



City-Wide Risk Assessment Banepa Municipality

Nepal Red Cross Society
2022

Table of Contents

Section A: General Background and Introduction to the City-wide Risk Assessment for Banepa Municipality.....	01
Section B: City Profile.....	03
Part I: Resilience of What: City Systems in Banepa.....	08
Part II: Resilience to What: Shocks and Stresses in Banepa.....	11
Part III: Resilience for Whom: Those most vulnerable in Banepa.....	18
Conclusion and Recommendations.....	22
Resilience Developments.....	24
Annex I: Methodology	
Annex II: Lessons Learned	

Abbreviation and Acronyms

NRCS	Nepal Red Cross Society
KUYRCC	Kathmandu University Youth Red Cross Circle
VCA	Vulnerability and Capacity Assessment
CWRA	City-Wide Risk Assessment
DRR	Disaster Risk Reduction
NGO	Non Governmental Organization
INGO	International Non Governmental Organization
ICIMOD	International Centre for Integrated Mountain Development.
NWSC	Nepal Water Supply Corporation
KVIWSP	Kavre Valley Integrated Water Supply project
KU	Kathmandu University

Section A: General Background: the need for flood resilience in Banepa, Nepal

Nepal is currently and is set to remain amongst the top ten fastest urbanising countries in the world, with a projected annual urbanisation rate of 1.9% until 2050 (UN DESA, 2014). A few decades ago, Nepal was a primarily rural country. At present, according to the World Bank, 20.58% of the population resides in urban areas, and within 25 years, this will comprise 50%. This is due in part to positive advancements, for example, the concentration of strong services and sectors spanning education, health and infrastructure development, along with economic activity, have driven in-country rural to urban population flows. As a result, cities and towns across Nepal continue to expand at an unprecedented rate [1]. In addition to the opportunities urban environments present, these quickly expanding cities in Nepal, host a confluence of urban risk.

Unplanned settlements and urban development continue, outpace municipalities' ability to resource and plan adequate service provision, as well as protect and manage natural resources in balance with urban planning demands (World Bank, 2013). In particular, the movement of people into urban areas continues to take place at the behest of hydrological integrity. Such expansion, as stated by Ajaya Dixit, South Asia water resources and environmental expert "... is about people, politics and power" [1].

As people expand the built surface areas of cities and towns, the paving of greenfield sites exacerbates flood risk. This is seen especially during times of intense rainfall, throughout the monsoon season, with pronounced impacts mid-June – September in cities including Kathmandu, Lalitpur, Bhaktapur and Kavrepalanchowk. This has come at the cost to livelihoods, damaged property, and even loss of life.



Flooding event in Banepa, Source: Nepali Times

Between 1954 and 2018, floods in Nepal have affected 6.1 million people and caused economic losses of about 10.6 billion USD, and on average claim 100 lives per year (EMDAT, 2019).

In regard to governance, politically, the shift from Nepal's unitary to federal system in 2015, brought with it, the federal level, seven provinces and 753 local governments [2]. Amidst restructuring, subnational governments continue to find their footing within a new ecosystem of climate and disaster risk management (DRM) legal frameworks and institutional arrangements. As per the current constitutional provisions and DRR/M Act - 2018, the power and responsibilities lie in the jurisdiction of local and provincial government for effective Disaster Risk Reduction and Management in Nepal.

[1] <https://www.recordnepal.com/ajaya-dixit-water-is-about-people-politics-and-power>

[2] Government of Nepal. Constitution of Nepal. <http://www.easynepalotyping.com/nepali-sanvidhana>. Accessed January 25, 2018. Published 2015.

[1] <https://www.worldbank.org/en/news/feature/2013/04/01/managing-nepals-urban-transition>

"This process has been very fruitful as we face floods every year but we had never conducted an assessment of the flood, now we can use the assessment findings to support further flood reduction work." Disaster Risk Reduction Focal Mr. Dhurbaraj Nepal, Municipality of Banepa

City-Wide Risk Assessment Approach

For municipalities, such as Banepa, situated in the flood-prone Kavrepalanchowk District, 25 kilometers from the country capital of Kathmandu, support to strengthen resilience and reduce disaster risk through local policies, strategies and plans, is critical.

The Nepal Red Cross has been actively supporting municipalities to advance their governance in disaster risk reduction and management as auxiliary to government, supporting the government to pass the National Disaster Risk Reduction and Management Act of 2017, co-chairing the Community-Based Disaster Risk Management (CBDRM) platform together with the Ministry of Federal Affairs and General Administration (MoFAGA), and connecting the voices of those most vulnerable to local decision-making in urban areas (Strengthening Urban Resilience Engagement[1])[2].

In addition, the IFRC and Zurich Flood Resilience Alliance have supported Nepal Red Cross with the development of tools, including the Municipal Disaster Risk Governance Assessment Tool, and approaches to strengthen city-wide resilience, via the IFRC Asia Pacific Urban Community Resilience Hub Small Grants program, which enabled this City-Wide Risk Assessment. [3] [4].



Above: Participants of the City-wide Risk Assessment in Banepa, Nepal. Source NRCS

[1] <https://ktmredcross.org.np/sure-programme/>

[2] <https://preparecenter.org/story/nepals-municipal-disaster-risk-governance-assessment-tool-a-case-study-on-strengthening-disaster-risk-management/>

[3] <https://preparecenter.org/initiative/asian-pacific-urban-community-resilience-hub/>

[4] <https://preparecenter.org/resource/strengthening-local-risk-governance-in-nepal/>

The City-Wide Risk Assessment of Banepa Municipality was held on the 4th and 5th of December 2021 at the Kathmandu University in Dhulikhel, Kavrepalanchowk to assist the municipality of Banepa, and its most flood-risk prone communities to jointly:

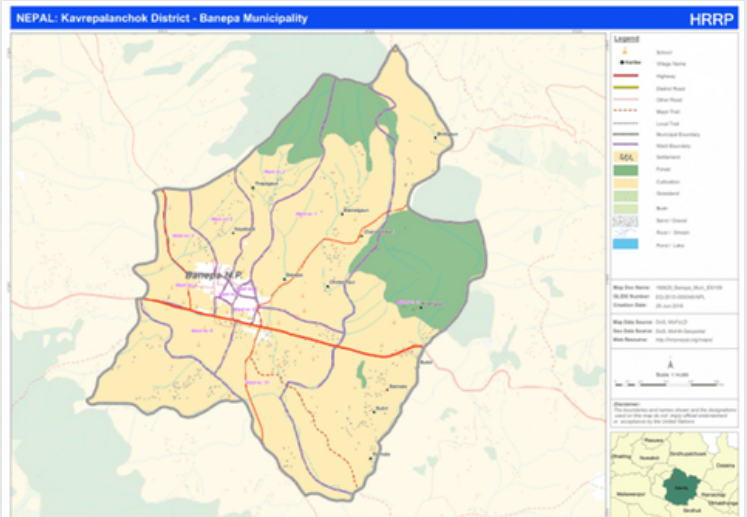
- Identify community resilience priorities and needs that require city-level attention and intervention;
- Determine whether and how community and city-level resilience priorities align; and,
- Identify entry points for building resilience at the community-level that can contribute to overall city-level resilience.

Section B: Section B: City Profile General Background

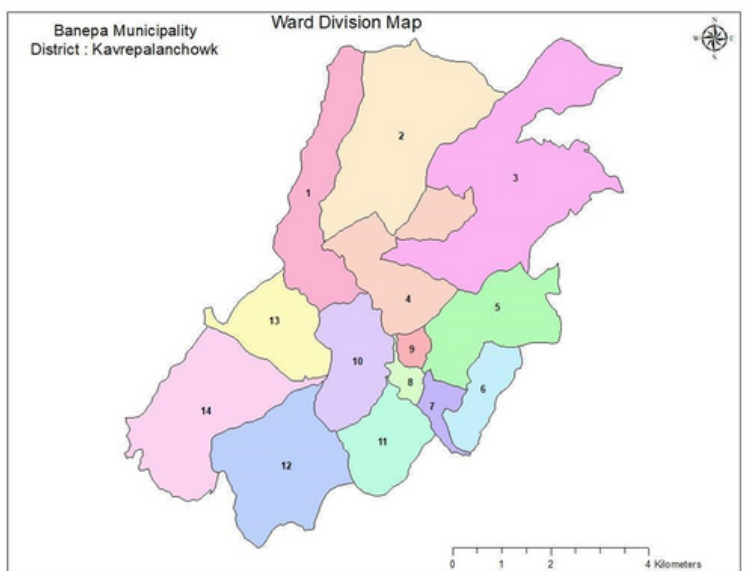
Banepa, is one of the two major cities of Kavrepalanchok district, located around 30 kilometers east of Kathmandu in Bagmati Province. It is situated at an altitude of about 1500 meters from mean sea level, and surrounded by Dhulikhel municipality in the east, Panauti municipality in the south, Mandandepur municipality in the North and Bhaktapur district in the west.

Banepa is well-known as the city of “8 Ganesh and ponds”, where 8 Ganesh temples with 8 adjacent ponds and Phalchaa are situated, and these Ganesh are said to mark the boundaries of Banepa in ancient times, namely, Tukampwo Ganesh, Kobha Ganesh, Waku Ganesh, Talapukhu Ganesh, Jyasanani Ganesh, Kanthu Ganesh, Thachhu Ganesh. The name Banepa derives from two words, “Bane” meaning “Business”, and “Pa”, “Place”. True to its namesake, Banepa remains a major trade route to Tibet, with the Arniko Rajmarg, with the only highway that connects Nepal and China (Tibet), running through this town. In addition, the B.P. Koirala Highway also passes through Banepa. Though Banepa may be a small town, it is a primary economic center within greater Kathmandu.

