Rooftop Gardening and Management in Nepal: Requirements for Specific Policy, Acts and Regulations

Prepared by:
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Submitted to:
Kathmandu Metropolitan Council (KMC)
General Background
The 2011 Census shows that 17% of total population of Nepal resides in cities (2011 Report of Census Department). Even though Nepal is still largely made up of villages, hills and mountains, it is evident that rapid urbanization is taking place. For many years, Kathmandu has faced high numbers of immigrants from rural areas, due to the following reasons:

- Unsafe conditions due to Maoist Civil War
- Limited job prospects in the rural areas
- Lack of health, education and other basic amenities in the rural areas.¹

Currently 2.5 million people reside in Kathmandu valley, population increases by 4% each year and it is considered as one of the most rapidly urbanizing regions in South Asia. Kathmandu District is the most rapidly growing district in the country. Over one million people live in Kathmandu Metropolitan City (KMC), while the rest live in four other municipalities and the surrounding pre-urban areas.

Kathmandu city is the first city in Nepal facing challenges caused by rapid urbanization and modernization.² Unplanned urban development and poor enforcement of regulation have led to rapid and uncontrolled urban sprawl, uncontrollable traffic, an increase in environmental pollution, ground water scarcity, waste and water management problems as well as a rapid decrease in agricultural land. Loss of these production areas, that traditionally provided Kathmandu city with rice, grains, vegetables, poultry and dairy made it more vulnerable to disruptions in food supply. The city now has to depend on the produce of either rural areas or imports from India or China.

Unplanned growth has also led to irregular, substandard, and inaccessible housing patterns and significantly increased vulnerability to disasters.³

Objectives of the Study
This study reviews the need to formulate new policies and laws regarding Rooftop Gardening (RTG) in urban and sub-urban areas. Currently just a limited number of households are practicing RTG with the support of NGOS, municipalities and The Ministry of Agriculture Development. KMC has decided to provide support to 500 households in order to expand the RTG program with aims to enhance local food production and household waste management.

¹ Bishnu Pant, IIDS, Nepal-ISSUES OF URBAN GOVERNANCE IN NEPAL: WITH SPECIAL REFERENCE TO KATHMANDU METROPOLITAN CITY.
RTG is currently being promoted by a few specific organizations and the question is if this program can be up-scaled and expanded. Related to that, another question arises on role of the government regarding RTG. The main objective of this study is to find out whether the existing environment protection law allows for and is sufficiently supportive of RTG or if there is need of formulating new policies, laws on RTG for its further promotion and management and to support RTG provisions at larger scale.

**Limitations of the Study**
This review is limited to the programs supported by foreign institutions and the Nepal government as per environment protection and food security provisions. It is focused on the possibility of broader use of RTG and need for formulation of policy and regulations. It will refer to RTG usages, policies and standards being practicing in other countries based on available articles and internet websites.

**Recommendations**
The report will provide legal suggestion/recommendations regarding the expansion and management of RTG. It suggests to make RTG Programs mandatory and to provide various types of technical and financial assistance to local bodies, especially Metropolitan City and Municipalities, to introduce RTG Policy and laws.

**Nepal's Political-Administrative Definition of Urban Areas**
The Municipality Act of 1991, its 1997 amendment, and the Local Self-Governance Act of 1999 stipulated three criteria for designating urban local governments: (a) a minimum population of 10,000 in the Mountain and Hill zones and 20,000 in the Tarai region of Nepal, (b) the availability of basic urban infrastructure and services (such as a transportation by road or air and access to telephone services), and (c) the size of internal revenues generated by the local government. Nepal’s urban local governments are classified into the following three categories:

- **Metropolitan city**: a settlement with a minimum population of 300,000; at least Nepal rupee (Nr) 400 million in annual revenue, and access to basic infrastructure.
- **Sub-metropolitan city**: a settlement with a minimum population of 100,000; at least Nr 100 million in annual revenue, and access to basic infrastructure.
- **Municipality**: a settlement with a minimum population of 20,000; at least Nr 5 million in annual revenue, and access to basic infrastructure. In the Mountain and Hill zones, a settlement with a population of 10,000; annual revenue of Nr 0.5 million, and limited infrastructure can also be declared a municipality.
Problem Identification

