the diminishing green spaces, reduced infiltration of rainwater has played significant role in the worsening of urban environment. The green city initiative through green infrastructure development can overcome such urban problems.

Green city initiative views to address environmental problems in the cities. It ensures improved urban life quality through eco-friendly urban planning and development addressing social, environmental, economic, and health aspects. It integrates all the major components to help make a city more sustainable for the sake of future generations (Endarwati, M.C et.al, 2012). It adds significant value, minimizes risk and assists in identifying the best solutions to make environmentally sustainable, long-term financially viable and economically vibrant. Green cities function in the spirit of self-reliance and self-sufficiency, and offer their residents an excellent quality of life through clean air, water, pleasant streets and parks. The green city concept includes:

- Sustainable land use
- Eco-buildings
- Renewable energy & energy efficiency
- Clean air
- Water and waste management
- Sanitation & health
- Environmental management
- Green transportation
- Green economy

The green city initiative encourages green behavior, green economy and green infrastructure development. It makes the city a part of environmental solution rather than problem. The use of bicycle lanes, micro wind turbines, improved cooking stoves, reduced use of non-biodegradable materials, household waste management, community level waste treatment plant and other many ways makes urban areas more environment friendly. The construction of manmade infrastructures i.e. roads and buildings intersperse in harmony with the environment, society and economy. They are resilient in the face of natural disasters, and the risk of major infectious disease outbreak is low. In this regards, the green city is also termed as ecological city or ecological healthy city. From using renewable energy to cutting back on emissions, five cities across the globe are leading the way when it comes to implementing sustainable initiatives (Michael d'Estries, 2011). They are Vancouver (Canada), San Francisco, (U.S.A), Oslo (Norway), Curitiba (Brazil) and Copenhagen (Denmark).

As cities become greener they create a more attractive place for people to live, work and invest, which in turn enhances the potential for job creation, inward investment and economic growth (Johnston & Newton, 2004, EC, 2004). Therefore, the United Nations Environment Programme (UNEP) put emphasis on the development of green city in the world by celebrating the world environment day 2005 with the theme **"Green Cities"** and slogan **"Plan for the Planet"**.

The eco-city concept has been proliferating around the world. Various cities in Europe (Amsterdam, Copenhagen, Freiburg, Madrid, and Stockholm) and the United States (Portland), as well as in Latin America (Curitiba and Bogota) have set their course to become green cities and have prioritized compact development. The rich United Arab Emirates (Masdar) as well as the People's Republic of China, with its various eco-cities such as Tianjin; Dongtan, Shanghai; and Anting New Town-Jading District, Shanghai, are now following suit (20 are being planned across China alone).

The city of Curitiba (Brazil) has been heralded as one of the first eco-cities. It began proactively to address the challenges of sustainable urban development in 1966. Designed through a commercial competition, the master plan outlined integration between urban development, transportation and public health, and the city created an administrative agency to implement it. The plan created a modern Curitiba with green spaces, low-density residence, an effective bus system, environmental education and waste processing system (Suzuki et al. 2010). The harmonious co-existence of people, the environment and its urban ambience has made the city a tourist attraction.

Eco-city development authorities need to *respect local culture and identities*, and consider the needs of the end-users. The focus of eco-city planning is predominantly on the reconstruction of the area and of homes. China was perceived to have failed with the development of Huangbaiyu as an eco-city because the concept was not integrated into the daily lives of the inhabitants. Furthermore, the ecological structures and urban form introduced in the Huangbaiyu area overlooked existing local economies (Bassett 2009).

Table 1.3: Environmentally focused City plans

City	Plan or programme	How is environmental sustainability emphasized?
Beijing	Green Beijing 2008 for Olympics	Specific program
Chicago	Green Economic development strategies for the Chicago Region	Environmental strategic plan
Kitakyushu	Green Frontier plan to eco-model city	Environmental strategic plan
London	London Green Fund	Specific program
Los Angeles	Green La Green Building Program	Environmental strategic plan specific program
New York	Plan NYC, 2007	Mainstreaming in master urban strategic plan
Seoul	Master Plan for low carbon, green growth	Environmental strategic plan
Sydney	Sustainable Sydney 2030 Green building programme	Environmental strategic plan specific program
Tokyo	Green Building Programme	Specific program
Vancouver	Vancouver 2010 – a green bright future	Mainstreaming in master urban strategic plan