The population of Kavrepalanchowk is increasing, especially the City of Banepa. Although Banepa is the smallest municipality in the Kavre district in terms of area, it is the most populous in terms of population. The municipality has a total population of 55,628 with 27,305 males and 28,323 females with the increase in population rate being 1.5% annually. The city has a high population density (1,239/km²) of 1239 people residing per square km area and rapid urbanization of the city has resulted in incremental building of residential houses in an already limited area. In particular, areas near the riverbank of ‘Punayamata’, which has experienced an increase in the construction of residential homes in recent decades. This has resulted in the lack of a proper draining system, blockage in absorption, acceleration and runoff in drainage, causing urban floods every monsoon.



Map of Banepa Municipality. Source: Banepa Municipality



Source: Banepa Municipality

Physical Context

According to the 2017 district profile, the spatial extent of Banepa municipality is between 27° 37' 01" to 27° 39' 03" north latitude and 85° 30' 45" to 85° 32' 52" east longitude geographically. It occupies a total area of 54.59 km² and 14 wards. According to the 2011 Census conducted by the Central Bureau of Statistics (CBS), Banepa Municipality hosts a total population of 55,628. Of all the wards, ward number 8 has the largest population 7,001, while ward number 11 has the lowest with 7,001 residents. The Banepa valley has an altitude of 4800 ft above sea level and is covered by Chandeshwari forest in the east, Thagu forest in the North and Kwangu forest in the South. Chandeshwari Khola and Punyamata Khola flows across the city.

Banepa's climate is classified as warm and temperate. In winter, there is much less rainfall in Banepa than in summer. In winter, there is much less rainfall in Banepa than in summer. The month with the highest number of rainy days is July (28.93 days). The month with the lowest number of rainy days is December (3.60 days). The month with the highest relative humidity is July (91.21 %). The month with the lowest relative humidity is April (54.13 %) (Climate Data, 2022).



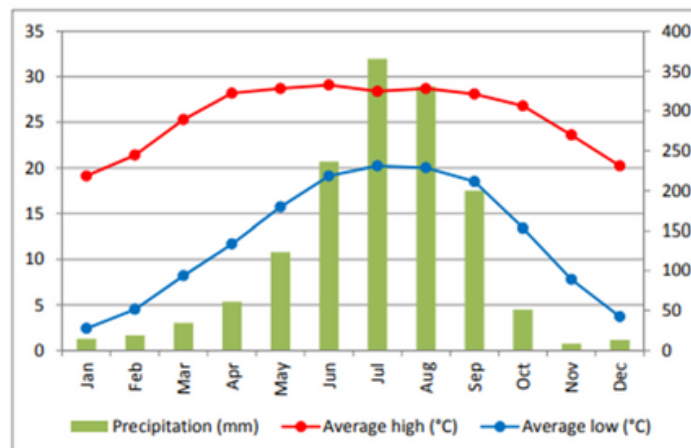
River System of Kathmandu Valley

Source: JICA/JST

Temperature and Rainfall in Kathmandu Valley

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high (°C)	19.1	21.4	25.3	28.2	28.7	29.1	28.4	28.7	28.1	26.8	23.6	20.2	25.5
Average low (°C)	2.4	4.5	8.2	11.7	15.7	19.1	20.2	20	18.5	13.4	7.8	3.7	12.1
Precipitation (mm)	14.4	18.7	34.2	61	123.6	236.3	365.4	330.8	199.8	51.2	8.3	13.2	1454.9

Source: Department of Hydrology and Meteorology



Source: Department of Hydrology and Meteorology

Economic Context

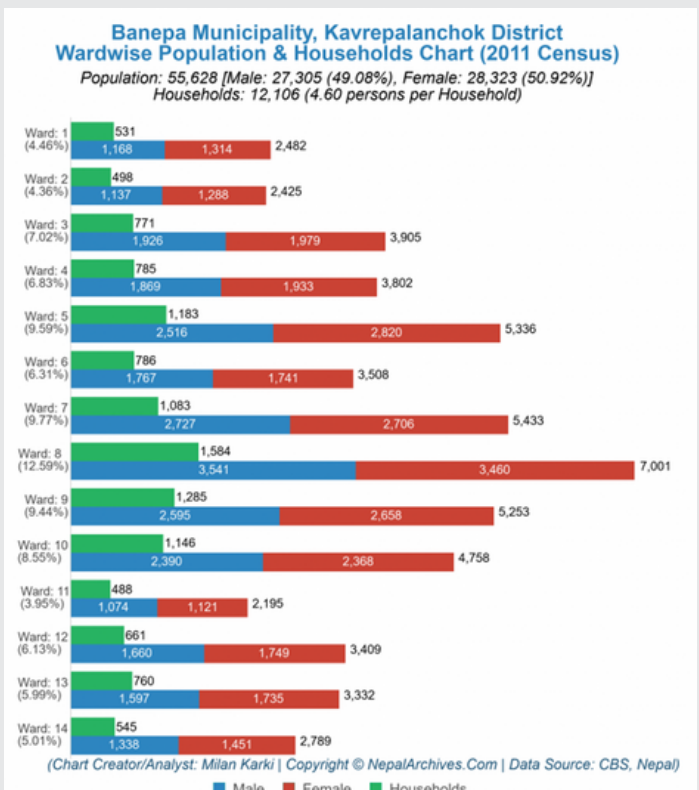
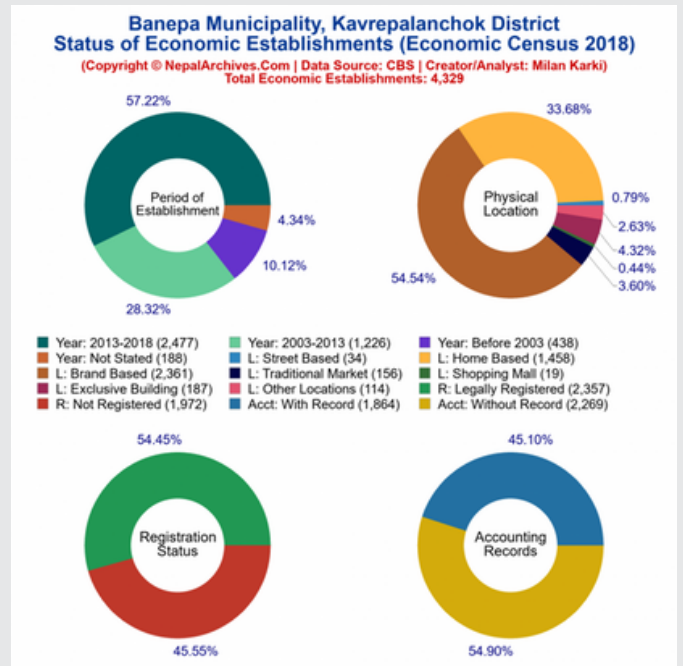
Banepa municipality has served as a center of trade and commerce since ancient times. Today this is also reflected in the culture and demographics of the city. The majority of residents in the municipality are of the Newar people, famous for traditional business and trade, especially in textiles and metal utensils. The city was also a place of high importance during the malla dynasty. Today the city continues to host diverse businesses, industrial production and distribution, agriculture and services.

According to the 2018 Economic Census, there are total 4,329 establishments in Banepa Municipality involved in various economic activities. In those establishments, a total 21,356 persons are engaged in economic activities are either self-employed or an employee, with total male engagement of 12,669 and female engagement of 8,687 persons.

People are also engaged in the city's informal economy as daily wage workers for agricultural farms and construction works, street and pushcart shop, unregistered sweet vendors and in local brewing industry, although the exact percentage could not be determined within the scope of this Assessment.

Demographics

As per 2011 population census, Banepa had a total 55,628 population with 27,305 males and 28,323 females. The male to female ratio is 0.96. With respect to the number of households, Banepa had a total 12,106 households. A population and household diagram of the municipality per wise is as shown in the diagram right. Among the 14 wards, ward 8 has the largest population, largest number of households and second smallest square kilometer area, and therefore highest population density.

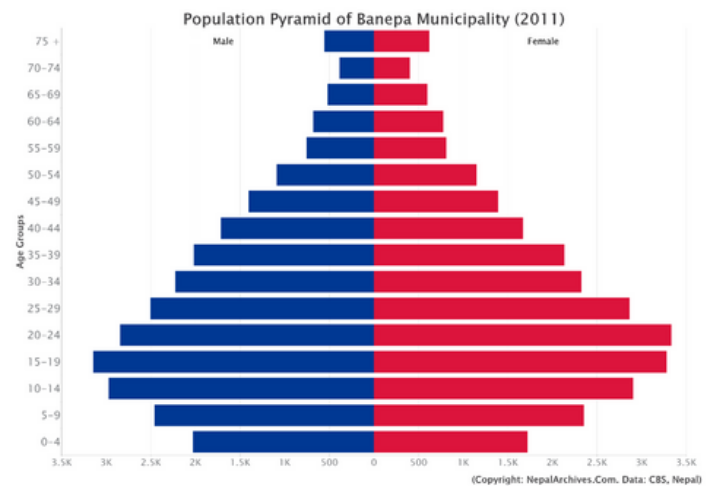


Demographics

Regarding the distribution of age, the largest population segment in the municipality as of 2011 were between 15-19 years-old, a departure from the national average 10-14. The largest population age group differs from the total population in terms of gender, whereas the largest male population falls between 15 and 19 with a total 3,144 people, while the female population falls between 20 and 24 with a total population of 3,332. The least populated age group stood between 70 and 74 years of age, accounting for a total population of 787, which consists of 387 males and 400 females. The median age group of total population falls below 4 and between 40 and 44 with average population of 3,568.

