



NEPAL COUNTRY REPORT

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SUMMARY

Nepal is experiencing rapid urbanization giving rise to risks that increasingly causing concern. In the absence of stringent policy regulating and managing growth, uncontrolled and haphazard urban development has created numerous problems, including deficiencies in basic urban services; environmental degradation; encroachment on public lands, forests, and river banks; and sprawling settlement development.

Disasters triggered by natural hazards are causing heavy loss of life and assets, and represent an unparalleled threat to Nepal's development. The effects of climate change and extremes have further aggravated the country's disaster vulnerability. Nepal, one of the most disaster-prone countries in the world, is exposed to multiple hazards such as earthquakes, floods, landslides, fires, heat and cold waves, lightning, windstorms, hailstorms, droughts, and epidemics.

Whereas disaster management has been included in the periodic plans of municipalities since 2009. Earthquake Vulnerability Maps have been prepared for only 5 municipalities by Earthquake Risk Reduction and Recovery Preparedness Program for Nepal. Further, Risk Hazard Maps have been prepared for 4 municipalities as of 2012. There is a lack of preparation to deal with disasters. Most the municipalities do not have a disaster management section within their institutional framework.

While linking research with policy is a major concern in Nepal, politicians and policymakers rarely base their decisions on research, including studies into urban and ecosystem issues, given political dynamics. Thus, making evidence-based policy a reality remains a challenge. Based on interviews with experts during this study, reasons suggested including the effect of political influence on policy making, significant gaps in prior policy and practice, poor dissemination of research findings, ineffective use of media outlets, and a lack of engagement by researchers with policymakers.

Consultative research processes are crucial to improve the impact of research on policy. Research findings are more likely to be used in policymaking if concerned stakeholders – researchers, practitioners, policy and political decision makers, and government officials – come together to define problems and help design research. Policy makers consulted during this study prefer specific and concrete recommendations from research. Policy briefs, research insights (1-page length) highlighting specific problems and recommendation, and other brief communications formats are more useful to them. Media op-eds are also powerful tools to promote use of research in policy. However, they require more reliable and valid information. They further highlighted that the timing of delivery of research findings is important for a policy formulation or change in specific policy.

Mainstreaming disaster risk reduction in urban development planning and policy is crucial for sustainability, but is hindered by institutional gaps. Ensuring evidence is put into use in resilience planning remains a challenge as policy formulation processes do not recognize the need for such research results.

Opportunities are emerging. After implementation of federalism in Nepal, municipalities became more autonomous and can impose tax, allocate budget, make their own policies and enforce them. This has opened opportunities to them for designing and implementing inclusive and resilient cities on their own, and have called for support from researchers and advocacy groups supporting government in different sectoral areas.

The Government of Nepal has also initiated several urban planning activities. Ten new cities are planned along the mid hill highway that connect east and west of Nepal. These are planned to be disaster resilient, economic hubs, and with distinct identities. They represent pilots for researchers to input into evidence-based, disaster resilient and environment friendly urban planning, able to be replicated to further afield.

Nepal's National Adaptation Programme of Action (NAPA) to climate change has identified Urban Settlements and Infrastructure as one of the six key themes and included "Promoting Climate Smart Urban Settlements and Infrastructure" as one of nine priority projects. It is becoming increasingly important to incorporate disaster risk assessments into the urban planning and management of disaster-prone human settlements and particularly by addressing the problems of informal settlements in high-risk areas. Collective efforts of researchers, policy makers and practitioners on reviewing, formulating and implementing policy for the resilient urbanization will be essential in moving this forward.

Collective efforts of government, researchers, policy makers and practitioners on reviewing, formulating and implementing policy for the resilient urbanization are a must. In Nepal, research is more dominated by international financial institutions and donor agencies. Most of these research activities include project evaluation, assessment, and studies based on project Terms of Reference. There is almost no state funding for the policy research. Hence, increased public funding for policy research would increase ownership of policy makers in research outcomes.

Similarly, research organizations have weak legitimacy and narrow public acceptability. They are mostly self-organised and rely on external funding. As the government is more structured and formal, policy makers show a reluctance to recognise and appreciate the knowledge coming from the research.

The reconceptualization of policy research as a collective enquiry to generate a shared knowledge on specific policy issue can make it more effective. This implies an engaged and reflective approach to research that would not only generate new knowledge but also ensure that decision makers fully buy into the knowledge. Over all the policy research, writing research findings in different formats and outlets, and dialogues across different level and among policy stakeholders will ultimately contribute to the effective policy formulation and implementation in Nepal.

BACKGROUND

Urbanization is considered an indicator of modernisation and the most viable processes of development. Around 53% people in the world live in urban area [1]. In the next four decades, all the world's population growth is expected to take place in urban areas. Moreover, most of the expected urban growth will take place in developing countries, where the urban population is expected to double, from 2.6 billion in 2010 to 5.2 billion in 2050 [2]. As urbanization increases, the importance of natural resources equally increases to meet the needs of urban populations. The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision making [3].

