



Ministry of Natural Resources and Environmental Conservation



Myanmar Climate Change Alliance

Building resilient, inclusive, and sustainable cities and towns in Myanmar

Policy Guidance Brief 4

October 2017



The Myanmar Climate Change Strategy & Action Plan (MCCSAP) is a 15-year road map of Myanmar's strategic response to climate-related risks. MCCSAP aims to increase the adaptive capacity of the country and maximise opportunities for low-carbon and climate-resilient development. To achieve this, the Strategy is intended to guide investments in six key development sectors including: (i) agriculture, fisheries and livestock; (ii) environment and natural resources; (iii) energy, transport and industry; (iv) urban development; (v) health and disaster risk reduction; and (vi) education, public awareness and technology.

This Guidance Brief is one of a series produced by the Myanmar Climate Change Alliance (MCCA) to help develop understanding on key sectoral challenges, strategic objectives and specific actions to effectively address climate change in Myanmar. The series aim at providing high-level policy guidance designed for use by the Members of the six sectoral Working Groups on MCCSAP. In addition, the briefs seek to raise awareness of various stakeholders on the national priorities of action in the field of climate change.

Key Points

- By 2030, the number of people living in towns and cities in Myanmar could reach 20.4 million compared to 14.9 million in 2014. This continuous urban population growth will influence Myanmar's development under the challenges of climate change in future.
- Expanding cities and towns will emit more greenhouse gases in future due to construction growth and increasing demand for energy and services.
- Climate change is expected to have significant negative impacts on urban centres in Myanmar, including impact on urban infrastructure and services, increased rural-urban migration, enormous socio-economic costs, and health implications. Unless addressed, these impacts will impede the country's development.
- Cities and towns in Myanmar are exposed to recurring rapid-onset natural hazards, such as cyclones and floods. Urban areas will increasingly lose assets and lives to climatic hazards.
- Myanmar should follow two main streams of action. First, it can reduce climate vulnerability by fostering climate informed-urban planning and promoting disaster resilience. Second, it can engage in reducing new emissions through compact urban development and low-carbon construction technologies.
- According to the Climate Change Action Plan for the Urban Sector, all township and city dwellers, including the most vulnerable, should live in sustainable, inclusive, low-carbon and climate-resilient cities and towns by 2030.
- The expected results to achieve this outcome are: (i) town and city residents have access to resilient infrastructure and services; (ii) climate change resilience, low-carbon development and socially inclusive approaches are defining elements of urban planning and development, providing mitigation and adaptation co-benefits; (iii) new buildings are designed and constructed to be energy and resource efficient and resilient to natural hazards.



Non-adapted houses for disabled people in Pakokku town (Credit: Sukun/MCCA, 2016).

Why is the urban sector of strategic importance for the sustainable development of Myanmar?

The population living in cities and towns is growing rapidly.

About 14.9 million people (29.6 per cent of the population) live in urban areas in Myanmar (Census 2014). Yangon and Mandalay are the largest cities and prime economic centres of the country where 20 per cent of the urban population is concentrated. While the rural population is still dominating, the number of people living in urban areas is expected to increase, reaching 34.7 per cent by 2030, and 50 per cent by 2040 (MoNREC, 2017). This tendency is driven by population growth and increasing rural-urban migration. The latter is triggered by recent economic development and industrialisation of urban centres, negative impacts of climate change on agriculture, and poverty and unemployment in rural areas.

The urbanization trends will influence Myanmar's development under the challenges of climate change in the decades ahead.

As the country's economic potential unlocks, urban centres will face an increasing demand for energy, urban infrastructure and services, and construction boom.

The growing urban population and economic development will amplify the energy use by households and businesses. Yangon is already consuming 50 per cent of the total national electricity supply (MoNREC, 2017). Considering the low energy efficiency standards in the country, urban development processes will likely accelerate the increase in greenhouse gas emissions from commercial and residential buildings, and public and industrial facilities. The levels of methane released from the urban waste

sector are also expected to rise sharply (MoNREC, 2012a).

Large urban centres, such as Yangon and Mandalay, may become major emitters of greenhouse gases in future.

