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# MAKING CITIES RESILIENT

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NATURAL HAZARDS &  
URBAN CONCERNS

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Thimphu City corporation  
Bhutan

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## Introduction

As an involvement to the launching of the “Global Campaign on Making Cities Resilient”, the Thimphu City Corporation, Bhutan, is pleased to submit the following experiences, preparedness and issues related to natural hazards and urban concerns.

### Earthquake:

**Experiences** – We have experienced several earthquakes in the past. Last year’s earthquake in the east have caused the maximum damage. Few lives were lost while many buildings were damaged. Thimphu city was spared of the devastation. It has been very lucky so far.

**Preparedness** - We are prepared. We impose stringent design requirements based on Zone IV & V. Structures built after 1999 are earthquake safe. However, most structures built before 1999 are not earthquake resistant. We have therefore taken up a project of retrofitting one structure to showcase as an example. Several advocacy campaigns are also being carried out.

**Issues** – We have limited manpower, expertise and experience to monitor. This often leads to deviation during constructions. People complain about the increase in cost of construction due to structural requirements. Thus a proper study is required to ascertain the Seismic zone

### Landslide

**Experiences** – At the national level this is a menace especially during rainy seasons. However, it is not so much of a problem in the Thimphu municipality. Yet because of our fragile terrain and 2009 cyclone experience we cannot be complacent.

**Preparedness** – we are prepared in terms of mitigating damages if it happens. Allowable ground coverage on all plots is strictly regulated. Density is also controlled through limiting building heights based on precincts. No constructions are allowed within 30 meters from the Main River (Wangchhu) and 15 meters from all streams and rivulets. Moreover landowners living in slope categories above 30% can build only within 20% of their plot/s. This is to allow rain water percolation, apart from reducing density in environmentally fragile areas. These are put up in the form of DCR 2004.

**Issues** - We have limited manpower, expertise and experience to monitor. This often leads to deviation during constructions. The landowners keep on requesting officials or approach politicians to allow more than 20% coverage. Unless there is some kind of incentive this rule is at risk of being amended

## Cyclone

**Experience** – Worst experience on May 25 & 26, 2009. We were hit by the tail end of monstrous cyclone Aila. 76 mm rainfall.

**Damages** – 13 lives lost. Total Nu 722 million worth loss to the country in the form of government infrastructure (544 mil), farm and feeder roads (47 mil), agricultural property (7.5 mil), bridges (56 mil), drinking water supply and irrigation systems (45 mil), livestock (15 mil) and private properties (7 mil).

**Preparedness** – All construction approvals within the municipality should meet the wind safety standards. They will have to build drains within their property and connect them to municipal drains. Had it not been for our strict construction restrictions along the rivers and streams the disaster during the Aila cyclone would have been even more disastrous.

**Issues** – With the booming construction industry most land surfaces will be paved and the volume of surface water runoff will increase. Due to global warming the Copenhagen conference on climate change has declared Thimphu as one of the ten fragile cities of the world. Thus there is a dire need to prepare a comprehensive master plan for drainages.

## Flood

**Experiences** – The first recorded experience of a major flood was in 1968 when one of our streams (Chubachhu) flooded. The extent of damage as narrated by our forefathers was devastating. Further, our main river and the streams have the habit of swelling every year during monsoon. With more development it is expected to get worse.

**Preparedness** – In some ways we are prepared by way of declaring buffers along rivers and streams as no construction zones. The question is, is it enough? Planting of trees on areas identified as soil stabilization zones is a yearly routine. Our TSP plan has identified areas for watershed management

**Issues** – the effectiveness of planting trees in soil stabilization zones is crippled by lack of supervision which is due to limited manpower and expertise. The watershed management zones immediately outside the municipal boundaries are under the administration of the District. There are no clear directives on how and who should manage. On the other hand lands immediately outside the municipality is undergoing through lots of land fragmentation and speculation.

## Fire

**Experiences** – Thimphu has experienced several forest fires and few accidental fires in isolated locations. However, at the nation level it is a major issue. Between 1994 to 2004 there were 803 forest fires damaging 309181 acres of forest. Fires in settlements have happened in other areas but not in Thimphu.

***Preparedness*** – We are prepared in terms of implementing the building and development rules. We are also incorporating fire hydrants in most of our water supply schemes currently underway. However, if major fire happens, our two fire brigades (managed by the Royal Bhutan Police) are going through a tough time in terms of manpower, machineries, trainings and experience.

***Issues*** – The TCC do not have its own fire fighting brigade. The three fire brigades managed by RBP may not be sufficient. Building designs should scrutinize the fire safety requirements which are not being practiced so far. We need to introduce this but don't know how to go about doing it. Moreover we have a serious concern of the existence of an ammunition depot in the north part of Thimphu (Taba). The potential damage it may cause need to be studied.