Increasing Dependency
Due to the urbanization of agricultural lands, Kathmandu has grown increasingly dependent on its neighboring districts and foreign countries for its daily food requirements. As the Nepalese society started developing, construction of new houses expanded. There being no restriction to the use of Property Rights in the country, there is an outburst of concrete buildings of different shapes and sizes scattered all over the city. This resulted in a sharp decrease in urban open spaces and greenery. Agricultural land and forests have been destroyed and the encroachment of open spaces makes that even rainwater cannot infiltrate in the ground anymore for groundwater recharge. Due to human infringement, natural water resources like Dhunghedhara, wells and ponds have dried up. The mountains which used to be shrouded with a blanket of white are now often devoid of snow. Because of all the human and climate induced changes, at present, the winter days are not as cold as they used to be. For the above mentioned reasons, experts have warned for concern, nationally and internationally, fearing long term negative impacts on the environment.

In addition, these negative impacts on the environment, have also contributed to lack of daily requirements of food items/vegetables, making the nation dependent on food imports. Generally locally available products like garlic, onions, gingers and green vegetables now need to be imported from other neighboring countries like China and India to cover the unmet demand, which in turn causes large sums of money to go out of the country. In order to keep the vegetables imported from other nations fresh, a lot of chemicals are used that may adversely affect the health of the consumer.

Changes in Land Use
As stated by the World Bank, Kathmandu Valley and its nearby areas of fertile and barren lands are being converted to housing. Agriculture use had been the predominant land use in the Kathmandu valley, followed by forests and grasslands. Agriculture land in the valley has been reduced from 41,950 ha. in 1984 to 33,308 ha. in 1994 and to 27,570 ha. in 2000. Urban land haz increased correspondingly from about 3,096 ha. in 1984 to 8,378 ha. in 1994 and to 9198 ha. in 2000. The net urban area will increase from about 10,128 ha. in 2010 to 14,332 in 2015. The Kathmandu Valley development plan 2020 (KVTDC) estimated that if a gross density of 300 persons per hectare can be achieved within the existing urban areas, the demand for urban land in the next 20 years will be slightly over 3600 hectares

The following two tables illustrate that the land use pattern in Kathmandu valley has changed rapidly.

Table 1

<table>
<thead>
<tr>
<th>Years</th>
<th>1976</th>
<th>1989</th>
<th>2001</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Km²</td>
<td>In %</td>
<td>Km²</td>
<td>In %</td>
</tr>
<tr>
<td>Urban/Built-up</td>
<td>8.97</td>
<td>13.89</td>
<td>17.92</td>
<td>27.75</td>
</tr>
<tr>
<td>Water Body</td>
<td>3.00</td>
<td>4.65</td>
<td>2.00</td>
<td>3.10</td>
</tr>
<tr>
<td>Forest Cover</td>
<td>7.08</td>
<td>10.96</td>
<td>5.69</td>
<td>8.81</td>
</tr>
<tr>
<td>Open Field</td>
<td>2.76</td>
<td>4.27</td>
<td>1.42</td>
<td>2.20</td>
</tr>
<tr>
<td>Cultivated Land</td>
<td>42.77</td>
<td>66.23</td>
<td>37.55</td>
<td>58.14</td>
</tr>
<tr>
<td>Total</td>
<td>64.58</td>
<td>100</td>
<td>64.58</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th></th>
<th>Land cover area in Km²</th>
<th>Magnitude in Km²</th>
<th>Total change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban/Built-up</td>
<td>8.97</td>
<td>+8.95</td>
<td>+12.29</td>
</tr>
<tr>
<td>Water Body</td>
<td>3.00</td>
<td>-1.00</td>
<td>+1.43</td>
</tr>
<tr>
<td>Forest Cover</td>
<td>7.08</td>
<td>-1.39</td>
<td>-4.60</td>
</tr>
<tr>
<td>Open Field</td>
<td>2.76</td>
<td>-1.34</td>
<td>-0.62</td>
</tr>
<tr>
<td>Cultivated Land</td>
<td>42.77</td>
<td>-5.22</td>
<td>-8.50</td>
</tr>
</tbody>
</table>

From 1976 to 2009, 35.69 km² (55.26 %) has been added to the urban area. At the same time forest area, open field and cultivated land have decreased

Decrease in green areas in turn has resulted in rising temperature and air pollution which adversely affect the health of urban inhabitants, as demonstrated by research and studies.