The transport sector, which is largely reliant on petroleum products, constituted 28 per cent of the national greenhouse gas emissions in 2000 (MoNREC, 2012a). Today, the energy use for transportation is increasing more rapidly compared to the energy consumption in any other sector (MoNREC, 2012a). Therefore, growing demand for transportation services and motor vehicles, particularly in urban areas, could lead to a dramatic rise in greenhouse gas emissions from the use of fossil fuels in the near future.

The construction sector has been expanding steadily since 2001. Urban developments such as large infrastructure, housing and commercial buildings have influenced the landscape in and around cities. Without proper strategic planning, urban growth may drive unsustainable land-use change and deforestation, and have negative impacts on the country's commitment to maintain forest coverage to reduce global emissions (MoNREC, 2017).

Despite these challenges, cities and towns of Myanmar have limited capacities for a long-term strategic planning.

Local level actions and decisions for sustaining urban infrastructure, services and land use are urgently needed. However, except for its three main cities (Yangon, Mandalay, Nay Pyi Taw), Myanmar's townships do not have either the capacity or the mandate for setting long-term development goals.



What are the impacts of climate change on urban areas?

Myanmar's climate is becoming warmer, with increasing frequency and intensity of heat waves and storms, and shifting seasonal weather patterns. The average temperature in Myanmar is projected to rise by 0.7-1.1°C during the period 2011-2040 and by 1.3-2.7°C from 2041 to 2070 in comparison with the values for the 1980-2005 base period.

In a warmer climate, the risk of slow- and rapid-onset disasters such as droughts, coastal inundation, floods and tropical storms will increase, and could impede Myanmar's urban development.

Urban centres located in coastal areas and the Delta Zone are already experiencing disasters such as cyclones, flooding, sea level rise and water shortages.

Inland towns and cities are exposed to deadly hazards like river and flash floods, droughts and heat waves. Human activities such as deforestation, and unsustainable land and water use management practices, amplify the risk of disasters.

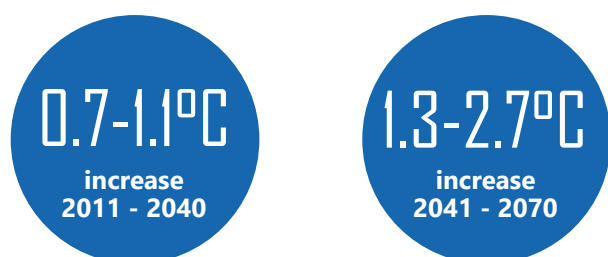
Vulnerability of urban areas in Myanmar is rooted in country-wide inadequate urban planning and construction techniques, poor infrastructure (e.g. lack of drainage, water and sanitation systems), undeveloped basic services sector, and limited local level capacities.

Without adaptation, natural hazards triggered by climate change will have a devastating effect on urban infrastructure and services.

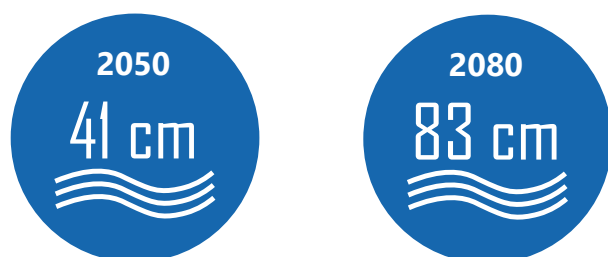
As the population grows, major challenges to towns and cities in the future will be securing water and electricity in conditions of increasing demand, while water will be less available due to climate change. At the same time, rapid-onset disasters will impact infrastructure and services.

FUTURE CLIMATE IN MYANMAR AND IMPACTS ON TOWNS AND CITIES

Increasing average temperatures and heat extremes



Sea level rise



Note: The provided values for increase in temperatures and sea level refer to projections with base period 1980-2005 and 2000-2004, respectively.

Erratic rainfall - periods of heavy and intense rains followed by long-lasting dry spells – leading to frequent river and flash flood events, and droughts.

Loss of life and livelihood due to natural disasters that are growing more frequent and intense with the global warming.

Cities may become even warmer because of the urban heat island effect.

Hydropower energy and water insecurity in urban areas.

Increasing risk of coastal hazards – coastal flooding, storm surges, strong winds and cyclones. Some coastal cities may be flooded due to sea level rise and force migration.