This scoping study intended to develop an understanding of the threats and opportunities that Nepalese urban centres face and pose through ecosystem services and dis/services, and identify the information supply and demand on building resilient urban areas in Nepal. This further highlights the status of urban resiliency and opportunities for improvements in Nepal. While preparing this document, we used a range of secondary data including grey and reviewed literatures, data bases and policy documents as the source of data. We also hosted face to face interviews with experts on individual basis based on a generic check list of questions.

URBANIZATION TRENDS

With a population of 26.5 million people and an area of 1,47,181 km, Nepal occupies 0.3% of the land area of Asia. Nepal is situated within latitude 26° 22' N to 30° 27' N and of longitude 80° 4' E to 88° 12' E. The altitude ranges from a minimum of 70 meters to a maximum of 8,848 meters and climate varies with topography. The average width (North to South) is 193 km whereas the average length is 885 km (East to West). The country has great variation in topography, which is reflected in the diversity of weather and climate. Specially, the country experiences tropical, mesothermal, microthermal, taiga and tundra types of climate [4].

Nepal a landlocked country, sandwiched by India and China. 39% of the population is urban (Table 1; [5, 6]), and Nepal is ranked as one of the fastest urbanizing areas of the Global South. Kathmandu valley has 2.5 million people is growing at 4% percent per year, making it one of the fastest growing metropolitan areas in South Asia and the first region in Nepal to face the unprecedented challenges of rapid urbanization.

Year	No of Municipalities	Urban Population	Urban population (%)	Urban Population growth rate	Total population growth rate
1961	16	336222	3.6	3.44	1.65
1971	16	461938	4.0	3.18	2.07
1981	23	956721	6.4	7.28	2.66
1991	33	1695719	9.2	5.72	2.08
2001	58	3227879	13.9	6.44	2.25
2011	58	4523820	17.1	3.38	1.35
2011*	217	10057690	37	2.00	1.20
2016**	217	11104502	38.8	-	-

Table 1: Urbanization in Nepal. Note: *The population of the present 217 municipalities in 2011. **Projected population assuming growth of population at the rate of 0.48 percent per annum.

As Nepal experiences rapid urbanization, meeting international standards has become a major concern. Global experience clearly demonstrates that urbanization is an important driver of economic development but that potentiality has not been adequately tapped in Nepal. In the absence of a stringent policy regulating and managing growth, uncontrolled and haphazard urban development has created numerous problems, including deficiencies in basic urban services; environmental degradation; encroachment on public lands, forests, and river banks; and sprawling settlement development.

Cities are a key nexus of the relationship between people and nature and are huge centres of demand for ecosystem services, and generate extremely large environmental impacts [7]. The important element of ecological urbanism is that biodiversity conservation in cities doesn't just make people happier, but also has significant impact on increasing urban resiliency to climate change. One of most important ecosystem services, derived from urban forestry, has several benefits. Social benefits include recreation opportunity, improvement of home and work environment, aesthetic and architectural benefit, climatic and physical benefit, ecological benefit, and economic benefit. Current projections of rapid expansion of urban areas present fundamental challenges to design more liveable, healthy and resilient cities.

However, due to the unplanned and rapid urban expansion, Nepalese urban centres are facing problems including environmental degradation, scarcity of basic services and necessities, rise of squatter settlements and urban poverty. Cities are not resilient to disaster, or eco-friendly.

DIVERSITY OF PROBLEMS BETWEEN URBAN CENTRES AND SURROUNDING ECOSYSTEMS IN NEPAL

Nepal is exposed to multiple hazards such as earthquakes, floods, landslides, fires, heat and cold waves, lightning, windstorms, hailstorms, droughts, epidemics due to its variable geo-climatic conditions, young geology, unplanned settlements, deforestation, environmental degradation and increasing population.

Disasters triggered by natural hazards are causing heavy loss of life and assets. Disasters are an unparalleled threat to Nepal's sustainable development. The effects of climate change and extremes have further aggravated the country's disaster vulnerability. Thus, Nepal is one of the most disaster-prone countries in the world.

Nepal's Disaster Profile

Nepal has fragile geology and steep topography making it twentieth most disaster prone country in the world [4]. Regarding the relative vulnerability to climate change related hazard, earthquake and flood hazard, Nepal ranks, respectively, in the fourth and eleventh and thirtieth among 198 countries of the world. Nepal faces high magnitudes and intensities of a multitude of natural hazards.