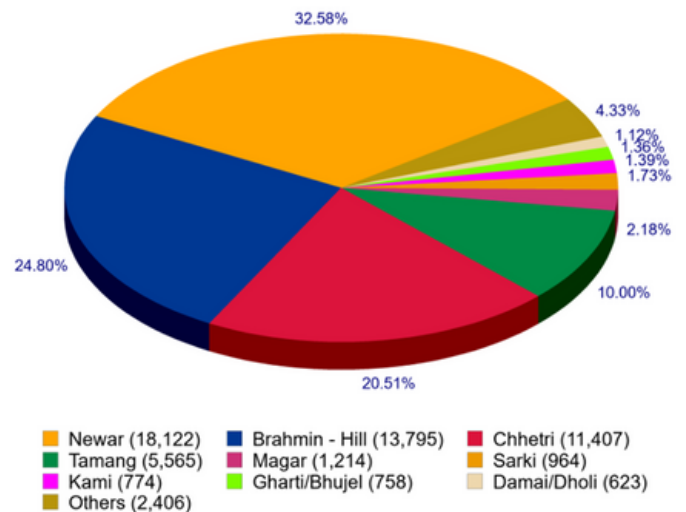
The Newar community comprises the majority of Banepa's inhabitants, with a total population of 18,122 (CBS,2011) The smallest community is the Pahari caste with a population of 11 people in total.

The multi- caste groups of people residing in Banepa are majorly Newar followed by Brahmin, Chhetri, Tamang, Magar. People of several other castes who live in Banepa are Brahmin - Hill, Chhetri, Tamang, Magar, Sarki, Kami, Gharti/Bhujel, Damai/Dholi, Sanyasi/Dashnami, Rai, Gurung, Dalit Others, Terai Others, Muslim, Teli, Tharu, Thakuri, Yadav, Majhi, Limbu, Kalwar, Danuwar, Marwadi, Hajam/Thakur, Sherpa, Sunuwar, Koiri/Kushwaha, Kathbaniyan, Brahmin - Tarai, Dhanuk, Sudhi, Bangali, Chamar/Harijan/Ram, Kayastha, Kurmi, Badi, Thami, Undefined Others, Kanu, Gaine, Dhobi, Pahari.



Source: NepalArchives.Com.Data: CBS, Nepal

Population by Caste in Banepa Municipality



Source: NepalArchives.Com.Data: CBS, Nepal

The major languages spoken in Banepa are Nepali (57%) followed by Newari, Tamang, Maithili.

The municipality lacked the following data and information: recent census, including further population characteristics and socio-economic information.

Disaster Risk



Source: Nepal News

Nepal is one of the 20 most disaster-prone countries worldwide with more than 80% of total population at risk of natural hazards, including floods, landslides and earthquakes. Recently, flooding incidents as a result of Landslide Lake Outburst Flooding, common in Himalayan river basins, are increasing. The country currently ranks 4th globally in climate risk[1], 11th in earthquake occurrence, 20th for multi-disaster hazard risk, and 30th in flood risk. In between 1971-2019, disasters claimed the lives of 39,659 people, injured 79,147, and damaged 1,320,257 households[2].

The cities and towns across the country are frequently affected by multiple hazards, unplanned urbanization and poorly designed buildings further increase disaster risk.

Banepa municipality comprises mid hills, plain land and river shores. It is also a rapidly urbanizing city with dense housing construction and encroachment issues. Due to this, the area is at risk of various disasters including floods, landslides, household fires, and hailstorms. In addition, Banepa is constantly under a seismic risk.

The city is one of Nepal's most ancient cities, and unreinforced masonry construction poses an equal threat to assets and residents during earthquakes. Roughly 150 houses in Banepa were affected by the Nepal Earthquake 2015. Chronic, every day urban risk, such as urbanization, deforestation, road accidents, unmanaged waste disposal and poor construction practices, compound risk. As per the Banepa Municipal report by the Disaster Management Department, in year 2021, 300 households were affected by floods along with related casualties, 500 households were affected by landslides with one reported casualty and two injuries, three incidents of household fire were reported affecting 300 households and 9 incidents of road accidents were reported[3].

[1] https://www.researchgate.net/publication/319686998_CLIMATE_CHANGE_AND_ITS_IMPACTS_IN_NEPAL

[2] <http://drrportal.gov.np/uploads/document/892.pdf>

[3] Banepa Municipality Report, 2021.

Part I: Resilience of What: City Systems in Banepa

Day 1 of the Banepa City-Wide Risk Assessment (CWRA) commenced with an interactive exercise to identify Banepa's core systems. Urban systems, as the Red Cross Youth Circle introduced, can be physical, such as transportation, water, electricity, education, health, as well as non-physical, including governance, financial, disaster management. The mapping of core systems identified by participants were as follows:

Transport

Banepa is well connected by road networks. The Araniko highway (115 km) is the only highway that connects Nepal to Tibet crosses in between the municipality. Almost all the places are well accessed by paved roads. Only a few kilometers of the road remains traditionally brick and stone paved.

As per CBS 2011, 3.86% of households use motorized transport, 16.26% of household uses motorcycle and 5.55% of household uses bicycle as their medium of transport. There are also efficient public transport services in the city and there are provision of bus stops, although more detailed information is lacking.

Seven petrol pumps and effective motor garage and workshops are present in the municipality.

Despite a good level of connectivity, heavy traffic and minimal parking space results in vehicles parked along roadsides, and frequent traffic jams in the city.

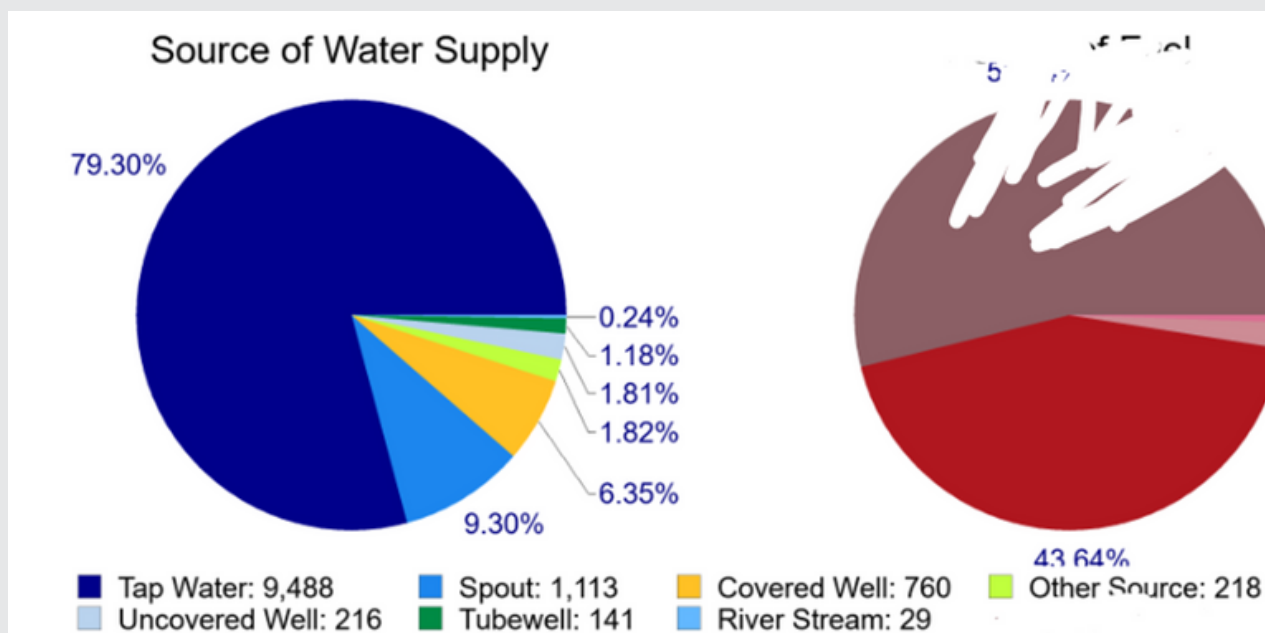
The highway is managed by the Department of Roads, Nepal whereas the municipality manages the other feeder roads. Respective institutions are responsible for the construction, repair and maintenance of the road.

Further information to support future assessments include urban development and transportation planning and management documentation:

- Urban transport planning and development documentation
- Road and traffic control related information
- Public transportation sector related information
- Road development and traffic management information