Summarized from: Horton R. et al., 2016; MNREC, 2012; MNREC, 2017.



“After Nargis life was not easy so I came to Yangon to find a job [...] I left high school when I came to Yangon. I really wanted to finish high school but I couldn’t.”

“After Nargis there was no work in my village. Some farmed but it was so hard. I came to Yangon to work, and I work here now. I send my wages home for my parents to live on. They don’t farm anymore.”

Credit: MCCA (2017). “The Rising Tide” film, Yangon Film School

Urban systems in Myanmar are highly sensitive to extreme weather phenomena. Many towns and cities will likely experience higher structural losses and damages than ever before. Prolonged dry conditions and heat waves may cause disruption of water and energy supply networks. Low-lying coastal towns like Bogalay may have to redesign their infrastructure entirely, or even partly relocate, because of sea level rise (MoNREC, 2017).

Climate change and recent disasters are new drivers of migration to cities.

Long-term climatic changes leading to a decline in agricultural productivity, reduced freshwater availability, permanent coastal inundation, and frequent disasters such as cyclones, floods and droughts, will force more people to migrate from rural to urban areas. For example, changes in climate observed over the last 20 years in the Central Dry Zone affected crop productivity and conditioned

migration to urban areas in Myanmar or to other countries (GoM, 2015). Furthermore, Myanmar is likely to see significant population movements from low-lying coastal areas to large cities induced by sea level rise.

Rapid-onset climate hazards are becoming more frequent and destructive. Large-scale disasters such as Cyclone Nargis (May 2008), which affected 2.4 million people, had enormous, long-lasting socio-economic consequences including loss of livelihood and income opportunities, negative effects on children’s access to education and migration.

High migration flows often lead to the establishment of informal settlements located in the most at-risk zones of towns and cities, which increases the number of people exposed to climate-related hazards such as floods.



Myae Nu Kyun (Yangon) during high tide. Flooding to this degree occurs daily, and residents rely on boats constructed from styrofoam for mobility. Credit: UN-Habitat, 2016

The socio-economic vulnerability of these dwellers could be further deepened by the long-term effects of climate change. These migrants are likely to suffer more from poverty, food insecurity and have only limited access to basic services.

In future, climate-related hazards in towns and cities can result in significant social and economic costs through a loss of productivity, employment opportunities, and increased prices of food and services.

The projected climate changes will likely affect small- and medium-sized towns, which largely depend on rain-fed agricultural production and related businesses. The expected frequent water shortages may lead to elevated prices of basic services in the largest cities - Yangon and Mandalay. Impacts on agricultural production would affect food supply and prices as well, threatening the food security of low-income households (MoNREC, 2017).

Urban health risks posed by climate change will increase in the future in the absence of effective policy response.

Heat waves will increase the risk of heat-related morbidity and mortality, especially in big urban centres. With rising temperatures and heat stress, large cities like Yangon and Mandalay could be exposed to the urban heat island effect, which makes an urban area significantly warmer than its surrounding areas. High air pollution levels,

and reduced water availability for drinking and sanitation will also bring negative health outcomes. More frequent floods and storm surges in the future may lead to an increase in water- and vector-borne diseases.

What is the current response to climate change in the urban sector?

At present, Myanmar is still in the early stage of urbanisation. This provides an opportunity for the national government to steer the urban development towards climate resilient and low-carbon future through integrating climate change into relevant policy and legislative frameworks.

The first efforts in this direction has been made with the revision of the National Building Code (updated in 2016). The Code provides guidelines for regulating the building construction activities across the country including safety measure standards, and rules for use of disaster-resilient materials, building design and construction techniques. Importantly, the updated National Building Code has specific provisions for energy and water use efficiency, and green buildings. Therefore, the enforcement of this legislation could support the country in achieving its greenhouse gas emissions reduction target. Capacity-building and awareness raising activities, which target the public and private sectors, are essential to achieve desired results.

In addition, the Government of Myanmar is currently drafting new policy and legislative instruments for achieving sustainable urban development in a changing climate.

- The *National Urban and Regional Development Planning Law*, which takes into consideration environmental and social issues that need to be integrated into spatial planning;
- The *National Housing Framework*, which will seek to integrate climate change considerations in the delivery of affordable and inclusive housing;
- The *National Urban Policy*, which will address climate change in urban areas.