## **Draught**

***Experiences*** – The country as a whole has not experienced draught so far. We have a national poverty rate of 23 % most of which are in rural areas. Urban areas are said of have 2 % poverty. However, no comprehensive study has been carried out to ascertain the prevalence of poverty in urban areas. However, with development, the pull factor of urban areas (hope of better opportunities), combined with the push factor of rural areas (poverty) has caused Thimphu to grow very fast. Currently it is growing at 10% annually – fastest growth in the world. This has caused other problems such as: shortage of housing supply, unemployment, urban crime, etc. if this trend continues, Thimphu is definitely in for a major crisis.

***Preparedness*** –We are currently implementing six Local Area Plans (each measuring about 1 sq km) through ADB and WB funding. This intervention will cause the release of land for constructions which shall be accessible to roads, water supply, sewerage, waste collection, street lighting, telecommunications and a range of other amenities.

Moreover, we have recently surveyed and identified sites for the development of well planned low income housing with access to basic amenities (water, sewer, drains, and waste management). This however is subject to approval and commitment to fund by the decision makers.

***Issues*** – We need support to survey, study and establish a proper database. We are crippled with shortage of manpower, knowledge and expertise

## **A brief note on Urban Crime/ violence**

### ***Experiences***

- 15 categories of crime
- 2007 = 1773 instances
- 2008 = 1758 instances
- 2009 = 2368 instances
- Crime against women = 233 in 2009

### ***Preparedness***

- Establishment of Woman and Child Protection Unit (WCPU)
- Patrolling
- Police Youth Partnership Program (PYPP )
- Police Parent Partnership Program (PPPP)
- School sensitization program
- Road show
- Door to door visit
- Live television panel discussion to create awareness
- Response mechanism – Toll free line & emergency patrol vehicles

### ***Issues***

- Increase in crime faster than the police strength
- Increase in involvement of youth and educated people
- Rise in involvement of women and girls in crime
- Armed violence
- Cyber crime
- Rise in social and economic offences.

## Land use planning – incorporating elements of resilience

Thimphu city has grown very rapidly ever since its establishment as the capital of the nation in 1955. The first urban plan was prepared in 1964 which remained unimplemented. Another urban development plan was prepared in 1986 that guided the development of Thimphu through 1990s. In 1998 a strategic plan was prepared that influenced the need for extending the then 8 sq. km. of municipal boundary to cover a larger area. In the same year the Council of Ministers issued directives to further guide the urban development with the objective to make Thimphu a dream city of all Bhutanese that is culturally vibrant, environmentally sustainable and above all people friendly. The preparation of the new development plan for Thimphu, covering an area of 26.132 sq. km. began in 2001. The 25 year plan was given high priority and involved a process of consulting all stakeholders. There have been at least about 27 public meetings/consultations (excluding consultations for LAPs) until the formal approval of the Thimphu Structure Plan 2002-2027 on February 3, 2003 by the Council of Ministers.

The TSP is woven around 22 main ‘Themes’, nine ‘principles’ of Intelligent Urbanism, and ten fundamental ‘strategies’. *The 22 main themes include: Nation building & civil society; City of our dreams; Tashichho Dzong; Convivility & human scale; Public policy and urban form; Bhutanese dream; Parable of archery; Urban growth; Domain of automobiles; Reclaiming the public domain; City core; Gateway to the capital; Urban corridor; Urban villages; Open space system & the Wangchhu; Footpath system; Forest boundary & city landscape; Peripheral zone control; Knowledge city; Social services; Utilities network; Shelter systems; and the National Capital region. The nine principles of Intelligent Urbanism include: Balance with nature; Balance with tradition, Conviviality; Efficiency; Human scale; Opportunity matrix; Regional Integration; Balanced Movement; and Institutional integrity. The ten strategies include: Decentralization of growth; Regionalization of growth; Densification; Transport oriented growth; Resource utilization; Urban precincts; Public assets; Defining the urban core; Facilitating access to shelter; and ‘Let it be!’ (for details refer TSP 2002-2027).*

Apart from highlighting on the various problems of existing scenario the TSP critically addresses them to come up with proposals for action. The TSP gives clear idea of the assumptions, considerations, opportunities and constraints, which molded the Structure Plan, along with appropriate evaluations and possible alternatives.