Part I: Resilience of What: City Systems in Banepa

Water Management

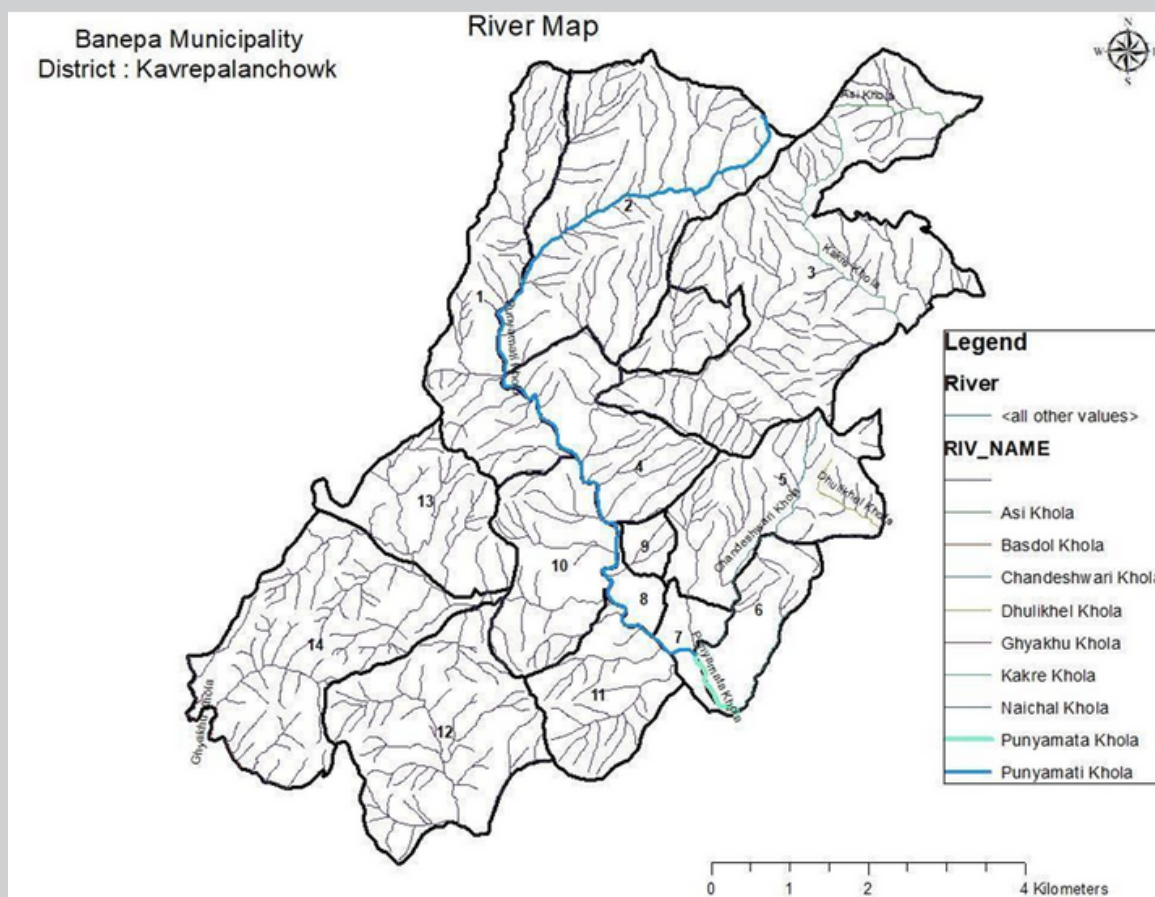


Banepa Municipality is home to total 9,488 houses, which were equipped with piped tap water resources while 141 houses were reported of having tube well water facilities. Same as, 760 houses had covered well while 216 houses didn't have any cover on their tube well. Other resources of water facilities were spout water (1113) and river stream (29), which were reported of the household's source of water.

There are several water supply sub-systems in operation in supplying drinking water to Banepa Municipality. The two major systems are operated by Nepal Water Supply Corporation (NWSC). These systems serve primarily the built-up core areas of the Municipality. Inadequacy of available water quantity and supply hours in the existing systems and poor water quality result in municipal challenges, especially as the population of Banepa continues to grow.

At present about 33% of the total municipal population of Banepa in wards: 1, 2, 3, 4, 5, 6, 7, 8 and 9 are served by the NWSC operated systems. The water supply sub-systems presently operating in Banepa Municipality include Sashipani and Dhaneshwor water supply systems serving primarily in the built-up core areas and operated by NWSC. Chandeswori water supply system is managed by WUSC. Banepa sub project system consists of construction and/or rehabilitation of Sashipani source and water treatment plants (WTP) at Sashipani and Dhaneshwor, new RVTs at Kuikel and Magargoan, transmission lines from Shreekhandapur junction (Chaukot) to Sashipani, Dhaneshwor, Kuikelgoan and Magargoan RVTs, distribution pipelines and inter-connections between new and existing systems.

Part I: Resilience of What: City Systems in Banepa



Source: NepalArchives.Com.Data:CBS, Nepal

Recently due to unmanaged and construction of roads and other infrastructures in the mid hills which is the source of water supply, the quantity and quality of the water being supplied is constantly decreasing. This phenomenon is compounded by climate change and unmanaged urbanization. City-wide risk assessment participants were in agreement of the need for concerted action to be taken in order to combat this issue.

In addition, the Punyamata river flows through the city. The 16 km long Punyamata river is located 30 km east of Kathmandu and covers an altitude gradient of ca. 600 m (average slope: 4%) before the river confluences with the Roshi river at 1,370 m a.s.l.

The 16 km long Punyamata river is located 30 km east of Kathmandu and covers an altitude gradient of ca. 600 m (average slope: 4%) Punyamata River flows through the city. The 16km long Punyamata river which was historically used as a source for drinking water and other household purpose is now severely polluted.

River encroachment on household developments, as well as industrial waste disposal in the river have been a major causes of the Punyamata's river pollution. Similarly, wastewater drains from households and local industry directly feed into the river, without any treatment, which significantly contributes to the pollution, at times, turning the river water black.

Part I: Resilience of What: City Systems in Banepa

Drainage

There is provision of drainage system that encompasses the entire municipality. The drains are located at both ends of the highway. The major issue remains drains connect directly to the Punyamata River without any treatment system. In addition, as the population of the city increases, the drainage capacity will need to be redesigned and reconstructed. Participants agreed the discharge of drainage seems to be greater than the discharge of water of the river especially in dry season, which results in water pollution and a foul smell nearby the river shore.

In addition, the drainage output equal to the water level in dry season. Given that the normal water level and the drainage outflow level are the same height, in the times of extreme rainfall, the water level is rises beyond the drain level, resulting in drainage of water from the pipes being halted. Participants shared this completely blocks the drainage and water floods the highway.



Depiction of Banepa's drainage system on a normal day verse in relation to flood events

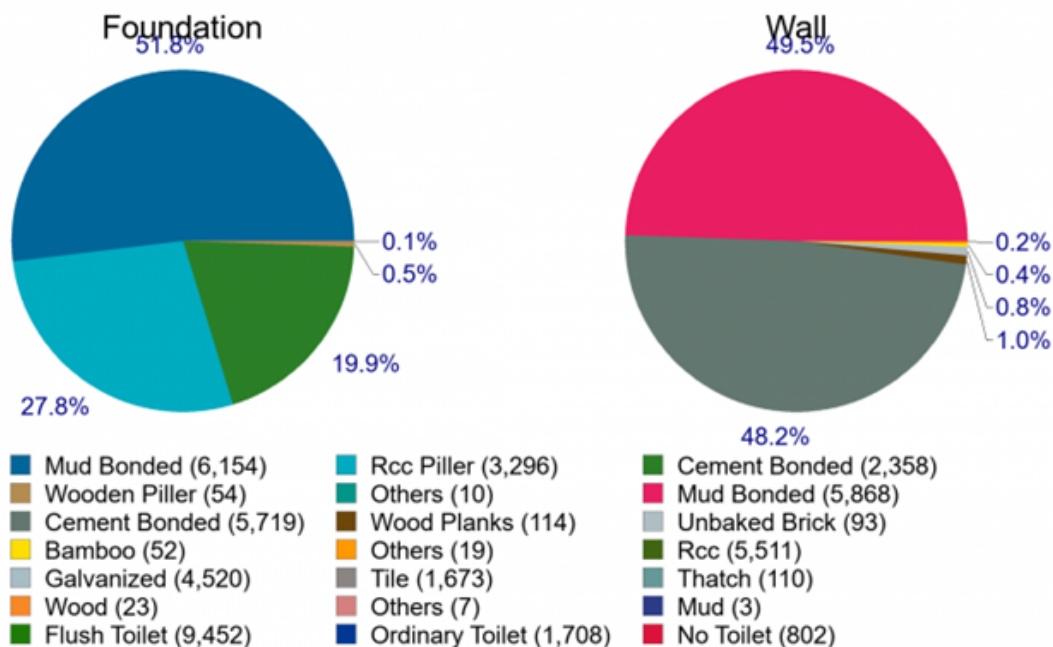
Source: Nepal Red Cross Society and Kathmandu University

Part I: Resilience of What: City Systems in Banepa

Housing

Banepa Municipality, Kavrepalanchok District House Designs Ratios (2011 Census)

Copyright © NepalArchives.Com | Data Source: CBS Nepal



Out of total 12106 households in Banepa Municipality, there were 6,154 houses that were constructed of mud bonding materials as a foundation, while 2,358 houses were cement bonded. 3,296 households were reported of being founded on Reinforced Cement Concrete (RCC) pillars, 54 houses were founded on wood. With respect to walls of the houses, 5,868 houses were mud bonded, 5,719 houses were cement bonded, 114 houses were wood planks bonded, 52 houses were bamboo bonded and 93 houses had unbaked bricks on their outer walls. The remaining houses classify as using 'other' types of outer wall materials, while some have no outer wall bonding at all.

There were several types of house roofs reported. Total 110 houses were reported of having thatch roofs while 4,520 houses had galvanized roofs. Similarly, 1,673 houses had roof of tile, 5,511 houses had RCC roofs, 23 houses had roof of woods while 3 houses were reported having roof of mud. As per 2011 CBS census, some of the houses had other types of roofs while some did not report on the roof structure.

Part I: Resilience of What: City Systems in Banepa

Housing

Given the flood prone nature of the city, participants agreed houses constructed of mud-bonding and or unbaked brick materials were at higher risk.