1.5 Green infrastructures

The green infrastructures are natural and engineered ecological systems that act as living infrastructure. They integrate natural vegetation and soils into a community's infrastructure through variety of techniques, approaches, technologies and practices. They can be a useful tool for municipalities that are looking for urban environment management sustainably. The green infrastructure includes Green Roofs, Rain Gardens, Rain water harvesting, Porous and Pervious Pavements, Green parks and parking, pedestrian and cycling, wetlands, green road and highways, and green buildings. Besides, it includes systems for reducing the air pollution; solid waste and wastewater management for urban environmental management. They provide variety of environmental, economic, and social benefits. They improve the water and air quality, enhance water supply, reduces energy demands and increase energy efficiency, improve human health, moderate impacts of climate change, saves money, and enhance communities and neighborhoods. Therefore, the green infrastructure is essential for the existing or new cities where the population is blooming and green spaces are limited. It will to save the urban environment sustainably and make the city more livable.

1.6 Ilam municipality

Ilam municipality lies in eastern Nepal. It is 72 km north of East-West Mahendra highway at Charaali and approximately 600 km from capital city, Kathmandu. The latitudes and longitudes of the municipality are 26° 54' N, 86°56'25" E respectively. The altitude ranges from 600 m to 1600 m. The covers an area of 27 square kilometer that is 0.02% of total area of Nepal. The total population of Ilam Municipality as of 2008 is 34618 and the annual population growth rate is 3.86%.

The municipality was declared in 1958 by the then His Majesty government of Nepal. After instatement of '*Panchayat System*' in 1960, it was named as *Ilam Nagar Panchayat*. However, it was again renamed as *Ilam Nagarpalika* or Ilam Municipality after restoration of democracy in 1990. It is the districts headquarter of Ilam and also the zonal headquarter of Mechi zone, eastern Nepal. The core area, Ilam Bajar(market) was established as a headquarter of Ilam Gauda in 1818. Previously, the area was called 'Khalanga'. It became the important trade centre of east Nepal after 1956.

It is naturally decorated with green hills and forest. Tea cultivation has given more beauty to the greenness. The climate is sub-tropical. It is also called as queen of hills and is famous for its pristine landscapes of slopes, tea gardens, mountain streams, dense natural forests, holy sites

and unique culture. It possesses the oldest tea garden of Nepal that covers 135 acres of land. Thousands of domestic and international tourist visit Ilam every year. Mai River boards the municipality to the east, Puwa River to the West, Sarki and Ujeli River to the North and Puwa-Mai River to the South.

2. Materials and methods

The methodologies used for the study were literature review, stakeholder and expert consultation, focal group discussion (FGD), field visit, and questionnaire survey. The stakeholder (local and officials) consultation process was done through surveys and interviews. A list of questions were prepared on green city concept, zero waste, solid waste management, drinking water, sanitation, energy use, green space, green jobs and green infrastructures like public transportation, buildings construction, renewable energy technology. The field visit was carried out in July 2013.

The household survey was done randomly at every wards of the municipality. The majority of the sampling populations were from the urban wards since they were directly prone to the environmental problems. The samples were businessperson, hoteliers, civil society, women groups, NGOs and students. Besides, data were collected through public consultation at various location of the municipality.

Similarly, the existing policies on urban planning, environmental management and infrastructure development were briefly analyzed through available literature, reports, publications, websites and data on the topic. The focus was given to the Nepal's five year plan dealing with the urban environment and infrastructure development. The data obtained through the survey and literature review were computerized and analyzed for the final results.

3. Results

The present research was done as case study of Ilam municipality. The result of questionnaire survey and policy study area as follows:

3.1 Household Survey

Green city initiative

Ilam municipality is well known for its innovations in environmentalism. It is working in the field of environmental sector in coordination with NCDC and SEAM-N since 2010. Within short span of time, the municipality has achieved many positive results in the environment sector. It has trained and motivated the locals for environmental conservation.

Ninety percent of the surveyed people had knowledge about green city initiative of municipality. Indeed, they were the part of the initiative by obeying the rules set for achieving the green city plan. Only ten percent people reported their unawareness towards the initiative. However, they reported that they had heard the name but did not have sufficient knowledge about it.