A database maintained by the Ministry of Home Affairs, covering a period of 45 years (1971 to 2015) revealed that a total of 22,372 disaster events have been recorded during this period. Hence, annually, Nepal is exposed on average to about 500 disaster events. The dataset shows that fire is one of the most recurrent hazards in Nepal. Number of fire incidences were recorded 7,187 times, followed by flood (3,720), epidemic (3,448) and landslide (3,012).

Epidemics - caused by diseases including cholera, gastroenteritis, diarrhoea, encephalitis, meningitis, typhoid, jaundice, and malaria – are critically important in the sense that they represent one of the most lethal hazards claiming the lives of more than 16,500 people (41.1% of the total disaster-induced deaths) during the period. This is followed by earthquake, landslide and flood.

Epidemics and earthquake are the two most important disasters in terms of human injury – that resulted into injury of an absolute large number of people (92 percent of the total).

In terms of property loss, during the period of last 45 years, a total of 1,330,913 houses, including cattle sheds, were either destroyed or damaged. Of these, 982,855 (73.8%) houses were destroyed by earthquake alone, with most of the remainder taken by floods. Likewise, a total of 5,932,012 families have been affected by the 12 most important disasters, of which flood is attributed to affecting a large number of families (62.4% of the total), followed by earthquake, epidemic, and landslide. As, there are no segregated data on occurrence of disaster and its impact between rural and urban area in Nepal, Table 2 shows the major disasters and their impacts from 1971 to 2015 in Nepal.

Table 2: Major disasters in Nepal and the damage and loss, 1971-2015

Disaster type	No. of death	No. of persons missing	No. of persons injured	No. of houses damaged or destroyed	No. of affected families	No. of incidents
Epidemic	16,564	-	43,076	-	512,970	3,448
Earthquake	9,771	-	29,142	982,855	890,995	175
Landslide	4,832	165	1,727	32,819	556,774	3,012
Flood	4,344	6	527	215,427	3,702,942	3,720
Fire	1,541	-	1,379	83,527	256,445	7,187
Thunderbolt	1,502	129	2,444	952	6,880	1,505
Cold wave	515	-	83	-	2,393	390
Snow storm	87	7	-	-	-	5
Avalanche	16	3	7	-	-	2
Wind storm	-	-	2	-	-	16
Hailstones	-	-	-	6	2,608	17
Heavy rainfall	-	-	-	4	5	3
Other*	1,092	-	-	15,323	-	2,892
Total	40,264	310	78,387	1,330,913	5,932,012	22,372

Diversities of problems faced by Nepalese cities

A critical challenge for urban development in Nepal is management of disaster risk and stresses induced by environmental change. Nepal has been identified as amongst the most at climate-risk countries and is in an active seismic zone. Nepal was seriously affected by large earthquakes on April 25, 2015 (7.8 on Richter scale) and May 12, 2015 (7.3 on Richter scale). Over 500,000 homes were destroyed, 250,000 damaged, nearly

9000 people killed, 21000 injured, and 3 million affected. Data shows that during 1983 – 2005, over 28 billion Nepalese rupees (NRs) (£212 million) were lost due to disasters, an average of nearly 1,208 million NRs (£9 million) per year [8]. In the last 23 years, in an average per year about 938 persons lost their lives in Nepal. Similarly, 4.7 million people have been directly affected, around 841,000 hectares of land has been damaged, and 236,000 livestock have died. Haphazard and uncontrolled growth of built-up areas in urban centres has thus become a critical challenge.

Another associated challenge remains with environmental resources, with water emerging as a critical limiting factor. There is already a severe limitation in piped drinking water in cities, which has been now partially supplemented with 'private water', supplied in tankers or in bottles/jars by the private actors, rather than supplied by the government as a basic entitlement. This has a direct implication to the poor who are not in position to pay for water. The uncertainties of precipitation and ground water recharge within the ongoing climate change will create further shortage in water supply in Kathmandu [9] and other rapidly urbanizing cities in Nepal.

Nepal's air quality ranks 177th with 29.84 score, according to Yale's 2016 Environmental Performance Index (EPI)¹ [10]. Urban area's air in Nepal is amongst the most polluted in the South Asia region, which is caused by the rise in automobiles, continuation of wood-fired brick factories, and the dust particles from bad road and automobile exhaustion.

Many squatters living along the river banks in Kathmandu and other cities also face risks of flooding and water pollution, causing health and social stress on the children, elderly and sick people. A study by Bagmati Civilisation Integrated Development Committee in October 2015 revealed that, water in the Bagmati River that flows through Kathmandu contains 0.53 milligrams of dissolved oxygen per litre [11]. The fact that no aquatic animal can survive in water with less than 3mg/l shows how polluted rivers can be.