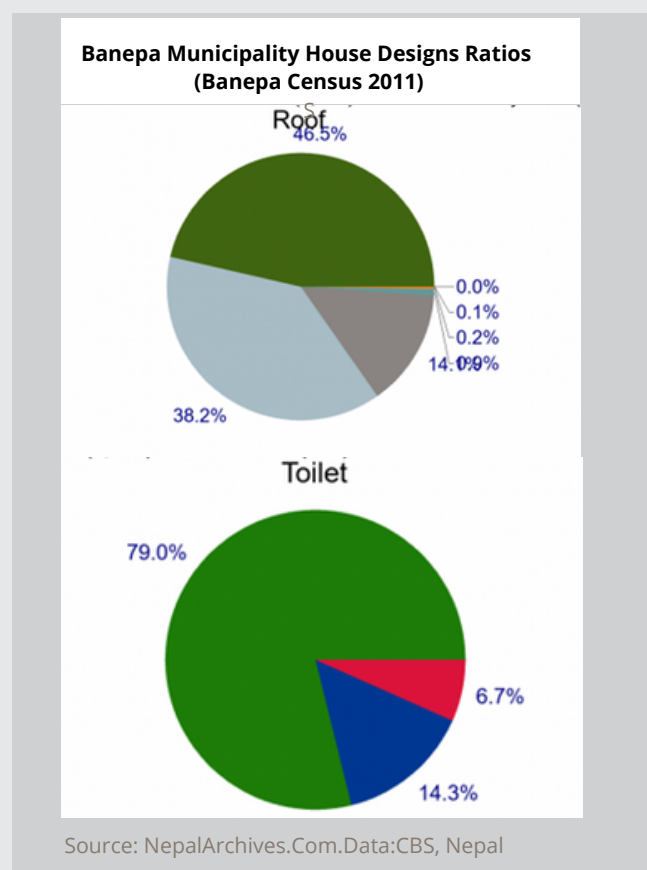
With respect to the toilets, 802 out of 12,106 houses do not have a private toilet situated within their households. The CWRA participants shared this has been an issue for the municipality and has dedicated resources to assist those families in building latrines. Nevertheless, 9,452 houses were reported of having flush toilet while 1,708 houses reported having ordinary toilets.

Communications

The city is well equipped with various infrastructure to support communication, such as electricity, telephone and internet facilities. There is also a radio station in the area. The city still lacks early warning system installed, in emergency events, for example, regarding the flooding of the river, the municipality communicates via radio, television and mobile miking.

Governance

The municipality is divided into 14 wards. The municipality office is located in the centre of the city. All the governmental services are provided through the office. CWRA participants shared the municipality is comprised of diverse sections that oversee Agriculture, Disaster, Tax, Housing Design, Monitoring, and other services. In addition, there is an individual ward office in each of the 14 wards that is responsible for ward-level support, including small grants to support the wards residents.



Banepa's urban population frequently utilize and are a part of all these systems. Many natural hazard events, disrupt the components of the systems and thus affect daily life of the urban residents. Banepa municipality, like other parts of country, is not immune when it comes to natural hazards. There is a history of major disasters causing destruction of infrastructure, services, daily life activities. The Gorkha Earthquake of 2015 with a magnitude of 7.8 Richter scale destructed many traditional load bearing structures with huge casualties. In addition, the region continues to be affected by flooding from the Punyamata river every year. Similarly dry landslides, household fires, and road accidents also pose significant threat to the residents of the municipality.

Part I: Resilience of What: City Systems in Banepa

Governance cont.

CRWA participants shared that currently, the municipality lacks effective plans and policy for disaster preparedness and management. However, the municipality falls under the wider Disaster Plan of the Kavrepalanchowk district. The entire Kavre district has formed a District Disaster Management Committee under the patronship of Chief Districts Officer of Kavre district and the Deputy Chief District Officer, who serves as the coordinator of the Committee.

The Committee developed the District Disaster Preparedness and Response Plan (DPRP)-2019 which encompasses a district overview with hazard, risks and capacity associated in the district as well as district-wide disaster preparedness and recovery plans.

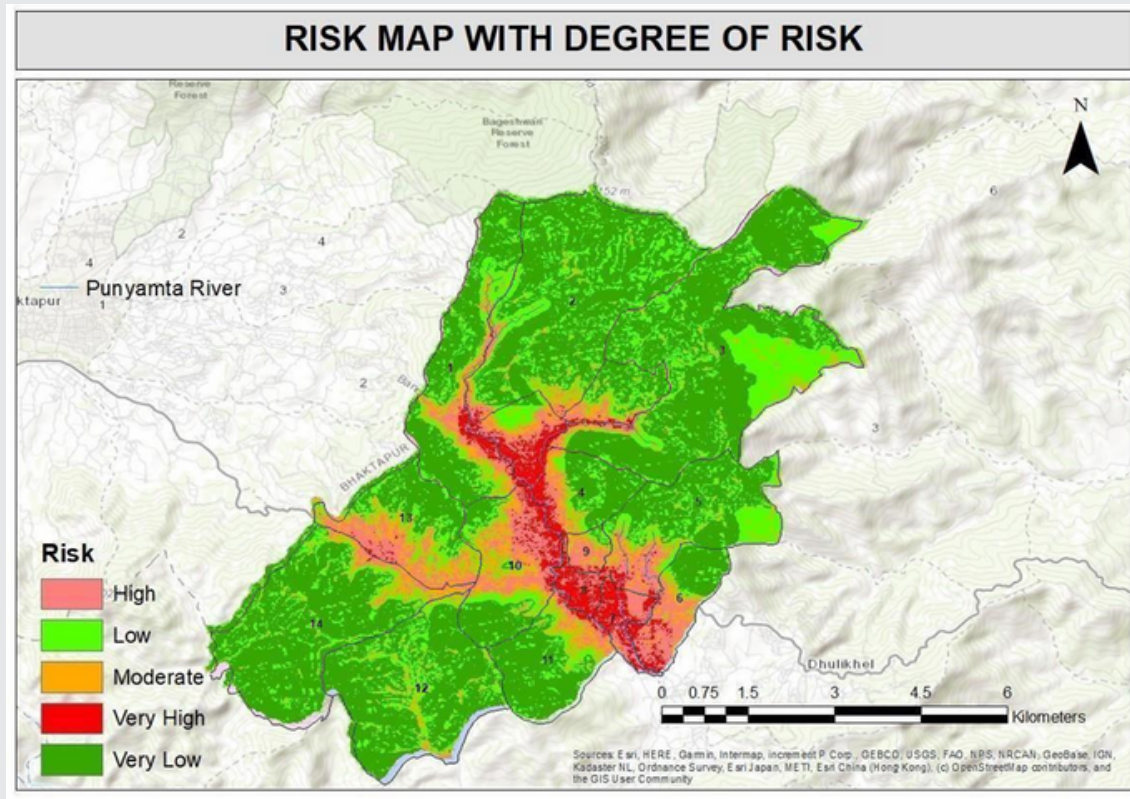
Accounting for the serious effect of monsoons causing floods and landslides, the Committee recently released a Monsoon Preparedness Plan 2020. The CRWA participants noted that although the monsoon preparedness plan consists of short-term measures such as unclogging the drains, desilting and river training works, it still lacks long-termed plans and policies in order to achieve sustained resilience. In addition, the interrelatedness of climate change and floods is also not mentioned in the plans, therefore the need for climate resilient strategies remains an existing gap.

The committee is also working on the development of a Kavre territory Disaster Management Plan. Data and information from each municipality and village development committee within the territory are collected.

The Integrated Community Based DRR project, launched by Nepal Red Cross Society, financially and technically supported the Plan.

Vulnerability in this context, is related to the natural hazards Banepa Municipality is exposed to at any given time. The characteristics are determined by physical, social, economic, environmental and governance factors and/or processes which increase the susceptibility of an individual, a community, assets of systems to the impacts of hazard. Other human-made hazards do interplay and contribute to various aspects of systems within the municipality.

Part II: Resilience to What: Shocks



The CWRA working groups assessed and identified slow and rapid onset shocks and stresses experienced in Banepa. The major shocks identified include:

Floods:

As per the report submitted by the Banepa Municipality to District Disaster Management Committee in 2020-2021, 300 household were affected from flooding with one casualty in the municipality. Flood incidents typically occur in the Pulbazar area due to heavy discharge in Punyamata river.

Landslides:

As per the 2020-2021 report submitted by Banepa Municipality to District Disaster Management Committee, 500 households were affected from landslides with one causality and two injured within the administrative boundaries.

Landslides are typically categorized to be dry, and occur in the low slope hills around the valley where majority of the marginalized groups of people reside.

Road accidents:

The B.P. highway joining Banea- Bardibas and highway connecting Banepa to the Kathmandu valley experience high levels of traffic. As a result, serious road accidents occur especially in the crowded city areas. As per the report submitted by Banepa Municipality to the District Disaster Management Committee for 2020-2021, nine casualties were reported due to road accidents.

Household fires:

As per the 2020-2021 report, 50 households were affected from 3 incidents of household fires in the localities of Nala, Bhaishapati and Chardobato

Part II: Resilience to What: Stresses

The stresses identified by the CWRA participants in Banepa include:

Unmanaged urbanization:

Banepa municipality having a high population density of 1239 people per square kilometers has been facing tremendous issues due to unmanaged urbanization. Increased level of pollution, degradation of the river, issues with solid waste management present significant challenges. In addition, the narrow roads within the feeder network make it difficult for vehicles like the fire brigade and ambulances to respond quickly in times of emergency. Health issues, especially for children and elderly people due to the increased pollution levels were also raised as significant.

Deforestation:

Deforestation in the mid hills surrounding the Banepa valley, participants noted, is a serious issue. This is due to the cases of marginalized and poor immigrants settling the hills, who in search of agricultural land, deforest the entire area. Additional deforestation results as a product of development, such as the construction of roadway. These activities have both reduced the forest cover area, but also depleted the water sprout and tributary, along with decreased biodiversity.

Pollution and degradation of river:

The Punyamata river and its water quality continues to worsen due to improper waste disposal in the river, depletion of the waterspout source, and increased encroachment of river area and high siltation.

This has resulted in the loss of aquatic life, deterioration of the riverside landscape and increase in water-borne disease. Participants noted the stormwater and drainage facility is lacks capacity to serve the growing increase in the population density. These need to be redesigned to work efficiently in current circumstances. The municipality does not have the right to engage in construction works along the highway, it is requesting the authorized organization (Department of Roads) to engage. Participants also noted, the waste collection which has been minimized to 2-3 days per week needs to be increased and source segregation and separate collection of the segregated waste must to be promoted in order to attain a circular economy.