Zero Waste

The municipality had organized promotional activities and training with the support of UN-Habitat to achieve the objective of zero waste within its boundary. Therefore, dwellers from the urban wards were more aware on zero waste than the rural. Sixty percent respondent said they knew about zero waste and forty percent denied. The municipality was promoting the concept slowly in all the wards of municipality.

Solid waste management

Solid waste is one of the major problems of every urban area. Large volume of solid wastes could be seen besides the road in many developing countries. Regarding this question, people were asked about the types of solid wastes generated from houses, their segregation and collection system of municipality and its final disposal. Eighty seven percent people reported that the wastes collection system of municipality was praiseworthy. They collect the wastes every morning. People reported that 80 percent of the wastes were organic in nature. People had good practices of managing the wasters either making manure or feeding the wastes to the domestic animals. These practices were mainly in the rural wards. The wastes from urban wards are collected by the municipality and managed at the temporarily landfill site.

Health and Sanitation

The sanitation was praise worthy in the household level. The municipality has gained significant achievement in those sectors. More than 90 % people had toilet at their houses. The municipality has made legal obligation for the construction of toilets at every households. Therefore, the remaining ten percent people have directed to construct the toilets very soon. However, the urban dwellers showed their grievance against community drainage in the market area. The narrow road had disturbed the drainage system. Eighty five percent people suggested that the drainage system should be expanded in every corners of the municipality. The existing drainage facilities cover market area only.

Drinking water

Seventy eight percent of respondents were satisfied with the current water supply. The municipality was supplying 862500 liters per day against the 937000 liters demand per day. The municipality is protecting its nearby water sources like springs, rivers/rivulets to meet the demand. On water quality, twenty percent people doubted although SEAM-N is working and concerned to the routine check of environmental parameters of water in those areas. The previous lab reports show the water quality is comparatively better than the other municipalities of Nepal.

Energy Use

Energy is the basis necessity for every people and one of the key factors of the green city concept. The promotion of renewable energy could be important for the greener and cleaner city. At present, there are two urban wards in the municipality. The remaining wards are sub-urban and rural. They are on the process of urbanization due to migration of people from rural areas and other districts in search of better and secure living. The people in the rural wards are dependent on firewood or biogas for cooking. Less than 20 % household use Liquefied Petroleum Gas (LPG) for cooking in the rural wares. However, hundred percent household in the urban areas use LPG. There are many small and medium hydropowers at the vicinity of the municipality. It has made people to enjoy the hydroelectricity for lightening purpose at every household within the municipality.

Green space

The municipality is well surrounded by the green forest and tea gardens. There exists a tea garden within the municipality area. Recently, it was declared as the green park. People use this

green space for walk and entertainment. The municipality is increasing its green spaces by constructing few more parks within the municipality. More than 98 % people reported that the green space was good for healthy living and praised the initiative of municipality for creating green parks.