Disaster management has been included in the periodic plans of municipalities since 2009. Earthquake Vulnerability Maps have been prepared for only 5 municipalities by Earthquake Risk Reduction and Recovery Preparedness Program for Nepal. Further, Risk Hazard Maps have been prepared for 4 municipalities as of 2012. This shows a lack of preparation to deal with disasters. Even in cases where maps have been prepared they have not been utilized for reducing vulnerability. Most of the municipalities do not have a disaster management section within their institutional framework. For Instance, Dhahran Sub metropolitan city a medium sized town, which lies in the South-Eastern part of Nepal has a Disaster Management Unit, which is currently dysfunctional. This is due to staff work overload of staffs leading different sections of government simultaneously.

¹ <http://epi.yale.edu/country/nepal>

As of 2014, out of 58 municipalities, only 12 have enforced building codes for construction work within the municipal jurisdiction. With a total of 217 municipalities in 2015, and a predominantly rural setting of most of the new municipalities, enforcement of existing building code is even more challenging. Therefore, the issue is to strictly implement by-laws and National Building Codes in all municipalities, including Village Development Committees that are rapidly urbanizing. Also, enforcement of land use zoning is almost non-existent in municipalities, which has been a major hurdle in development of safer settlements. For instance, Pokhara a touristic town of Nepal has seen decline in agricultural land with loss of open fields and croplands to urban use, and further villages are increasingly depopulated [12].

Table 3: Land use/land cover change 1977-2010

Land use type	Land cover Area in Km ²				Magnitude in Km ²			Total change in Km ²	Total change in %
	1977	1990	1999	2010	1977-1990	1990-1999	1999-2010	1977-2010	1977-2010
Urban	3.50	11.11	18.62	28.44	+7.61	+7.51	+9.82	+24.94	+45.09
Water Body	7.73	6.85	7.10	7.02	-0.88	+0.25	-0.08	-0.71	-1.28
Open Field	6.46	4.44	3.53	4.26	-3.81	-0.91	+0.73	-2.20	-3.98
Forest Cover	0.84	0.75	0.87	1.22	-0.09	+0.12	+0.35	+0.38	+0.68
Cultivated Land	33.59	29.18	21.40	11.21	-4.41	-7.78	-10.19	-22.38	- 40.46
Sandy	3.19	2.98	3.79	3.16	-0.21	+0.81	-0.63	-0.03	0.60

Based on the data from the Central Bureau of Statistics (2012), urban poverty in Nepal increased from 9.55% in 2004/05 to 15.46% in 2010/11. Rising poverty in urban area is an indicator of decreasing resiliency of urban population to disasters. A survey in Ratnanagar Municipality in Chitwan district revealed that 27% of the population is below the poverty level; nearly 41% of the population is vulnerable to further sinking into poverty. In the national context, according to 2014 World Bank records, Nepal is ranked 184th out of 213 countries in the list of Gross National Income per Capita category.

According to data from the Ministry of Federal Affairs and Local Development (MoFALD), only 71 of 217 municipalities have 100 fire engines as of now. The physical condition of

fire engines is poor because they have not been operated or maintained well. All a municipality's fire engines are kept in the same place despite the inefficiency of this system, and few have the extension ladders and elevators needed to fight fires in high rise buildings. There are not enough search and rescue tools, and even when available they are not well-stored. For effective response, search and rescue tools are neither adequate nor managed systematically. Provisions for emergency water and fuel storage are inadequate and there are too few fire alarms and extinguishers. The management capacities of municipalities in terms of fire prevention and fire extinguisher are inadequate. Fire-fighters have limited skills and knowledge and some have never had the opportunity to participate in trainings and orientations on fire-fighting. Over 60% of fire accidents occurred in the Kathmandu Valley due to short-circuits, while poor handling of highly inflammable petroleum products, burning candles and oil-fed lamps were other major causes of fire [13].

There is no adequate data on risk to cities from forest fires however, occasionally, embers from forest fires also cause fires in nearby villages, especially in the Terai region where the roofs are made of thatched grass. At least 100 villages are damaged by fire every year with loss of lives, cattle and other property. At least one hundred villages are burned annually in Nepal, some of which are destroyed by forest fires [14].

DISASTER RESPONSE INITIATIVES IN NEPAL

Nepal's disaster management initiatives commenced with the enactment of the Natural Calamities Relief Act 1982. In 1992, Nepal observed the International Decade for Natural Disaster Reduction Day² for the first time. A National Building Code Development Project began in the same year. Various projects and workshops were conducted to tackle the disaster risk in Nepal thereafter. Non-governmental organizations like National Society for Earthquake Technology³ were founded. In 1998, His Majesty's Government of Nepal declared 16 January as the National Earthquake Safety Day (ESD). Along with these initiatives, there have been several disaster related alerts, predictions, safety trainings, demonstrations and related activities in Nepal.