The proposals for action include the creation of Environmental Enhancement Zones, supported by the creation of a National Open Space System. The natural environmental zones and the open space system will facilitate a walkable footpath system including, stairways and footbridges. The Structure Plan identifies heritage sites which require conservation, restoration, and improved access. Proposals for linking religious precincts with open spaces will make them more accessible to daily users. Heritage “walks” and “drives” will enhance people’s experience of these treasures. There are specific proposals to enhance the Tashichho Dzong, the Memorial Chorten, Prayer Wheels, and heritage villages. The most compelling structural aspect of the plan will be the proposed traffic and circulation system. This proposal lays out the Urban Corridor, arterial roads and connector roads. The map showing various precincts are attached in

**Annexure I.**

In western planning system “land use plan” specifies zones, restricted for various functions. This has had a counterproductive effect of generating dull “gray” areas, with boring mono-functions. The Structure Plan promotes mixed-use development looking at the ‘Dharma’ of Bhutanese life where different phases of life and occupational callings demand their own precincts. These precincts facilitate and promote various activities, and are sanctified as auspicious places for these necessary activities, which make up the city life. The precincts assure that a religious function will not be disturbed by an industrial function and that residential “house holding” activities will not be disturbed by intensive retailing and wholesaling. The list of precincts, their description and uses sanctioned are attached in **Annexure II**. The summarized development control regulation under various precincts is also attached in **Annexure III**.

The Structure Plan also recognize that the city must be planned for people who do not now live in it and that these future generations have no “voice” in the preparation of the plan. The housing strategy is designed to accommodate future residents in affordable and compact, walkable neighborhoods.

The Structure Plan also sets aside space for social services and amenities, so that future generations will have access to basic health care and educational facilities. It facilitates the distribution of potable water, electricity and communications networks. It plans for storm water drainage, sewage drainage and solid waste disposal.

All the components of proposal in the TSP will affect the future population, more than the present population. These proposals will affect the citizens of Bhutan who own the capital as an image of their “nationhood,” more than those who own shops and plots in the city today. These proposals are the structured aspects of the city, which are not negotiable components of the urban structure, yet they have been proposed based on the public consultations with stakeholders, and technical consultations with systems managers and engineers.

Anybody interested in knowing the detail components of the TSP 2002-2027 are advised to access the entire document from the TCC website [www.tcc.gov.bt](http://www.tcc.gov.bt) or [dudh.gov.bt](http://dudh.gov.bt)

## **Neighborhood Nodes as an indirect means to make cities resilient**

The Thimphu Structure Plan 2002-2027 has divided the entire stretch of the city into 16 basic units called urban villages. Each urban village is composed of one or two Local Areas encompassing an area of about 1 sq km each. Most of these Local Areas has earmarked (reserved) 2 to 4 acres of land for the development of Neighborhood nodes within 15 minute walking distance of the community. The concept of Neighborhood Node, which will provide most of the community facilities to the residents of a local area, at walkable distances, is one of the main concepts of the Structure Plan. These Neighborhood Nodes are perceived to be predominantly a pedestrian regime. They would provide for an environment where people can leisurely shop, take walks, meet friends, and children can play around. In future if things go well a 12 m ROW will lead the Express Buses to these nodes, where a shaded waiting area, with proper sitting arrangements and facilities for the physically challenged will be provided.



These NNs will provide all the basic facilities and amenities listed below which are expected to help the fulfillment of urban safety and convenience.

| Facility                   | Nature of Facility                                | Plot Area (approx) | Built up Area (approx) |
|----------------------------|---------------------------------------------------|--------------------|------------------------|
| Neighborhood Clinic        | Diagnostic, Casualty, Emergency                   | 500                | 100                    |
| Nursery School/Crèche      | of Age Group of 3 - 6 years                       | 450                | 450                    |
| Commercial Center          | Convenience Shopping                              | 300                | 200                    |
|                            | Fuel Station, Auto Repair Shop                    | 500                | 150                    |
|                            | Café, Neighborhood Bar/ Pub                       |                    | 150                    |
|                            | Internet Café                                     |                    |                        |
| Transportation             | Bus Stop, Taxi Stand                              | 500                |                        |
|                            | Tram Station (in future)                          |                    |                        |
| Public Conveniences        | Phone Booth, News Stand                           | 25                 | 25                     |
|                            | Public Toilets                                    |                    |                        |
| Fire Fighting              | Provision of Fire Engine                          | 75                 | 75                     |
| Infrastructure Maintenance | Electrical Sub Station                            | 50                 | 25                     |
|                            | Water Supply Monitoring Cell                      |                    |                        |
|                            | Tel. Complaint/ Bill Receipt Cell                 |                    |                        |
| Social Infrastructure      | Postal Agency/ Collection Center                  | 100                | 25                     |
| Solid Waste Disposal       | Store for Recyclable Wastes                       | 75                 | 25                     |
| Police post                | For local safety, complaints and detention        | 450                | 450                    |
| Central plaza              | Passive recreation with lawns and sitting benches |                    | 1500                   |

However, it may be noted that none of these NNs are developed so far due to lack of manpower, resources and technical expertise. Since the lands are already reserved we are optimistic that things will happen someday.

*Important note: It may be noted that this paper does not cover intangible dimensions of urban concerns such as; psychological wellbeing and happiness, air quality, noise, conviviality etc.*