**Facing Challenges**

Local government institutions concerned with urban and regional planning and development should play a more proactive and coordinating role in enhancing urban food security and city resilience to climate change. Countries like America, Germany, France and other European countries have adopted urban and peri-urban agriculture and forestry (UPAF) and rooftop gardening (RTG). UPAF is one of the innovative solutions which can play a strong role in

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5 Dynamics of land cover change in Kathmandu, Nepal by **Dr. Bhagawat Rimal**
GIS Expert Published in: (February 2012)
(http://www.geospatialworld.net/Paper/Application/ArticleView.aspx?aid=1431#sthash.0ODeA77L.dpuf).

6 Dr. Bhagawat Rimal GIS Expert, Dynamics of land cover change in Kathmandu, Nepal by Published in: (February 2012)
http://www.geospatialworld.net/Paper/Application/ArticleView.aspx?aid=1431#sthash.0ODeA77L.dpuf.
enhancing food security and nutrition for the urban poor, diversifying income opportunities and enhancing community building. Additionally, it can create greener cities and improve the urban climate by capturing CO₂ and dust while also making the cities less prone to flooding and landslides. UPAF can also lower urban energy use and greenhouse gas (GHG) emissions, by increasing local food production and reducing food transports.

In Nepal, the Ministry of Agriculture, promotes RTG –though principally in rural areas- as part of its general vegetable cultivation program. In Kathmandu Metropolitan City (KMC), currently, RTG is practiced by more than 1000 households. RTG follows the community program model and can be conducted if 35 houses jointly apply for it. For this, KMC is providing technical assistance, engaging social workers and providing training. With the practice of RTG household solid waste management (composting of organic waste), fresh and healthy vegetable production along with development of greenery are promoted. 80% of the domestic need for fresh vegetables can be met with this method. The KMC program is to be extended to Lalitpur Sub-Metropolitan city, while the possibilities for RTG in Pokhara are examined.

**Rooftop Gardening: Experiences in other Countries**

Green (vegetated) roofs have been in existence since ancient times. In France, gardens were planted in the 13th Century atop a Benedictine abbey. Norwegians developed such roofs centuries ago as a means of thermally insulating their buildings. Five roof gardens were installed atop the seventh floor of the Rockefeller Center in New York City between 1933 and 1936.

In fact, limited land resources, expensive sources of energy and ancient sewer systems overwhelmed by storm water runoff have all contributed to the success of the green roof industry in Europe. Over 800 green roofs can be found in Germany alone, a leader in building codes and incentives for green roof installation. In Asia, Japan has become a center for green roof technology. Its capital, Tokyo, is the first city to mandate building vegetation that must constitute 20% of all new construction.

Green roofs have been installed across America in steadily increasing numbers in the past decade, and research is being conducted in North American universities on the impact of the green roofs on the environment, economy, and energy resources. Some major American corporations like Ford Motors Co, The Gap, and H. J. Heinz Co. have recently installed green roofs and approved design for the New World Trade Center includes the Rooftop Gardens. However despite breakthroughs in green roof elements, making them more readily available in the United States, little is known about green roofs and even less about installation standards.⁷

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In the context of Nepal, RTG does not have much history and has been introduced recently as a program through public awareness. Even though developed countries have not followed RTG to meet food demand, it is an alternative worth considering for urban and pre-urban areas for food production and environmental protection in countries like Nepal.

Legal grounds for Rooftop Gardening and vegetable farming
Even though the Ministry of Agriculture Development and Kathmandu Metropolitan City have already started RTG but there is no legal ground laid down relating to RTG. It is being conducted based on the social awareness and voluntary interest. Therefore, it is necessary to formulate policies and enact laws relating to management of RTG to maintain greenery in urban areas and meet demands of green vegetables.