What is the required response?

As its urban areas expand, Myanmar will witness increasing greenhouse gas emissions and growing demand for climate-sensitive resources. Meanwhile, future climate will be more extreme than ever before, which threatens the development of cities and towns. This underlines key challenges to urban settlements: to ensure that all urban residents have access to climate-resilient infrastructure, including sanitation, drainage and secure housing; and that

transport plans, energy system and urban design can support low-carbon and disaster-resilient development. Therefore, Myanmar needs to reconcile climate change mitigation, adaptation and sustainable development objectives within urban planning.

Mitigation to climate change requires reducing and limiting greenhouse gas emissions through investment in renewable sources of energy, energy efficient buildings, and low-carbon transportation and construction technologies.

Adaptation efforts reduce the vulnerability of urban infrastructure and services, as well as of people, businesses and their assets through investment in new and upgrade of existing infrastructure, promoting disaster-resilient housing, diversification of water and energy sources, and fostering climate-informed urban planning.

Poor people - particularly those living in informal settlements without secure tenure and livelihoods – are the most vulnerable to the impacts of climate change. Furthermore, climate change could deepen existing poverty and social inequalities (e.g. gender and income inequalities). In future, particularly vulnerable groups such as pregnant women, children and the elderly could face increasing health risks associated with the impact of various disasters,

In Muditar riverside, Yangon, water logging continues to be a problem even in the summer season. The lack of any man-made drainage facilities and the natural state of land in the delta region heighten the risk of logging even during the dry months. Credit: UN-Habitat, 2016



changes in the spread of diseases and vectors, and reduced access to clean drinking water in urban settlements. **An effective response to climate change thus necessitates policies, which promote equitable and inclusive urban development.**

What is the climate change strategy for the urban sector?

The Government of Myanmar has recently formulated the Myanmar National Climate Change Policy, which is a high-level statement of the country's long-term vision and position on climate change.

Myanmar's vision is to be a climate-resilient, low-carbon society that is sustainable, prosperous and inclusive, for the well-being of present and future generations.

The Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016-2030 is the prime instrument for the implementation of the Climate Change Policy, which defines sectoral objectives and response actions.

Acknowledging that climate change is a threat to

achieving sustainable urban development, the Urban Sector Action Plan of MCCSAP seeks to attain the following goal:

All township and city dwellers, including the most vulnerable, are safe from increased risks of rapid- and slow-onset natural disasters and live in sustainable, inclusive, low-carbon, climate-resilient towns.

This outcome is in alignment with national policies and the Sustainable Development Goal (SDG) 11: "make cities inclusive, safe, resilient and sustainable".

The Urban Sector Action Plan rests on the following key principles embedded in MCCSAP:

- **Inclusive development** to include poor, landless, marginalised and vulnerable women and men to act as agents of change, and all geographic regions to shape and benefit from opportunities provided by climate-resilient and low-carbon development. The needs of residents of informal settlements, the urban poor, and other vulnerable groups should be addressed to ensure inclusive urban development.
- **Integrated development** to direct government, development partners, civil society, private sector entities and communities to align, harmonise and coordinate policies and programmes to support the strategy's overall objectives.



How does the Urban Sector Action Plan address the climate change vulnerability of towns and cities in Myanmar?