COVID-19:

The Corona virus constitutes as a significant stress worldwide. Throughout and across two years COVID-19 has incurred not only serious health issues in Banepa, but also the social and economic problems. The number of COVID-19 infected persons stands at 16168 including 9026 male and 7142 female from 2020-01-23 to 2022-05-31. Many residents have lost their employment, business and industry shut down and residents already vulnerable, have been pushed into deeper poverty due to it. At the time of the CWRA, exact numbers were not available.

Part II: Resilience to What: Stresses

Degradation of air quality:

PM2.5 concentration in Nepal air is currently 9.2 times above the WHO annual air quality guideline value. High population density and unmanaged urbanization has seriously degraded the air quality within the municipality. This has further been intensified due to the high intensity of traffic moving across the major highway in between the city. According to the IQAir the PM 2.5 plays a major role in air pollution which is in the range from 110-125 AQI which significantly unhealthy, in particular for sensitive groups.

Governance and City Services:

Participants identified the governance and other services of the city to be inefficient. Due to the 2015, constitutional and governance reforms which took Nepal from a unitary to a federal state, like many of the newly formed 753 municipalities, across seven new provinces, Banepa is struggling to keep pace with rapid urbanization and municipal service provision demands. Like many municipalities in Nepal, Banepa lacks effective disaster management plan and concurrent strategies, policies and plans to support disaster preparedness as both the city-wide and community (ward) level. In addition, sectoral plans for key municipal services are lacking, for example, for the Solid Waste Management. The general lack of data and information to inform Banepa's plans poses an ongoing challenge.

Part III: Resilience for Whom: those most vulnerable in Banepa

The CWRA participants assessed how city systems and shocks and stresses impact residents, in particular, those facing the greatest vulnerabilities. As a rapidly urbanizing city, Banepa municipality is experiences a range of shocks and stresses. During the CWRA assessment Resilience of What and To What activities (Annex 1), floods and road accidents were identified as priority shocks to the municipality. Whereas unmanaged urbanization, deforestation and activities contribution water and land pollution have been identified as the major stresses.

Punyamata River Flooding

After the CWRA assessment identified flooding as the primary hazard of focus for the municipality, further in-depth group discussions were conducted on flooding events with municipal authorities and local actors. All of the historic flooding events have originated from the Punyamata River. The 16km long river starts from the mid hills of Nala and then merges with the Roshi at Triveni Dham of Panauti. A decade ago, according to VCA results, residents state the water in the river was clear enough to be used for drinking and household purpose. Few people also claimed to have performed swimming activities in the river. In addition, the river supported a higher abundance of fish and biodiversity, while maintaining its width. Currently, the river is in a much worse condition. Today the river has declined into a narrow stream, polluted by severe household and industrial waste. Improper drainage and a lack of a city-wide wastewater management system compounds this.

Part III: Resilience for Whom: those most vulnerable in Banepa

Cause, effects and impacts of flooding on systems and people

As a result of the CWRA and VCAs participants cited more frequent river flooding in recent years. Human activities, in particular development and concurrent erosion, combined with improper waste disposal and climate change, has resulted in high rates of siltation. As silt accumulates, the waste thrown in the river also acts as barrier for the sediments and the longitudinal course of the river is disturbed. This has shallowed the river basin. In addition, the encroachment of development has directly reduced the width of the river. In times of intense rainfall, run-off water is discharged into the currently narrow, shallow riverbed, combined with riverside development, makes settlement areas along the river highly prone to urban flooding. This is compounded by unplanned urbanization in other areas of the city, whereby is growing lack of infiltration space in Banepa municipality further increases the discharge. Irregular rainfall pattern as a result of climate change has also contributed to the flooding.

Flooding at Punyamata river Banepa



Source: Nepali Times

Waste and sediments blocking river flow



Source: Nepal Red Cross Society

Part III: Resilience for Whom: those most vulnerable in Banepa

Cause, effects and impacts of flooding on systems and people

Flooding incurs the most significant disruptions to urban systems of all hazards assessed. Critical infrastructure including the major highway becomes obstructed in times of flooding. Much of Banepa's infrastructure, such as the highway bridge, has not been designed to withstand current and future climate trends. From the picture below, the bridge is too low to avoid the high discharge of water floods. Similarly, the flood waters overwhelm the feeder networks.

The agricultural lands along the banks of the river are also affected in times of flooding, as crops are destroyed and production is disrupted. Flooding not only impacts the surrounding river area, but also disrupts all drainage facilities, leading to flood and wastewater accumulation in many areas of the city as a result of clogged drains. Participants in the CWRA and VCAs sited traffic jams which can last hours.

From the Resilience for Whom exercise, participants noted that daily life for all city dwellers is disrupted as a result. For example, it becomes challenging to reach desired destinations like offices and schools, especially when public transport halts. In addition, markets are forced to close disrupting the supply of goods and services and impacting livelihoods.



Depiction of low lying highway bridge in core area of the city
Source: Nepal Red Cross Society



Depiction of river flooding damage to agricultural land
Source: Nepal Red Cross Society

Part III: Resilience for Whom: those most vulnerable in Banepa

Cause, effects and impacts of flooding on systems and people

The CWRA participants noted all city residents are under the risk of air and water pollution and at risk due to a lack of clean potable water. Climate change further compounds existing shocks and stresses.

In addition, the CWRA assessment identified that ward 4,7,8,10 were among the wards with high risk in terms of flooding and also concluded that individual Vulnerability and Capacity Assessment (VCA's) should be performed in those wards. This was also verified from the hazard map prepared from the remote sensing application utilizing the various hydro metrological data.

Through the VCA conduction, residents noted they feared in times of emergency it would be impossible for the ambulance and other emergency services to reach to them. Those most at risk are socio-economically disadvantaged and marginalized people in high-risk areas of exposure. Results of Nepal Red Cross Society Vulnerability and Capacity Assessments conducted verified Wards 4, 7, 8, 9, 10 to be highly affected by floods each year.

Although the floods affect all localities, children, elderly people, socio-economically disadvantaged and marginalized groups are the most vulnerable.



Depiction of household waste in the river and and observed river width due to encroachment

Source: Nepal Red Cross Society

To date, the casualties reported from Punyamata flooding are children and elderly people. In addition, agricultural lands in the bank of river are also impacted. Farming is disrupted which impacts farmers' livelihoods.

Part III: Resilience for Whom: those most vulnerable in Banepa

Cause, effects and impacts of flooding on systems and people

In particular, the people residing at the Punyamata river shore, in the hills of Ward-4 and along Ward 8 were identified to be those most at risk. Both wards are closest to the highway. Most of the houses are unreinforced load bearing walls of mud-lime mortar. In addition, residents livelihoods depend on the areas micro-enterprises, including wholesale and retail markets, primarily of clothes, shoes and daily household items, which are impacted by flooding events each year. Cascading effects of floods to supply and transportation systems, impede access during flooding events and place residents under further strain. As the water level increases the outdated sewer and drainage becomes clogged and unable to perform. As a result, the water enters the urban households placing assets and people at risk.

On the whole, residents across all Wards had a low level of awareness in terms of waste management practices, although all sited waste as a primary hazard.

In particular, Ward 4 marks the starting point of Punyemata river, where there is a practice of disposing waste from factories and household sewage directly into the river. Findings were further verified by flood hazard mapping (Figure 9).

The municipality has identified itself and the Nepal Red Cross Society as the organizations responsible for Disaster Management in the area.

In times of disaster especially flooding, both the organizations work together to respond, rescue and rehabilitate. Once a flood occurs, the Nepal Red Cross Society responds and in coordination with the municipality and local levels, by carrying out initial rapid assessment to gather information on the number of people affected, infrastructure impacted and the estimate of loss and the current needs of the community. This supports the local government and NRCS as well as other organisations who work on humanitarian response for relief distribution and planning for response. On the whole the participants agreed substantial preparedness measures coupled with soft and hard infrastructure are needed.



Source: Nepal Red Cross Society

Conclusion and Recommendations



Above: Banepa Municipality City-Wide Risk Assessment Participants, 2021

The two-day City-Wide Risk Assessment provided a participatory overview of Banepa Municipality's resilience of systems to shocks and stresses, as well as identified resulting city-wide and community level vulnerabilities and capacities. Urban flooding from the Punyamata River was concluded to be the major shock placing municipal systems and select communities at high risk. The following recommendations were developed as an initial result of the CWRA, recognizing Banepa Municipality and local actors remain at the start of the resilience journey.

Community & Ward Level

At the ward/community level, given the low level of awareness, the following measures are recommended:

Environmental management awareness, water and sanitation awareness, asset protection knowledge, governance awareness, first aid knowledge, future flood risk and exposure awareness, education and evacuation and safety knowledge should all be strengthened. These should prioritize high-risk areas as well as connect to city-wide awareness programs. Further in-depth urban eVCAs conducted by Nepal Red Cross Society can help to further identify urban community groups most at risk. At the ward level, resilience and disaster risk reduction and management plans were additionally identified as a priority, including ward-level contingency plans.

Conclusion and Recommendations

Municipal level

Banepa Municipality identified the urgent need for municipal plans, including Disaster Risk Reduction and Management, as well as sectoral plans (especially for transport and road management and waste management) being among the top priorities, in addition to a city-wide resilience and climate action plans. Underscoring all is the need to further understand risk. For example, the conduction of a climate risk assessment, can better inform current and future planning. Building on the flood hazard mapping conducted under the scope of the CRWA Small Grants project, a comprehensive flood risk assessment would further inform the Banepa flood resilience planning.