Over the years, the Government of Nepal (GoN) has shifted its focus from a reactive to a proactive approach for disaster risk management (DRM) and has undertaken efforts in strengthening legal frameworks, policy and planning, organizational aspects, institutional capacities and DRM partnerships. These include moving from a disaster response oriented legal framework, the National Strategy for Disaster Risk Management (NSET,

² On 11 December 1987 at its 42nd session, the General Assembly of the United Nations designated the 1990's as the International Decade for Natural Disaster Reduction (IDNDR).

³ NSET was founded as an NGO on June 18, 1993 with the vision "Earthquake Safe Communities in Nepal by 2020".

2008), the Crisis Management Act 2015 (under bill), transformation from the National Calamity Relief Act 1982 toward a new Disaster Management Bill (currently in discussion toward endorsement), coordinated work for the improvement of overall DRM capacity through the Nepal Risk Reduction Consortium, an established focal desk for DRM within line ministries, establishment of national multi-stakeholder platform for DRR, to name a few.

Government of Nepal committed to the implementation of the new Sendai Framework for Disaster Risk Reduction 2015-2030 at the Third United Nations World Conference (March 2015) on Disaster Risk Reduction, to enhance efforts to strengthen disaster risk reduction to reduce losses of lives and assets from disasters, increase the capacity for understanding about the disaster risks, strengthen the global cooperation for DRR and establish multi-hazard risk information management (EWS) system for potential disasters worldwide.

Further, the Nepal Risk Reduction Consortium (NRRC) – an arrangement to unite humanitarian and development partners with financial institutions in partnership with the Government of Nepal and to reduce Nepal's vulnerability to natural disasters – identified 5 flagship priorities for sustainable disaster risk management based on the Hyogo Framework and Nepal's National Strategy for Disaster Risk Management.

- **Flagship I: School and Hospital Safety:** Led by Asian Development Bank, Ministry of Education, World Health Organization and the Ministry of Health, Flagship 1 aims to build the earthquake resilience of schools and hospitals through retrofitting, training, awareness raising and safety measures that ensure these buildings are operational after a major disaster. These efforts will protect the most vulnerable from a major disaster while ensuring critical hospital services remain intact.
- **Flagship II: Emergency Preparedness and Response:** Current assessments suggest that a major earthquake in Kathmandu will result in the deaths of 100,000 people, hundreds of thousands injured and close to 1 million displaced. To reduce and respond to these devastating effects, Flagship 2, led by Red Cross and the Ministry of Home Affairs, seeks to enhance the Government of Nepal's preparedness and response capabilities at the national, regional and local level.
- **Flagship III: Flood Risk Management:** Each year, hundreds of people lose their lives and thousands of families are affected from floods across the country. Under Flagship 3, led by the World Bank and the Ministry of Irrigation, the initiatives focus on both the short-term goal of strengthening institutional capacities while improving flood management and mitigation in the long term with the aim of protecting Nepal from flood related disasters and sustaining development.

- **Flagship IV: Community Based Disaster Risk management:** Communities are the first responders to natural disasters and require the skills and resources to effectively mitigate, prepare and respond to disasters. Led by the International Federation of Red Cross/Red Crescent Societies and the Ministry of Federal Affairs and Local Development, Flagship 4 has the ambitious aim of making 1000 Village Development Committees (VDCs) disaster resilient by using an agreed upon set of characteristics for disaster resilience.
- **Flagship V: Policy/Institutional Strengthening:** Sustainable disaster risk management in Nepal requires strengthened policies and institutional capacity. The United Nations Development Programme and the Ministry of Home Affairs, lead Flagship 5 with the aim of enhancing the Government of Nepal's disaster risk management capacity centrally and at the municipal and local level. This important task includes strengthening building codes and land use planning, and improving national institutions for disaster risk management.

INFORMATION DEMAND

Consultative research processes are crucial to improve the impact of research on policy. Research findings are more likely to be used in policymaking if concerned stakeholders – researchers, practitioners, policy and political decision makers, and government officials – come together to define problems and help design research [15].

While linking research with policy is a major concern in Nepal, politicians and policymakers normally do not base their decisions on research including studies into urban and ecosystem issues, thus making evidence-based policy a further and real challenge in Nepal. Based on the interviews with experts during this study, reasons include the effect of political influence on policy making, significant gaps in prior policy and practice, poor dissemination of research findings, ineffective use of media outlets, and a lack of engagement by researchers with policymakers.

The following sections provide the brief information demanded by the policy makers, format, timing and process of information, challenging and enabling factors.

Information sources

There are no strong databases or information banks for any policy initiatives in Nepal. Sources including the census data from the Central Bureau of Statistics, climatic data from the Department of Hydrology and Meteorology, economic and development-related data from the Ministry of Finance, are some of the major databases in Nepal. Since there is no government council for social, environmental, and economic research, there is no

comprehensive portal for research archiving. Donor funded research by non-academic institutions and individuals are driven by donor's Terms of Reference. In this regard, experts suggested for that state funding for research and use of such research in policy is still needed.