Potential impacts of climate change on urban areas	Key vulnerability factors	Urban Sector Action Plan: Expected Results	Indicators for monitoring progress
<p>Increasing risk of slow- and rapid-onset disasters, and sea level rise</p> <p>Loss of life and destruction of infrastructure and houses due to natural disasters</p> <p>Energy insecurity caused by erratic rainfall, seasonal shifts and altered hydrological cycle</p> <p>Water insecurity due to droughts or salinization/contamination of water resources</p> <p>Climate-induced migration to large urban centres</p> <p>Polluted urban environment and effects on the health and quality of life</p>	<p>Inadequate urban planning and need of promoting climate-informed decision making</p> <p>Poor infrastructure and limited access to basic services</p> <p>Residential and commercial buildings not resilient to disasters</p> <p>Resource- and carbon-intensive building and urban transport sectors</p> <p>Urban population growth, poverty and social inequality</p> <p>Limited capacities of townships to respond to the growing climate challenges</p> <p>Low level of private sector's awareness on climate change</p>	<p>Town and city residents have access to resilient infrastructure and services that protect them from natural hazards of increased intensity, continue to perform during and after shocks and are best adapted to the new climatic context.</p> <p>Climate change resilience, low-carbon development and socially inclusive approaches are defining elements of urban planning and development, providing mitigation and adaptation co-benefits.</p> <p>New buildings are designed and constructed to be energy and resource efficient and resilient to natural hazards and disasters, so that they emit less carbon and produce savings from reduced energy consumption, providing equity and affordability.</p>	<p>Spatial, land-use and national spatial planning frameworks include climate change considerations from a low baseline</p> <p># of laws, policies and by-laws for urban management and development that include climate change considerations, from a low baseline</p> <p># of township and city climate change action plans based on ecosystem adaptation or other approaches</p> <p>% of new, converted and retrofitted infrastructure, basic services and buildings that are climate change responsive, from a low baseline</p> <p>% of town planners, architects and engineers who can help townships and cities to plan and manage with climate change considerations, from a low baseline</p> <p># of real estate developers and private industries who integrate climate change in their development projects</p>



Sectoral Action Plan



Policies and legislation

Objective: Ensure that legal, policy and normative instruments for urban development and management integrate climate change.

Activities:

- Mainstream climate change adaptation and mitigation into legal and policy framework for urban development and management
- Develop by-laws at township and city level that incentivise low-carbon development and require climate-resilient development
- Integrate energy efficiency, environmental considerations and disaster resilience into building regulations
- Develop climate change and disaster risk management action plans at urban and local levels
- Undertake climate risk assessments for essential public buildings and emergency services



Institutions

Objective: Build climate change-responsive institutional and decentralised processes in urban settings.

Activities:

- Strengthen urban institutional processes that promote sustainable transport
- Strengthen local governance ability to address climate change with focal points for climate change adaptation and resilience



Capacities

Objective: Increase the human resource capacities and awareness of CDCs and townships to address climate change.

Activities:

- Improve urban authorities' capacity to use basic technology for data collection, data management and geographic information systems (GIS)
- Strengthen capacity of local government officials to assess vulnerability and plan for climate change adaptation from township to national level
- Increase sectoral capacity for effective liquid and solid waste management
- Increase town planning capacities to integrate climate change into spatial strategic urban and land-use planning
- Revise existing education curriculum to include climate change (particularly for engineering and architecture at university level)
- Implement campaigns for community awareness of likely impacts of climate change and basic disaster risk reduction (DRR) techniques





Financing

Objective: Build financial capacities for addressing climate change at local level, using multiple sources of funding.

Activities:

- Increase budgeting at local level for climate change adaptation and mitigation
- Increase capacity of local authorities to access additional sources of funding, including national and international climate financing



Technology and innovation

Objective: Increase access to technology for urban climate resilience.

Activities:

- Assess technology gaps for addressing and monitoring climate change adaptation and mitigation, including disaster-resilient buildings