- **Municipal plans for Banepa:** City-wide resilience Plan and Climate Action Plan, Disaster Risk Management and Disaster Risk Reduction Plan, Sectoral Plans (Transport, Waste), along with spatial planning, land use and building regulations (codes and zoning ordinances) can strengthen city-wide flood resilience. Effective policy needs to be set up for the river conservation and the encroachment issue needs to be resolved as per Land act of Nepal 2021 and Nepal Wetland Policy 2059. Forming a coalition dedicated to flood resilience, incorporating cross-sectoral municipal departments, at risk community groups, public and private organizations, NGOs and INGOs is recommended.
- **Risk Assessments:** Climate risk assessment, flood risk assessments, eVCAs and updated Census data for strengthened understanding of vulnerability, including socioeconomic, demographic and other vulnerability data.
- **Flood preparedness and DRR:** Development of a municipal flood action plan, awareness raising and educational campaigns for environmental management, water and sanitation, asset protection, first aid, future flood risk and exposure awareness, evacuation and safety knowledge should be promoted at the city-wide level for residents with a focus on vulnerable groups. The municipality should ensure dedicated funds for flood risk reduction and management, as well as strengthen seasonal preparedness capacities, together with the development of contingency plans. Investments in infrastructure: flood forecasting and Flood Early Warning Systems and communications infrastructure were identified as a high priority, coupled with regular drain clearing, waste separation and disposal, upgrades to city-wide water, waste management, and road and transport systems. This should be climate-smart (also integrating climate adaptation measures such as Nature-based Solutions for land conservation and integrated watershed management in line with sponge city concepts). Conducting simulations will benefit community and city-wide flood response.
- **Emergency response:** water-level control measures (temporary defenses, emergency diversions and temporary floodproofing and emergency repairs should be explored in addition to evacuation and rescue protocols for people and assets, devised by the flood resilience coalition.
- **Recovery:** develop Flood Recovery Action Plan

Resilience developments

As per the findings and recommendations of the CWRA, immediate measure the municipality committed to infrastructural upgrades. The following post project activities were initiated by the municipality pre-monsoon season, including unclogging of drains inside of highway roads and feeder roads and excavation of deposited silts and sediments which has increased the width and depth of river flow preventing the spilling in the river.



Clockwise: Punyamata river silt excavation, Unclogging of drains in Araniko Highway, Unclogging of drain in feeder road, Mayor along with team monitoring the activities

Post-project impact

As a result, following monsoon season only one flood incident accounting for 15-20 minutes of overflow occurred, this has been acknowledged by the municipality as a result of enhanced resilience. The municipality expects 800-1000 households within the area were able to continue to perform business and go about daily activities during monsoon season.

In addition, 600 plants were planted within the highway area to advance measures toward attaining a sponge city concept. Further preparations for modified bridge construction and upgrades are ongoing. The municipality of Banepa remains open to further projects and support to assist in flood resilience



"The IFRC Asia Pacific Urban Flood Resilience project has been very much instrumental in understanding the underlying risks, vulnerabilities and capacities of Banepa Municipality. The assessment and activities performed have been helpful in awaring people on how the ill practices are resulting in disasters and intensifying its effects. Personally, I came to know about the interdependence of solid waste to flooding and how the urban systems are affected by floods. The municipality is much thankful to the fundraisers, Red Cross and youth volunteers for their efforts and as well promises to implement the recommendations achieved like sediment control and unclogging the drain as soon as possible. We are aware of the lack of relevant data on disaster and risk and we will now be working for it. We also expect further collaboration and support in these movements. Thank you."

Shanti Ratna Shakya, the Mayor of Banepa Municipality

"Being a citizen of Banepa municipality it was difficult and challenging to solve the problems of a flash flood. Not only the flooding was the major aspect but the solid waste management was another challenge in the municipality. We, the people of banepa were very much positive about the project which will solve the significant problems of floods. During our childhood days, we have seen our school was closed during the rainy and floods. We had suffered a lot and now we are happy that the suggestion and recommendation will surely help to plan the policy and implement it to solve the arising problems. We are thankful to the grants provider, Urban Hub, Nepal Red Cross Society, and Special Thanks to Kathmandu University Youth Red Cross Circle for identifying the problems and ensuring this project will have a tremendous impact in the near days."

Mr. Nripesh Chand Bade, Banepa resident

Annex I: CWRA Methodology

Resilience of What: Systems

The data and information obtained from the City-wide Risk Assessment conducted with the participants applied the below participatory methodologies:



Above: group work mapping core systems



Above: participants map systems

System Mapping

Participants were divided into groups and were asked to identify and plot various systems present in Banepa City. Almost all started by plotting the road networks and likewise the river, government institutions, health institutions, bus stops, agricultural and forest areas, schools, water sources and petrol pumps.

Interaction between core urban systems

The aim of this activity is to identify the interaction between core urban system based on past shock/stress events for the core system associated with that event and how it behaved during and in recovery from the event. The mapping was done on the Five Capitals plus Governance framework:

Resilience of Water supply System			
Five Capitals	Core System	Suggestions for resilience	Governance
Human	Engineers, technician, policymakers, residents dependent to the water system	Quality education, Awareness Environment Impact assessment Initial environment investigation	
Social	Kavre Valley integrated Water supply system, Nepal Water supply cooperation Civil society Tole bikash sanstha (Community development organization)	Cooperation and proper coordination Law and regulation	Municipality, Community Development Organization

Interaction between core urban systems

The aim of this activity is to identify the interaction between core urban system based on past shock/stress events for the core system associated with that event and how it behaved during and in recovery from the event. The mapping was done on the Five Capitals plus Governance framework:

Resilience of Water supply System			
Five Capitals	Core System	Suggestions for resilience	Governance
Physical	Water pumps, water pipes, taps, water tanks , Generators, testing chemical	Quality Assurance Proper material testing Design with optimum factor of safety	Engineering Department at Municipality, Water supply organization
Natural	Natural water source, rivers, streams, precipitation,	Environment conservation Law and regulation	Environmental Concern Society
Financial	Banking, water Bills, Installation Charge		Finance Department, Microfinance Organizations, Banks

Observations

The group noted the following regarding the risks associated with the municipality:

- Change in water cycle pattern is a case of climate change impacting water security, in particular access to safe drinking water.
- Effective policy for the river conservation and the encroachment issue needs to be resolved as per Land act of Nepal 2021 and Nepal Wetland Policy 2059.
- The initial source for the supply of drinking water was a natural spout, declining due to urbanization and development
- The major Kavre Valley Integrated Water Supply System project is not being completed due to various socio- political issues
- There is lack of a climate smart water system, currently the system is supplied through the source itself using traditional practices and unsystematic pipeline
- The water table of the area is constantly decreasing and changed greatly as an aftermath of the Gorkha earthquake (7.8 Richter scale).
- The plan to set up Kavre Valley water supply system was initiated but the pipe expansion of the water supply system is halted due to obstruction from the dwellers in the Kavre Valley water supply system area
- There is scheduled water supply in urban area which is two hours per day, which does not fulfill the daily household needs, placing a strain on quality of life
- There is no practice of regular maintenance, water quality testing of the existing water supply system.
- High area of concrete and increase in urban infrastructures are creating a problem for ground water recharge
- The pollution of river has been intensified due to the direct disposal of household and industrial waste to the river
- The drainage directly connected to river is without treatment, and further decreases the water quality.
- There is a lack of awareness of people for the optimum and conservative use of water.

Interaction between core urban systems cont.

Resilience of Transportation system		
Five Capitals	Core System	Governance of System
Human	Drivers, Bus staff, Vehicle owners, personal riders, Public transport users	Personal safety programs
Social	Transport service company, transport service committee, drivers association, government agencies Traffic police	Law/ regulation Safe drive training
Physical	Vehicles (Bus, Cars, motorcycle, bicycle, etc.) Petrol pumps Roads Motor garage Bus stops	Regular maintenance Effective policies/acts
Natural	Paved roads decreases availability of arable land	
Financial	Banking institution, Finance, Insurance,	

Observations

The group noted the following regarding the risks associated with the municipality:

- Although highway is wide, given the overpopulation and only one of two highways joining the parts of the, the traffic in the capital is high and thus frequent traffic jams occur
- No dedicated space for parking compels riders to park vehicles in either side of the road especially in the feeder roads
- The feeder roads are also crowded due to less width and vehicles being parked on the either side of the road
- Frequent accidents occur due to hectic traffic and over speeding issues also partially due to road designs and a lack of planning
- The bridge over Punyamata river in the highway is not wide enough to manage traffic loads
- Recently the price of vehicle fuel is increasing that has resulted in the public bus fares to increase rapidly
- In residential areas of the city, small width of roads impedes garbage collection, emergency management services

Part II: Resilience To What: Shocks and Stresses

By identifying the shocks and stress that affect the city and classifying them in the different levels of intensity and frequency, attention can be brought to those shocks and stress that have high impact on the communities in urban areas and the system that they rely on. From the exercise with participants, the following results were obtained:

Categories of Shocks and Hazards	
<p>High frequency, Low impact Political instability Corruption</p>	<p>High Frequency, High Impact Flood Landslide Household Fire Water Pollution Encroachment Air Pollution Deforestation</p>
<p>Low frequency Low impact Cyclone</p>	<p>Low Frequency High Impact Earthquake Political Revolt</p>

Thus, flooding and pollution issues were determined to be the shocks and stresses with high frequency and high impact respectively and immediate actions were advised to be taken against those hazards for resilience.

Part III: Resilience For Whom

Participants explored how shocks affect core urban systems and how they in turn affect the people/communities that depend on these core urban systems in Banepa.