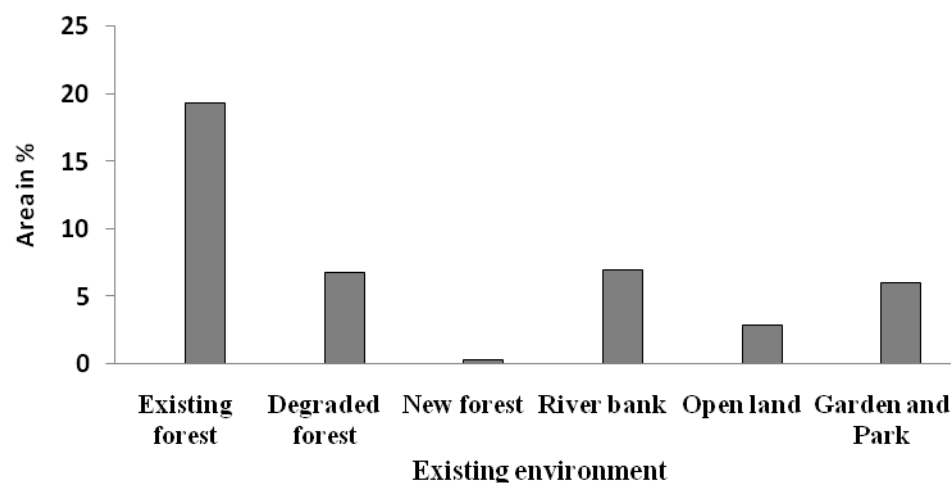


Figure 1: Existing environment of Ilam municipality

Green Jobs

Ilam district along with the municipality is among the popular tourist destination sites in Nepal. The green tea gardens and clean environment lure thousands of national and international tourists every year. It has provided the job opportunity for the local people. Also, 48% people are engaged in the agriculture sector, which is the major provider of green jobs in the world. The survey indicated only 28 percent people know about the green jobs. The terminology was very new for them although they had been practicing the green jobs for years. There are ample opportunities for green jobs through the development of hydropower projects in the area.

Green infrastructures

The houses in the rural wards are made by wood and mud. The buildings are concrete and modern in the urban wards. The pavements in the rural areas are partially earthen that provide sufficient space for infiltration of rainwater. The roads are concrete in the market. The municipal corporation is implementing the green city concept by making improvements in the environmental quality of the municipality. They have requesting all the residence of the municipality to promote the green. People were found aware on rainwater harvesting, on cycling, planting trees at their surroundings. The municipality has purchased land for solid waste management of the city. It is promoting improved cooking stoves (ICS) in the rural wards. This

work has been supported by local NGOs/CBOS. Ninety percent of the people reported that they are happy to be the part of green city initiative Ilam municipality. The rest ten percent people told that they had just heard the initiative but did not have sufficient knowledge to mention anything.

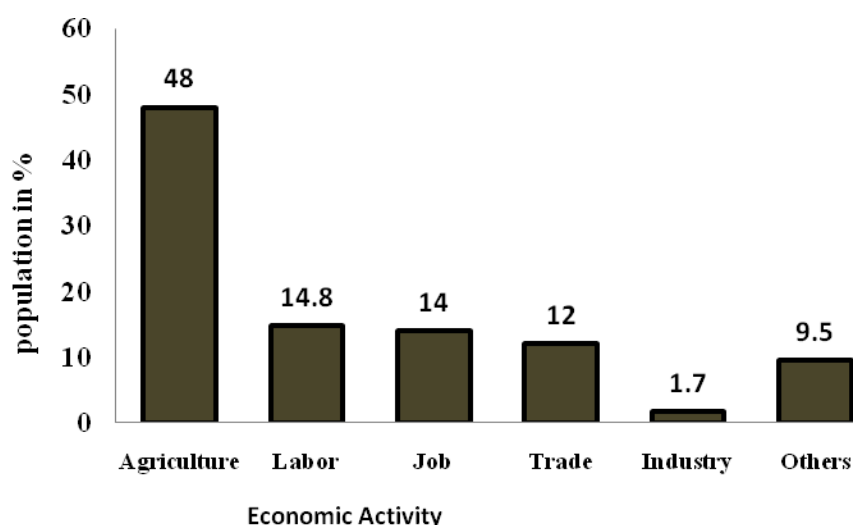


Figure 2: Economic activity of People at Ilam municipality

3.2 Achievement in Green City Initiative

Ilam municipality was found at the first phase of green city development. Only few works had started to achieve the objectives of green city. The municipality had formulated policies and strategies for green city development and their sustainable management.

The 15th city council's policies and programs for 2068-69 (2011/12) had incorporated the green Ilam Initiative plan. The Strategic plan for the green city Ilam has formulated and all the stakeholders have identified for achieving the goal of green city Ilam. The core-working group and the major stakeholders coordinated for making the green city strategic planning were Ilam municipality, Namsaling Community Development Centre (NCDC), Strengthening Environmental Administration and Management Nepal (SEAM-N) and Ilam Chamber of Commerce and Industries (ICCI).

The strategic plan has developed for five years. The municipality had organized various programs to achieve the goal of green city initiative and its sustainable management. For

example, one-day workshop was organized to conceptualize Green City Initiative approach to the stakeholders in September 2011. Similarly, a strategic planning workshop was organized in November 2011 that developed the planning framework, identified sectors, guiding principles, strategy, strategic plan, and implementation modality. As per the policy, the green concept would be incorporated in every sectors and aspects of development. The identified sectors included environment, urban planning, energy, transportation and communication, health, agriculture, socio-culture, economy, education and governance system.