Format, timing and process of information

Policy makers consulted during this study prefer specific and concrete recommendations from research. Policy briefs, research insights (1-page length) highlighting specific problems and recommendation, and other brief communications formats are more useful to them. Media op-eds are also powerful tools to promote use of research in policy. They further highlighted that the timing of delivery of research findings is important for a policy formulation or change in specific policy. This can help contribute to evidence-based policy formulation (Annex 1). Here, research findings can be communicated through platforms including media writing, policy dialogues and seminars, policy briefs, elevator and pitches.

Priority areas

Most experts interviewed overwhelmingly emphasized the need to implement existing policy provisions. For instance, implementation of Nepal's National Building Code (NBC) remains a critical issue though it was formulated in 1994. Current municipalities, the responsible agencies issuing building permits, do not ensure NBC compliance. The building permits process is very superficial and subjective; municipalities are largely enforcing NBC compliance in theory only. Few generalized checklists are developed and the questionnaires in checklists are overlooked or are easily manipulated. There is no effective mechanism for field verification of approved building plan drawings [16]. This indicates that Nepal's vulnerability to natural hazards is first and foremost a governance problem [17].

Experts also talked more about the SMART⁴ cities in terms of climate, identity, and infrastructure. These require city plans responding to a changing climate. Because, Nepal is geographically, socially, culturally diverse; a single model of response to climate and disaster related challenges will not work for all cities. One experts highlighted that Rajbiraj – a planned city in southern Nepal – is not functioning well due to a lack of economic opportunity. Hence, cities are to be conducive for the economic activities that ultimately make individuals more resilient in the face of disaster risk.

⁴ In context of Nepal, Smart Cities is a sustainable urban development vision to integrate multiple information and communication technology (ICT) to improve the efficiency of services and meet residents' and make it replicable. The word SMART refers to Sustainable, Measurable, Accessible, Replicable and Technical.

Natural resource management, particularly of water supplying towns in the mid-hills of Nepal, presents critical challenges needing urgent attention. Those towns rely on springs and streams in the surrounding catchments, which are gradually drying. After the earthquake of 25 April 2015 and subsequent aftershocks, many of those sources have disappeared.

BARRIERS AND ENABLERS

During expert consultations, barriers and enabling factors affecting urban resilience building in Nepal, incorporating use of evidence-based policy formulation and implementation, was examined:

Barriers

- As Nepal is politically in a transitional phase with state restructuring underway, there is confusion over which ministry takes responsibility of local bodies. Currently, the Ministry of Federal Affairs and Local Development lead governance, and development is led by the Ministry of Urban Development. Close cooperation between these two ministries seems vital. However, the experts interviewed in this scoping study revealed that the collaboration between these ministries is not strong, which has affected the implementation of Kathmandu valley's urban development plan that was initiated in the 1960's. Another major hurdle arises from powerful landowners who do not allow their properties to be included in urban planning or land pooling and also from political patronage as political parties are influential in decision making.
- Poor databases supporting appropriate policy and practice initiatives have also hindered the ideal of effective urban planning in Nepal. Most of the data are generic, superficial, and not grounded. For instance, concepts to develop green cities is in preparation, but action plans are delayed due to a lack of comprehensive data. There are no segregated databases that specifically represent rural and urban areas in Nepal. Generalised approaches to urban planning and poor implementation in geographically diverse urban centres has failed to respond effectively to disaster risk. The lack of reliable secondary information to assess risk and capacity due to a lack of prioritization and awareness of urban risk by stakeholders is another, interlinked, challenge.
- Urban planners are treated as engineers and their planning expertise is not well-recognized. Resilient and sustainable planning approaches are not applied in cities facing ecosystem and other disaster-related challenges; and even where there are relatively good plans, implementation is weak.
- There is overall low stakeholder engagement in urban DRR due to a lack of awareness on the issue of risk and vulnerability. Coordination among government

departments including municipal authorities and ministries is not traditionally involved with disaster risk reduction. Also, obtaining commitment from civil society and agencies working in this field has been challenging.

- ***Mainstreaming disaster risk reduction in urban development planning and policy is crucial for sustainability, but it remain a challenge as the policy formulation process do not recognize the need for research and evidence.*** Thus, the practice of risk-sensitive land-use planning in urban area is not implemented.
- Many policies in Nepal are formulated through rhetoric or otherwise singular ambition. Few polices are wholly evidence-based and they influence immediate stakeholders, usually service providers or profit-makers and businessmen interest rather than citizens.