Scoring system High impact=3, medium impact=2, low impact=1, No impact=0					
	Flooding	Landslide	Pollution	Deforestation	Earthquake
Transportation	3	1	2	1	2
Water supply	2	3	3	3	1
Shelter	2	0	0	0	3
Drainage	3	0	2	0	0

Part II: Resilience To What: Shocks and Stresses

Shock/Stress	What systems are most disrupted by this shock/stress?	Who is most affected when this system is disrupted?	Who is already working on this/who has power to influence this system?
Flooding	Transport, Shelter, Water supply, Drainage	Children, elderly people, Office workers, Farmers	Municipality, Red Cross, DRR organizations, ICIMOD, Practical Action
Landslide	Shelter, Water supply	Local Residents	Municipality, Red Cross, University
Pollution	Water system, Drainage	All the settlers and dwellers	UN, Red cross, Municipality
Deforestation	Water system	People connected to water supply system	Municipality, Red Cross, Wash institution
Earthquake	Shelter, Transport	All residents	Municipality, Engineering association, NSET, Red Cross, UNOPS

References

1. Government of Nepal. (2074). District Profile. Government of Nepal.
2. Municipality of Banepa. (2021). Municipality of Banepa. Banepa.
3. Nepal Archives. (2022). Banepa Municipality. Retrieved from <https://www.nepalarchives.com/content/banepa-municipality-kavrepalanchok-profile/>
4. Nepali Times. (2021, July 31). Kathmandu's 'flash floods' are 4 decades in the making. Retrieved from <https://www.nepalitimes.com/banner/kathmandus-flash-floods-are-4-decades-in-the-making/>
5. Thapa, . L., Panta, S., Panta, S., Kumar Raut, S., Maona, F., Tuladhar, . . . Joshi, A. (2021). Multihazard Mapping of Banepa and Panauti Municipalities. Kathmandu.
6. UN Statistics. (2011). Nepal Population Census.

Learning from Nepal Red Cross Society's Approach to Urban Flood Resilience

Nepal Red Cross Society (NRCS) has a history of working in close collaboration with the Municipality of Banepa to respond to annual floods. In recent years, due to climate change and urbanization, flooding events have increased in frequency and intensity. To support the the City of Banepa to identify city-wide risk, and devise an Urban Flood Resilience Plan, NRCS proposed to conduct a city-wide risk assessment. This was combined with GIS hazard assessments and select Vulnerability and Capacity Assessments in high-risk communities. At the onset of the project, to ensure strong stakeholder buy-in, NRCS engaged a range of stakeholders in initial project discussions. These included ensuring commitments on behalf of Banepa Municipality (Disaster Management Focal), as well as Kathmandu University. The stakeholders in the initial discussion included, Kathmandu University Youth Red Cross Circle, NRCS Kavre District chapter, Banepa Municipality DRR focal, Asia Pacific Urban Hub. In order to conduct the first NRCS City-wide Risk assessment, a Training of Trainers was conducted by the IFRC Asia Pacific Regional Office and American Red Cross. The virtual Training of Trainers was held from 15th to 17th of November, 2021. A total of 26 participants representing the Nepal Red Cross National Headquarters, Kathmandu University Youth Red Cross Circle, Banepa Municipality and Local residents completed the training. Participants attended virtually to learn the CWRA methodology, as well as to practice the training modules in person after each daily virtual module.

The trained facilitators were then assisted in stakeholder mapping to identify and invite diverse city stakeholders together with Banepa Municipality for the City-Wide Risk Assessment. The actual City-Wide Risk Assessment comprised two-days, welcoming diverse participants from the Municipality of Banepa, flood-prone Wards, Research and Academia, and humanitarian actors:

City-Wide Risk Assessment Participants

- Registrar, Kathmandu University ; River and Water quality researcher
- Mayor, Banepa Municipality
- Deputy Mayor Banepa Municipality
- Executive Head, Banepa Municipality
- Disaster Focal Person
- Chief, Banepa Unit, Nepal Police
- Ward Chief, Banepa-7
- Ward Chief, Banepa-10
- Ward Chief, Banepa-8
- Ward Chief, Banepa-9
- Hydro researcher, advisor KUYRCC
- Chairperson, NRCS Kavre Chapter
- Executive head, NRCS Kavre Chapter
- Program Officer, NHQ, NRCS
- PMER Officer, NHQ, NRCS

The city-wide risk assessment methodology enabled participants to understand city systems and their relationship to urban resilience. In addition, the participatory methodology enabled stakeholders from diverse sectors to participate in inclusive city risk assessment and planning. Stakeholders expressed their commitments towards working on reducing floods. As expressed by the Municipal Disaster Risk Reduction Focal Mr. Dhurbaraj Nepal focal expressed, "This process has been very fruitful as we face floods every year but we had never conducted an assessment of the flood, now we can use the assessment findings to support further flood reduction work."

Within the City-wide Risk Assessment (CWRA) participants identified the five most vulnerable wards facing frequent flooding from the Punyamata river. This was followed by stakeholder analysis of government bodies, community-based organizations, university professors who research on floods and their impacts on the local community. Discussions were carried out with key stakeholders to add further depth to the assessment.

In order to promote youth engagement in Disaster Risk Reduction and to ensure long-term sustainability, Nepal Red Cross worked closely with the Kathmandu University Youth Red Cross Circle as lead facilitators of the city-wide risk assessment. Youth were additionally trained in conducting Vulnerability and Capacity Assessment (VCA) tools and they used these two tools to conduct the assessment, produce report findings, to be shared at the ward and municipality level.

Lessons Learned

Engage Youth as key agents of change in Disaster Risk Reduction

Youth are important agents in risk assessments and the dissemination and advocacy of disaster risk reduction at community level. The youth were capacitated in Disaster Risk Reduction (DRR) through the project, although a short-term grant, this achieved significant outputs at the municipality level and at the level of the youth circle. As Nepal has a large youth population, youth voices are important in spreading awareness in relation to DRR, therefore National Societies should promote more of such engagements for successful implementation of the project and for long-term sustainability.



Youth participate in VCA orientation

“Engaging youths as a medium for disaster management and advocacy for resilience is a very exemplary action by the National Society. Personally the project taught me various skills that weren't a part of the academic curriculum yet a very required skill for professional life. Being trained for Vulnerability and capacity assessment and City Wide Risk Assessment was very fruitful. Also the project gave me ideas on implementing projects across communities and has motivated me to launch other similar activities in the community.”

Anubhav Ghimire, former president of the KUYRCC

Health and safety first

Covid-19 posed a challenge to project implementation, demanding social distancing and safety measures were devised and applied throughout the Small Grants implementation.

This necessitated translating the CWRA to a virtual format using participatory mechanisms for engagement including Zoom, Miro and Mentimeter. Presentations and homework were additionally shared and stored on virtual sharing platforms., including the virtual. The in person CWRA workshop and ward-level VCA conduction observed Red Cross and volunteer safety protocols.

Lessons Learned

Community must be at the center

Throughout the implementation of the Small Grants, the Youth Circle team and Municipality ensured community-level participation comprise an essential element of the city-wide risk assessment and urban flood resilience journey. Specifically through participatory engagement in the VCA and the inclusion of ward leaders in the CWRA ensured the voices of those most vulnerable to urban floods were embedded in the sub-national decision-making urban flood resilience coalition.

Allot ample time for the City-wide Risk Assessment, VCA conduction and reporting

The Small Grants project had an implementation timeframe of a few months. Although the in person CWRA took 2 days, and each urban VCA 5 days to complete, there must be significant time allocated for the completion of the reports. Municipalities like Banepa, in need of urban resilience support and capacity strengthening often lack robust data and information at the city or ward level. Especially when it comes to urban assessments, further data and information is often required. In addition, given that urban settings have less social cohesion than rural areas, its important to take time to assess connectedness and inclusion at the community level. The application of urban VCA tools, like the 24-hour clock to identify vulnerable community groups to plan key informant discussions, demand time. In order to ensure a complete report, further key informant interviews and city as well as ward level assessments would be required for deeper analysis.



Youth participate in tree planting as a result of CWRA

"The National Society has been eager to work on the small grants project on urban resilience. The Nepal Red Cross was successful in obtaining the grant in collaboration with the KUJYRC in 2022 and was excited to implement the project to motivate youths in the sector of Disaster Risk Reduction and mobilize youth as change agents in the society. The contribution of the youth has been significant and remarkable even during times when the impact of COVID-19 was high and field mobilisation was hampered, they implemented the activities successfully and had a positive impact on the community members as well. The project provided an entry point to building resilience from urban flooding and waste management issues by detail assessment of the municipalities and five wards."

Mr. Rudhra Adhikari Deputy Director of the Nepal Red Cross Society Disaster Management Department



Special thanks to Nepal Red Cross Society staff and Nepal Red Cross Youth Circle volunteers who led the overall project implementation, in collaboration with Kathmandu University.

In particular, thanks to the following contributors: Rudra Adhikari, Nepal Red Cross Society, Pragma Guatam, Nepal Red Cross Society, Anubhav Ghimire, Nepal Red Cross Society Youth Circle, who led the City-Wide Risk Assessments and reporting.

The City-Wide Risk Assessment was made possible thanks to the following participants: Prof. Subodh Sharma, Laxmi Narsingh Bade, Rekha Sapkota Dahal, Kabiraj Uprety, Dhruva Raj Nepal, Rajan Koirala, Barna Shakya, Chandra Bahadur Adikari, Haran Bahadur Manandhar, Sher Bahadur, Prof. Hari Neupane, Narayan Dhungana, Tri Rata Rajbahak, Harka Bahadur Bhandari, Pragma Gautam

Hazard mapping was provided by: Laxmi Thapa, Shrijana Panta Sanjeev Kumar Raut, Florencia MaTha Tuladhar, Janak Raj Joshi, Nawaraj Shrestha, Prashant Ghimire, Anish Joshi

Technical support for the project was provided by: Colin Fernandes, American Red Cross, Lucy Price and Catalina Torres, IFRC Asia Pacific Regional Office

Financial support: Zurich Flood Resilience Alliance