The municipality has taken the initiatives of environment friendly development like hydro electricity, tea garden, private and community forest, and protection of spring water sources etc. in recent years. The municipality, in partnership with NCDC and SEAM-N has been working in environment sectors since 2010. It had established Reed Bed water purification plant to treat hospital effluent before reaching stream. The public toilet cum bio-gas plant had been constructed with view to generate bio-gas from human faces. The plastic bag had been banned in the municipal area. It has maintained greenery through construction of public parks and green garden. The local people has directed to plant trees at their surroundings. The public have directed to incorporate the new building code for new construction.

The municipality had implemented the polluter pay principle (PPP) for certain packaged and bottled products and negotiating with other companies. This action was taken to make the city clean. It is promoting the local products through strategic plan.

The implementation of the green city concept has been affected by factors like budget, lack of technical manpower, commitment, political injustice. There are many policies and legislation regarding urban environment management. There are provisions of green parks, landfill sites, air and water pollution control, vehicular emission control and infrastructure development in the urban area. Nonetheless, they lack clear statement on green city development. It has impacted the budget allocation.

Currently the Ilam municipality is managing its program through the meager budge provided by the government, mobilization of their own fund and few donations from organizations. Besides, the municipality lacks the technically qualified manpower for effective implementation of green city program. Recently, Namsaling Community Development Centre –a local NGO is providing the technical support to the municipality. The municipality was found at the infancy stage of green city initiative. It has initiated the programs but still it needs few years to achieve its goals. However, the initiative itself is the praiseworthy in the region.

3.3 Policy, Legislation and Institutional Framework

At present, Nepal has one Metropolitan City, four Sub-Metropolitan Cities and 53 municipalities and the 41 settlements waiting for their approval as municipalities from the parliament. According to the Department of Urban Development and Building Construction (DUDBC), there are more than 132 small towns and market centers, which function as service centers for rural areas (*Nepal CEA*, 2007).

The rapid and haphazard urbanization is exerting immense pressure on urban environment and municipal managers often do not have sufficient expertise and resources to deal with the rapid growth. With the enactment of the Local Self-Governance Act, 1999, municipalities have been given many additional responsibilities but adequate measures to enhance their capacities to deliver these services have not been made. As a result, many cities in Nepal are facing environmental problems such as solid waste management, wastewater management and drainage.

Although Nepal has several policies related to environmental management, it does not have a policy specific to urban development or urban environmental management. During the first five year plan (1956-60), Nepal did not have basic infrastructure services so the attention was paid to supply drinking water, networking of roads and other infrastructure.

In the second five year plan (1963-65), some major road projects were constructed, however, no concrete work on urban development were done. Even in the third plan (1965-70), the concentration was basically on basic services like drinking water supply and solid waste disposal. Until, fourth plan, there were only four development region in the country. There were not concrete steps for the urban expansion in the country.

The fifth plan put little effort for the integrated development of Kathmandu and few other areas of Nepal. The focus was on the regional development plan. During this plan, the government declared five development regions throughout the country and urban centers were developed. In the sixth plan, the government prepared a master plan for the development of Lumbini with the assistance of famous architect Kantz Tange. It was realized that the growing population of the urban areas in Nepal would pose a threat to the systematic development of the cities. It made the government to realize city planning in accordance with population growth.

Table 3.1: Policies and Legislation Relevant to Urban Environment

S.N.	Policies
1.	Nepal Conservation Strategy (NCS), 1987
2.	Nepal Environmental Policy and Action Plan (NEPAP), 1993
3.	Industrial Policy, 1992
4.	National Transport Policy, 2001
5.	National Solid Waste Management Policy, 1996
6.	Tenth Plan 2002-07
7.	Sustainable Development Agenda, 2003
	Legislation
1.	Interim Constitution, 2006
2.	Environmental Protection Act (EPA), 1996 and Environmental Protection Regulations (EPR), 1997
3.	Local Self Governance Act (LSGA), 1999 and Local Self Governance Regulations, 2000
4.	Water Resources Act, 1992 and Water Resources Regulations, 1993
5.	Town Development Act, 1988
6.	Town Development Fund Act, 1996 and Town Development Fund Regulations
7.	Kathmandu Valley Development Authority, Act, 1988
8.	Solid Waste Management and Resource Mobilization Act, 1987
9.	Vehicle and Transport Management Act, 1993 and Vehicle and Transport Management Regulations, 1998
10.	Industrial Enterprises Act, 1992
11.	Fiscal Act, 2003/04