Enabling Factors

- After implementation of federalism in Nepal, municipalities became more autonomous and can impose tax, allocate budget, make their own policies and enforce them. This has opened opportunities to them for designing and implementing inclusive and resilient cities on their own.
- After the 2015 Gorkha earthquake, some changes were noted on disaster sensitivity. Earthquake resistant building, wider roads, open spaces are prioritized and implemented. Continuation of such initiative through learning from a large disaster is anticipated.
- Collaboration among related institutions and stakeholders is must for integrated urban planning. After the Gorkha earthquake in 25 April 2015 and its aftershocks, reconstruction process is undergoing. National planning commissions and other concerned authorities have started coordinating with different institutions. For instance – academicians and graduate students from the Institute of Engineering of Tribhuvan University were involved in assessing the status of damaged buildings; whether they were completely, partially or not damaged. This type of coordination among sectoral organizations can contribute to promoting resilience in cities.
- Ancient cities in Kathmandu valley predominantly created between the thirteenth and the eighteenth century (Kathmandu, Bhaktapur and Lalitpur) and three Durbar Squares (Basantapur, Bhaktapur and Patan) were planned cities where open courtyards (*chowks*) and public squares are often part of Narrow Street. Further, at most street corners, aside temples and on public square platforms (*dabali*) and resthouses (*pati*) can be found. However, these aspects are gradually ignored in recent planning. In this context, Urban dwellers can learn from these ancient towns and take appropriation action on building resilient cities.
- The Government of Nepal has initiated several urban planning activities. 10 new cities are planned along the mid hill highway that connect east and west of Nepal. These cities are planned to be disaster resilient, economic hubs, and with distinct

identities. These can be a pilot project for evidence-based, disaster resilient and environment friendly urban planning, able to be replicated to other cities as well.

- Cities are all the time connected to the surrounding peri-urban and rural areas. An isolated plan for cities cannot establish sustainable urban – rural linkages. Some linkage projects have arisen through the National Adaptation Programme of Action (NAPA) [18] and Local Adaptation Plan of Action (CAPA), which are expected to bring positive outcomes.

RECOMMENDATIONS

It is obvious that urbanization cannot, and should not, be curbed and cities are bound to grow in numbers and sizes. How we plan our cities and how we manage our urban ecosystems in relation to other natural ecosystems will largely determine our fate. Hence, focus should be on planning settlements that are resilient to natural and human-made hazards, protecting and valuing their ecosystems, natural habitats and biodiversity, and reducing the global ecological and carbon footprint. Based on our review, interaction with some experts, following are some suggestions for the actions and recommendations for future investments.

Nepal's National Adaptation Programme of Action (NAPA) to climate change has identified Urban Settlements and Infrastructure as one of the six key themes and included "Promoting Climate Smart Urban Settlements and Infrastructure" as one of nine priority projects. Provisions for making buildings earthquake-resistant are difficult to implement especially in the political transition, and because buildings in rural, semi-urban and urban areas are mostly constructed without input from qualified engineers. It is becoming increasingly important to incorporate disaster risk assessments into the urban planning and management of disaster-prone human settlements and particularly by addressing the problems of informal settlements in high-risk areas [19].

The effort of Ministry of Home Affairs to collaborate with sectoral ministries, National Planning Commission and municipalities, to address rescue and relief work for disaster victims, has been focused on relief rather than minimizing vulnerability. Engagement with efforts to strengthen capacity of communities, organisations and government to be resilient from disaster, and raising disaster risk awareness among stakeholders to ensure they have the information to act and reduce their risk are areas for targeted research engagement.

Collective efforts of government, researchers, policy makers and practitioners on reviewing, formulating and implementing policy for the resilient urbanization are a must. In Nepal, research is more dominated by international financial institutions and donor

agencies. Most of these research activities include project evaluation, assessment, and studies based on project Terms of Reference. There is almost no state funding for the policy research. Hence, increased public funding for policy research would increase ownership of policy makers in research outcomes.

Similarly, research organizations have weak legitimacy and narrow public acceptability. They are mostly self-organised and rely on external funding. As the government is more structured and formal, policy makers show a reluctance to recognise and appreciate the knowledge coming from the research.

The reconceptualization of policy research as a collective enquiry to generate a shared knowledge on specific policy issue can make it more effective. This implies an engaged and reflective approach to research that would not only generate new knowledge but also ensure that decision makers fully buy into the knowledge. Over all the policy research, writing research findings in different formats and outlets, and dialogues across different level and among policy stakeholders will ultimately contribute to the effective policy formulation and implementation in Nepal.

ANNEX I: POLICY ENGAGEMENT STRATEGIES IN NEPAL

Policy Engagement Strategies in Nepal:

The understanding of policy should not be understood in a limited sense of a formal document passed by the government. It could be better understood in terms of what the government does, or how it responds to societal problems. A policy engagement is thus not limited to the production of a policy document as an end-product. Instead, policy engagement entails the gamut of processes in which a policy problem is crafted, articulated and contested at multiple scales and societal fronts. It encompasses knowledge generation to political confrontation and to the interpretation and implementation of a policy. Policy researchers and activists use the range of methods and tools for policy engagement at national, district and local levels in Nepal. Based on our observation and practices that are adopted by several policy research institutions in Nepal, we broadly identified the following strategies that are in practice for the research policy linkages.