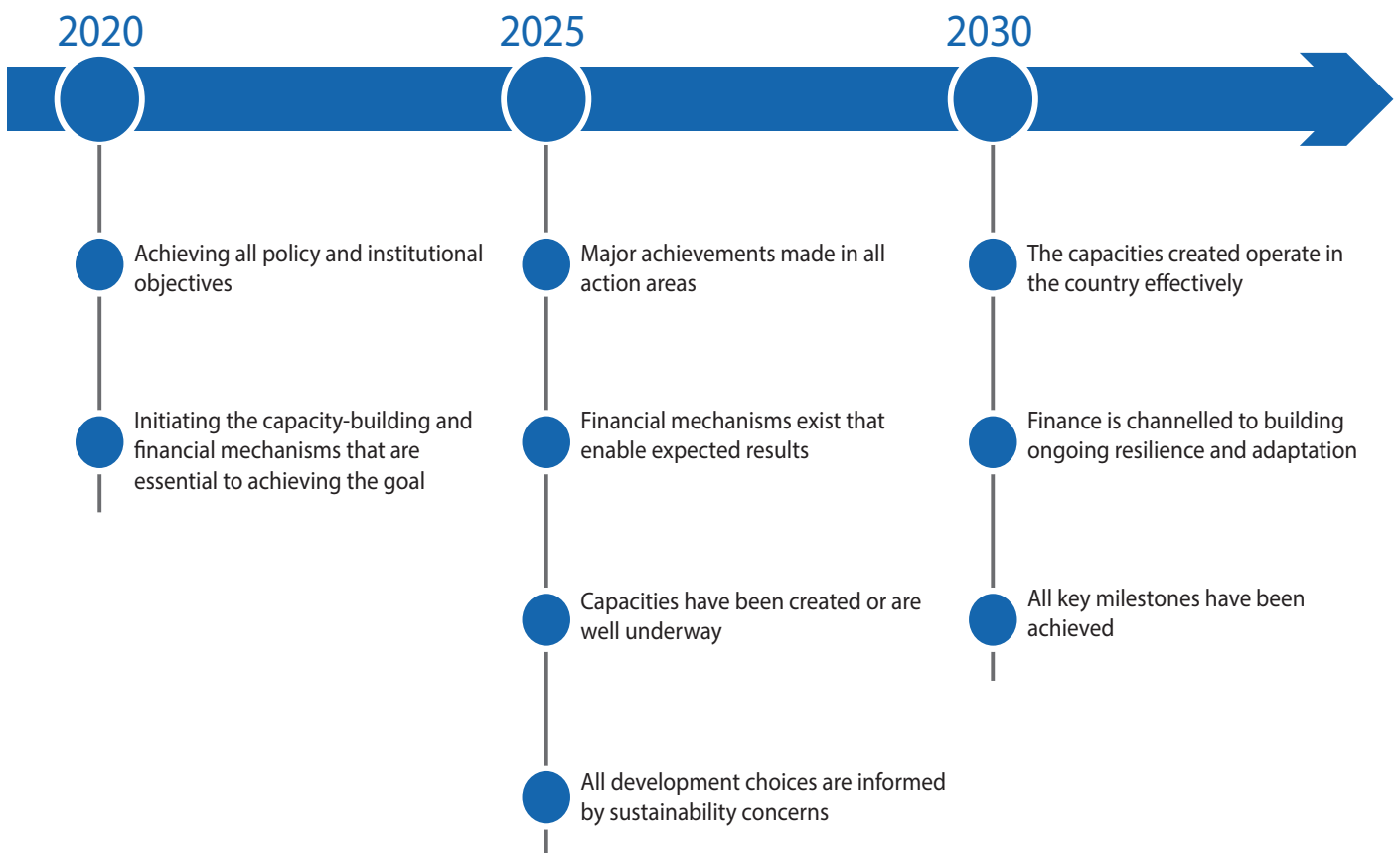
Partnerships

Objective: Promote public-private and civil society partnerships at town and city levels for climate change resilience and sustainable urban development.

Activities:

- Establish multi-stakeholder partnerships, and participation and debate mechanisms for local climate action at a township level
- Establish public-private partnerships to encourage investments in climate-resilient, low-carbon development through zoning, planning and incentive mechanisms

Timeframe to achieve results



How can urban resilience and green growth bring sustainable development outcomes?

The process of transforming Myanmar's cities and towns into resilient and green centres will lead the country towards achieving SDGs. For instance:

- Building resilient infrastructure and services in urban areas can secure access to energy, water and sanitation despite the impacts of climate change, and reduce the risk of human and economic losses due to disasters.
- A low-carbon and climate-resilient urban planning can improve health and quality of life in cities and towns. If the policy response to the increasing risk of slow- and rapid-onset disasters like storms, extreme heat events and water shortages is based upon an integrated, long-term strategic thinking, it can substantially reduce the food insecurity and health risks posed by climate change in urban areas.
- Improving resource and energy efficiency in the building sector, and reducing

emissions from the use of fossil fuels in cities can ensure healthy environment. Meanwhile, green urban growth can generate new sources of income, tax revenues and employment opportunities. The demand for technology and innovations can attract investments and foster economic growth.