In the seventh plan, the government decided to collect detailed information of the urban areas so that the cities could be developed into living places. Since the eighth plan (1992-1997), urban problems received government attention. The government focused on the establishment of GIS center, preservation of agricultural land, and prepares a national level master plan for the transport sector. The government, for the first time, provided housing loan through the banks, and encouraged private companies in housing sectors. The government provided a total of Rs 134.4 million as loan and Rs 96 million as grant through the Town Development Fund (NPC 1998).

In the ninth plan (1998-2002), the idea of small towns and markets received greater emphasis and as many as 58 municipalities were developed. The urban growth was thought to help in rural development and an increase in living standards. During this plan, infrastructure and public

utilities of municipalities and other cities were developed in order to systematize the process of internal migration. The Tenth Plan (2002-2007) did not specifically mention any plans regarding SWM, except the construction of a landfill at Okharpauwa for Kathmandu. In 1996, GoN adopted a Solid Waste Management Policy for Nepal but it has not been followed up with appropriate plans and programmes.

The government, in the three-year interim plan (2007/08 – 2009/10), accepted the lack of urban development policy, coordination among the urban agencies regarding physical development plans, and unhealthy competition between town development committees and municipalities due to overlapping the roles and responsibilities.

Nepal has formulated several policies and legislation focusing environmental management. Those policy documents have touched upon urban environmental management. Some specific policy statements, such as the National Transport Policy, 10th Plan and the Sustainable Development Agenda, aimed at ensuring improved urban environment. Many policies are directed to solid waste management, industrial waste management, zero wastes, rainwater harvesting, green roads and infrastructure development. However, there is clear gap between policy statements and their implementation.

Solid waste management is the major challenge in most urban centres in Nepal. It is estimated that 500,000 tons of municipal wastes are generated per year. However, the country has only three engineered landfill sites in Kathmandu, Pokhara and Tribhuvannagar. The other municipalities either lack the proper or they have none landfill sites. They dispose the wastes at open places near the river, ponds and roads. In 1996, GoN adopted a Solid Waste Management Policy for Nepal, but it has not been followed up with appropriate plans and programmes.

There is clear provision of providing services and facilities such as road, transport, electricity, drainage, sanitation and open spaces based on the density of area in Town Development Act, 1998. It also signifies the development of towns in an integrated manner. But, the haphazard urbanization has destroyed the beauty of city and increased the pollution in urban areas. Studies have indicated that the high pollution is having adverse impacts on the health and the economy (CEN/ENPHO, 2003). The National Transport Policy has several provisions related to vehicle emissions, but it ignores some important aspects of vehicle emission control, such as clean fuels, inspection and maintenance system and transport demand management, and it does not mention how the stated provisions are to be implemented.

The country has high potential for rainwater harvesting in the rainy season. But, most of the cities are lacking sufficient water supply from Nepal Water Supply Corporation (NWSC). Therefore, people are compelled to buy the tanker water, where quality is always the question.

National Conservation Strategy (NCS), 1988, is Nepal's first environmental policy and have several provisions for better urban living. It is followed by Nepal Environmental Policy and Action Plan (NEPAP).

Environmental Protection Act (EPA), 1996 and Environmental Protection Regulations (EPR), 1997 are the umbrella legislation for the protection of the environment and prevention and control of the pollution. EPA and EPR made mandatory to conduct Initial Environmental Examination and Environmental Impact Assessment for the projects having or have adverse impact on environment.

Interim Constitution, 2006 ensures clean environment as a fundamental right. Local Self Governance Act (LSGA), 1999 and Local Self Governance Regulations, 2000 requires the Municipalities to prepare physical development plans; carry out plans on drinking water and drainage; develop green zones, parks, and recreational areas; build community houses and rest houses; manage water resources, environment and sanitation, particularly preservation of rivers, streams, ponds, deep water wells, lakes, stone water taps and utilize properly; control and prevention of floods, soil erosion, control of air, water,

Fiscal Act, 2003/04 has provision for providing incentives to electrical vehicles and ban on import of second hand and reconditioned vehicles and two-stroke engine vehicles. It has made mandatory to take pollution tax of Rs. 0.50 per litre of diesel and petrol to be sold in Kathmandu Valley. However, the pollution tax has not been used.