DIAGNOSTIC STUDY

The Diagnostic Study is a rapid and timely study by a team of policy experts and practitioners on key bottlenecks, contradictions, interpretation, and contestation around the development and implementation of a policy. The Diagnostic Study focuses on a specific policy issue and associated instruments (including the government's decisions, circulars, or laws and regulations) and develops analysis on the information gathered primarily from affected constituencies.

POLICY DISCUSSION PAPER

The Policy Discussion Papers identify a contemporary policy problem within a policy sector, present and analyse data and evidence around that problem, and draw up policy conclusions. The Policy Discussion Papers also present a survey of contesting opinions held by different stakeholders: government departments and government personnel, civil society actors, NGOs, private sectors as well as the ordinary people who are at the receiving end of a policy.

POLICY SEMINAR SERIES

The Policy Seminar Series serves as a continuous platform for bringing in new research and evidence within a policy sector and nurtures possibilities for proactive and collaborative policy initiatives. The Policy Seminar Series allows sharing and dissemination of scholarly as well as policy relevant research within the sector.

COMMUNITY INTERACTION

Community interaction is a grassroots-level platform that provides opportunities to all interest groups in the community to express and articulate their concerns about gaps, bottlenecks, contradictions in the policies as they manifest in the course of implementation. The Community Interaction is conducted with different interest groups in an informal environment to ensure voices of the voiceless are captured. The concerns raised in the Community Interaction are presented and discussed in the sub-national level dialogue.

SUB-NATIONAL (MESO-LEVEL) DIALOGUE

Sub-national (or meso-level) Dialogue is a multi-stakeholder policy deliberation platform that is held at district and regional levels. The Sub-National Dialogue brings up and consolidates the policy issues gathered from local interactions, stimulates multiple viewpoints and opinions of stakeholder regarding policy issue, and offers suggestions for policy response. The Sub-National Dialogues engage meso-level policy actors including government officials, civic activists, politicians, non-governmental organizations, community representatives, and representatives of other constituencies.

NATIONAL POLICY ROUND TABLE

National Policy Round Table is a multi-stakeholder policy forum that provides an open interactive space to deliberate on all relevant policy agenda within a policy sector. It is particularly relevant for convening discussions and stimulating new thinking on contemporary policy agenda within the sector. While the issue relates to a policy sector, experts from other sectors are also invited in this programme. This allows participants to have cross-sectoral and generic public policy insights into the policy sector in question.

POLICY BLOGGING

Policy Blogging is an electronic discussion on a pressing policy issue within a policy sector, involving the exchange of sound evidence and arguments. It differs from other blogs in that it starts with electronic posting of a brief, research-based background paper on a policy issue and the paper poses key policy questions for other bloggers to respond to and comment. The blogging on the theme can extend over a month, or if an issue is relevant.

POLICY BRIEF

A Policy Brief is a short brief piece of writing (usually 4-page long) prepared based on in-depth research or policy dialogues. The Policy Brief communicates the summary of research findings and offers an authentic diagnostic of a policy problem and actionable opportunities for policy changes.

ANNEX II: CHECKLIST USED FOR THE INTERVIEW

1. What are the major urban and urban development problems in Nepal?
2. What are the major gaps in current urban policy, planning and execution?
3. How can we fill these existing gaps?
4. Do you believe we have sufficient database or regular data collection mechanism for urban disaster management in Nepal?
5. What sorts of data are required to inform urban policy makers?
6. What type of sharing modality or research knowledge can influence policy makers?
7. Experiences showed that local institutions (specifically the municipalities) are vital in effective disasters response. How can we strengthen their capacities?
8. Are there any opportunities of promoting eco-friendly development in urban centres? How?
9. Has Nepal towns in the direction of physically and technically smart cities keeping on mind Nepal is earthquake prone zone?
10. What recommendation would you make with actions to direct urban policies of Nepal?

ANNEX III: PEOPLE INTERVIEWED DURING THE SCOPING STUDY

SN	Name	Affiliation
1.	Sunil Babu Shrestha	Member - National Planning Commission (Urban Development Division)
2.	Krishna Gyawali	Former Secretary – Government of Nepal
3.	Rama Manandhar	Urban Planner – Ministry of Urban Development, Nepal
4.	Ashok Byanju	Vice Chair- Municipal Association of Nepal
5.	Raju Pokharel	Municipal Engineer – Dharan Sub Metropolitan city
6.	Kamal Bhandari	Training and Advocacy Specialist – Forest Action Nepal
7.	Kamal Paudel	Section Officer—Ministry of Water Supply and Sanitation

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