Legal provisions on RTG scattered in different legal instruments and proposed policies and also Recommendation to Enact Law

Provisions under Sectoral Laws
- Section 3 (A) of the Local Self Governance Act 2055 (1998) has provided the Policy and Principle to provide required right and authority to enable and effectuate local bodies in local self-governance through necessary resources.
- To organize and conduct the Agricultural Development Programs within the territory of Village Development is the Work, Duties and Rights of VDC as per Section 28 (1) (A) (B).
- Section 28 (1) (F) states that to make standard for construction of houses, building, roads and other structures and should give approval as prescribed. So while preparing Standards there should be a provision for RTG.
- Section 28(1) (H) 2 and 3 provides provision for Environment Protection. RTG will support environmental management positively, the policy could thus be reformulated (including RTG) and followed as soon as possible.
- There should be a policy laid down relating to RTG provision while constructing new houses as per the House Construction under Court Management Chapter of General Law (Muluki Ain).
- RTG provision shall be promoted as it has positive role while formulating Plans of VDC as per Section 43 (3) (A) (B) (F) of Local Self Governance Act.
The Project as stated under Section 46 (2) should be selected considering the protection and conservation of the environment. As RTG is supportive to this aim, it should be promoted.

The provision of RTG should be necessarily kept in all types of building constructions within Metropolitan and Municipality at the time of obtaining/granting approval from such authorities.

The Authority and authorized officer who grant approval for construction structures shall make compulsory the RTG provision as provided under Societal House Ownership Act, 2055. A fine could be laid in case Housing Companies deny to follow the provision strictly.

Municipality and Metropolitan shall promote management of household waste produced by such Societal Houses.

As organic waste could be utilized by making compost manure for RTG, all types of hospital, hotels and multistoried building shall necessarily follow the RTG provision.

RTG is a management strategy for Solid Waste produced in Urban and Pre-urban areas. It will help reduce waste volumes and areas for landfill. So it will be helpful in managing and minimizing Solid Waste as per Solid Waste Management Act, 2068 (2011), RTG shall be promoted enacting a specific law in this regard.

There shall be a compulsory requirement for RTG and Waste management in the Building Code to be drafted by Committee under Section 3 of Building Act, 2055.

Concerning bodies and authorities shall strictly inspect and monitor the provision of RTG at the time of granting approval or after completion of the construction. In case of non-compliance with RTG, they shall be liable for a monetary fine.

Specific Standards on RTG shall be formulated immediately and implemented for effective result.

Government shall introduce the House Tax, Renewal Tax exemption for those who will follow without any disruption RTG provisions in the urban and pre-urban area.

Policy shall be made to expand and promote the RTG through providing training and exchange programs.
• The necessary Technical support as well as resources shall be made available through state authorities/local bodies for RTG compliance.

• An award shall announce the best RTG follower and reward such house/family/community who will produce enough vegetable or maintains greenery.

• Markets shall be provided for those who produce excess food stuff/vegetables.

• The Policy, Rules, Regulations and Act shall be formulated considering the provisions as provided under Environment Protection Act 2053 (1997) and the Environment Protection Regulation 1997, Town Development Act, 2045, RTG shall be arranged, managed and regulated.

• As RTG will provide job opportunity to housewives and other member of family, the policy shall be formulated in an inclusive way.

**Key factors for Implementation**
1. Strong cooperation and coordination shall be maintained between the concerned authorities.
2. Specific and particular Acts, Regulations, Policies, Directives shall address RTG.
3. Government shall encourage RTG and promote it through respective ministries.
4. Climate Change, Environment Protection, Air pollution reduction types of legal instruments shall include the RTG.

**Current Status of RTG and Recommendations**

<table>
<thead>
<tr>
<th>Law on RTG</th>
<th>Current Provisions</th>
<th>Required Amendments (Recommendations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>As of now there is no specific and direct law to address Roof Top Gardening</td>
<td>Ministry of Agriculture Development and Kathmandu Metropolitan City have started RTG as a program (with support of RUAF Foundation, UN Habitat, ENPHO and NEFEJ)</td>
<td>To expand and sustain the current program and to manage RTG at government level, policies should be formulated and laws and regulations are to be enacted as outlined in this study. A specific RTG policy for KMC could be developed.</td>
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</tbody>
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