The Ministry of Physical infrastructure and Transport through its Department of Urban Development and Building Construction (DUBDC) implements urban development plans and programmes in Nepal. The other institutions include Ministry of Science, Technology and Environment and Ministry of Federal Affairs and Local Development (MOFALD).

4. Discussion

4.1 Green City

Cities are the growth engines of the future, offering their populations greater opportunities for education, employment and prosperity. They are the highest forms of social organization due to the complexity of road systems, transportation, building laws, markets, food distribution, educational systems etc. However, the growth of cities called urbanization is quite rapid, unplanned and unsystematic in Nepal. The urban population has dramatically increased after 2001. It has put pressure on the existing infrastructure, which is not capable of handling such fast growth. The government is quite passive in addressing the situation. The environment is worsening day by day.

To make the city a livable and address the environmental problems, the green city initiative of Ilam municipality is praiseworthy. There is a severe drinking water shortage in urban areas of Nepal, especially in Kathmandu valley. But, Ilam municipality is able to provide the water requirement through conserving the nearby water sources. To meet the water demand, the municipality is exploring the rainwater harvesting in urban areas. It also helps to recharge the aquifers that are the sources of ground water.

Most part of the country is suffering from the power shortage. But the small and medium hydropower plants are continuously supplying electricity in Ilam municipality. Such shortage of power supply could be managed through the harnessing of solar power in other areas. Nepal is blessed with adequate sunshine to generate solar power. It has approximately 300 days with average sunshine hours of 6.8/day. The private sectors can be encouraged in energy sector with proper subsidy. The rural wards of Ilam municipality use firewood for cooking. It can be reduced by encouraging them for solar or hydropower energy. Solar and hydropower energy are environmentally friendly and supporting the green city development in Ilam municipality.

All of the above can be achieved through the proper policy and legislations. The government of Nepal is the signatory to 21 international conventions for better environmental management. It has formulated many policies and legislation for proper urban development. There is provision of creating green parks in Local Self Governance Act (LSGA), 1999 and Local Self Governance Regulations, 2000. The Interim Constitution, 2006 also ensures clean environment as a fundamental right of people. But people have not realized them due to the policy gap between formulation and implementation.

4.2 Policy Implications

The government of Nepal's policies has provision for green parks, landfill sites, air and water pollution control, aquifer recharge, renewable energy and transportation. The policies themselves are nice but their implication is very weak. Also, some policies are overlapped and without clear vision. None of the policy clearly talks about green city concept. This concept is very useful for the sustainable and healthy city development in Nepal. It is estimated that over 50% of the world's population now live in cities and urban area and this is set to rise by 60% in future. Nepal is not an exception in the face of urban growth. Therefore, government of Nepal needs to amend and prepare new policies regarding the green and sustainable city. Based on above, the policy implications for green city development are as follows:

- Revision of existing and formulation of new policies;
- Incorporation of green city concept in new policy;
- Vehicular and industrial emission reduction policies;
- Promotion of green transport and subsidy on import of green vehicles;
- Key policy regarding land-use planning, buildings and waste;
- Policies regarding the use of cycle and cycle lanes within the city;
- Policies on the proper market for the green products and green jobs;
- Identifying alternative sources of energy;
- Conservation of water and land resources;
- Ensuring design standards for new infrastructure;
- Integration of climate change scenarios at local, regional, and national levels;
- Inclusion of environmental education; and

5. Summary

Ilam municipality is under the rapid rate of urbanization. It has taken timely action for green city development that is supposed to reduce the future environmental shocks. The initiative is first of its kind in Nepal. But, municipal office does not have technically qualified human resources to implement most of the activities. Those activities have been incorporated into the city strategic plan. Namsaling Community Development Centre CDC is the technical supporter of this program. The municipality is suffering from financial constraints for effective implementation of the green city program. Therefore, the government need to amend the existing policies and formulate new policies to support such initiative and expands in other region of Nepal.

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