- When urban climate change policies are tailored to take into account the needs and capacities of the poor, migrants and other vulnerable groups, they can have profound positive effects on poverty alleviation and social equity.
- Introducing nature-based solutions in cities such as open green spaces and green roofs can offer numerous co-benefits in terms of climate change mitigation (carbon sequestration), public health (reducing air pollution and the adverse effects of heat waves), disaster resilience (e.g. reducing the impacts of severe rainfall events) and biodiversity.
- Youth engagement in promoting green and resilient urban development can build the foundations of social transformation toward a sustainable future.



Freiburg – the model “Green City”

The city of Freiburg, Germany, is internationally recognized model of urban sustainability. Over the last 30 years, city planners has successfully established innovative renewable energy system and promoted low- and zero-energy buildings, healthy and sustainable urban mobility, and water saving measures. The transition to green economy has contributed greatly to regional economic growth and to creating new job opportunities. The city’s local action framework is grounded on citizen participation and environmental education to foster social change toward sustainability.

[Learn more:](http://www.freiburg.de)
www.freiburg.de

Barcelona – a model resilience city

The Spanish city of Barcelona - one of the ten largest metropolitan areas in Europe - is highly exposed to climate-related natural hazards. In 2008, following severe floods and a serious power outage that affected the city’s infrastructure and services, the local government decided to take action on building urban resilience to climate change and hazards. Today, Barcelona’s city resilience model is acknowledged by major international organizations and awarded in the “Making Cities Resilient” campaign of the United Nations. Barcelona’s experience in resilience demonstrates the importance of: addressing the social dimensions of resilience, long-term proactive action planning, and establishing solid partnerships.

[Learn more:](http://www.barcelona.cat/en/)
www.barcelona.cat/en/

Singapore – a model for urban water management

Despite receiving an ample amount of rainwater annually, Singapore has experienced severe water shortages in the past due to the lack of inland freshwater resources. Yet, today, the island city-state is a global water technology and management leader, and an International Water Hub. While the demand for water is continuously growing, Singapore has developed an integrated, effective and cost-efficient water management system to secure an adequate and affordable supply of water for the present and future generations. Supply side strategies include rainwater collection, water recycling and seawater desalination. Demand side programme of measures involves Water Conservation Awareness Programme and Water Efficient Building Certification, among others.

[Learn more:](http://www.pub.gov.sg/watersupply/singaporewaterstory)
www.pub.gov.sg/watersupply/singaporewaterstory



The Myanmar Climate Change Alliance (MCCA) was launched in 2013 to support the Government of the Union of the Republic of Myanmar in addressing the challenges posed by climate change. MCCA is an initiative of the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MoNREC). It is funded by the European Union as part of the Global Climate Change Alliance (GCCA), and implemented by the United Nations Human Settlements Programme (UN-Habitat) in partnership with the United Nations Environment Programme (UN Environment). For more information: www.myanmarccalliance.org; Facebook: @myanmarccalliance.



Learn more:

European Commission [online]. European Green Capital. Available at: <http://ec.europa.eu/environment/europe-angreencapital/>.

Government of Myanmar (2015). The Republic of the Union of Myanmar. The Union Report, the 2014 Myanmar and Housing Census. Census Report Volume 2. Department of Population, Ministry of Immigration and Population. Available at: <https://data.unhcr.org/thailand/download.php?id=421>

Horton, R., De Mel, M., Peters, D., Lesk, C., Bartlett, R., Helsingen, H., Bader, D., Capizzi, P., Martin, S. and Rosenzweig, C. (2016). Assessing Climate Risk in Myanmar. New York, NY, USA: Center for Climate Systems Research at Columbia University, WWF-US and WWF-Myanmar.

Ministry of Natural Resources and Environmental Conservation (2012,a). Myanmar Initial National Communication under UNFCCC.

Ministry of Natural Resources and Environmental Conservation (2012,b). Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change.

Ministry of Natural Resources and Environmental Conservation (2017) Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016–2030. Nay Pyi Taw, Myanmar: The Republic of the Union of Myanmar.

© 2017 MCCA/UN-Habitat. All rights reserved.

The views expressed in this publication are those of the author(s) and do not necessarily represent the official position of the United Nations, including United Nations Member States and UN-Habitat.

Photos: © MCCA/UN-Habitat (unless otherwise specified)

Front and back cover photos: Downtown Yangon, Credit: Sukun/MCCA, 2017