

Annex 4

Case Studies by Category

The ARC3.2 Case Study Docking Station presents over 100 examples of what cities are doing about climate change on the ground, across a diverse set of urban challenges and opportunities. They are included in the ARC3.2 volume and incorporated into an online website, (www.uccrn.org/casestudies), a searchable database that allows exploration and examination. The ARC3.2 Case Study Docking Station is designed to inform research and practice on climate change and cities by contributing to scientifically valid comparisons across a range of social, biophysical, cultural, economic, and political factors.

Case Studies in this volume can be found either within the Second UCCRN Assessment Report on Climate Change and Cities (ARC3.2) chapters (designated by number, e.g., 2.1) or in the Case Study Docking Station (CSDS) Annex (Annex 3) (designated by a letter, e.g., 2.A). Case Studies have been categorized here by chapter topic (Table A), geography (Table B), income category¹ (Table C), climate zone² (Table D), and city size³ (Table E).

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¹ For consistency, the data for Gross National Income per capita and the income categories were taken by the UCCRN from the source for GNI per capita (World Bank, 2017) and country classifications by income level (World Bank, 2017). These data are regularly updated, and the figures and categories used were those in effect at the time of Annex preparation. This information was included in all the data tables for the Case Studies, and it is merely indicative; the Case Study in hand may be referring to an urban area that may be richer or poorer than the national average.

² For climate zones, the Köppen-Geiger classification is used (Peel et al., 2007).

³ Based on metropolitan population (city sizes adapted from UN-Habitat, 2008).

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Cairo	Egypt	6.2	Citizen-Led Mapping of Urban Metabolism in Cairo	190–192
Addis Ababa	Ethiopia	15.2	Challenge of Developing Cities: The Case of Addis Ababa	562–563
Accra	Ghana	15.B	Accra: The Challenge of a Developing a City	753–755
Maputo	Mozambique	6.5	Public-Private-People Partnerships for Climate Compatible Development (4PCCD) in Maputo	203–205
Lagos	Nigeria	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Nairobi	Kenya	2.4	Will Climate Change Induce Malaria in Nairobi?	43–44
Dakar	Senegal	11.A	Peri-Urban Vulnerability, Decentralization, and Local-Level Actors: The Case of Flooding in Pikine/Dakar	737–739
Cape Town	South Africa	8.4	Ecosystem Based Climate Change Adaptation in the City of Cape Town	276–278
Durban	South Africa	4.1	Synergies, Conflicts, and Tradeoffs between Mitigation and Adaptation in Durban	111–112

Johannesburg	South Africa	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Dar es Salaam	Tanzania	9.6	Adapting to Climate Change in Coastal Dar es Salaam	345–347
Dar es Salaam	Tanzania	11.2	Vulnerability and Climate-Related Risks on Land, Housing, and Informal Settlements in Dar es Salaam	412–413

Asia

Masdar	Abu Dhabi	5.4	An Emerging Clean-Technology City: Masdar, Abu Dhabi	159–161
Dhaka	Bangladesh	6.B	Participatory Integrated Assessment of Flood Protection Measures for Climate Adaptation in Dhaka	712–715
Khulna	Bangladesh	6.4	Individual, Communal, and Institutional Responses to Climate Change by Low-Income Households in Khulna	200–202
Khulna	Bangladesh	9.2	Vulnerabilities and Adaptive Practices in Khulna	327–328
Hong Kong		5.3	Application of Urban Climatic Map to Urban Planning of High-Density Cities: An Experience from Hong Kong	157–158
Kunshan	China	10.6	Kunshan Eastern Health Care Center, Kunshan City	387
Shenzhen	China	16.A	Low-Carbon Transition in Shenzhen	758–760
Ahmedabad	India	10.1	Participative Development of a Heat-Health Action Plan in Ahmedabad	370–371
Bangalore	India	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Delhi	India	12.6	Managing Polluting and Inadequate Infrastructure Systems and Multiple Environmental Health Risks in Delhi	477–478
Gorakhpur	India	3.A	Integrating Climate Change Concerns in District Disaster Management Plans (DDMP): Case of Gorakhpur	670–672
Hyderabad	India	4.A	Climate Change Adaptation and Mitigation for Hyderabad City	684–686
Kedarnath	India	10.5	Kedarnath: Flood and Humanitarian Loss in Uttarakhand Districts in India	381–382
Surat	India	3.D	Surat: The Value of Ad-Hoc Cross-Government Bodies	679–681
Jakarta	Indonesia	6.A	The Community-Driven Adaptation Planning: Examining Ways of Kampongs in North Coastal Jakarta	710–712
Makassar	Indonesia	14.A	How Can Research Assist Water Sector Adaptation in Makassar City?	744–746
Tangerang Selatan	Indonesia	15.3	Integrated Community-Based Waste Management toward a Low-Carbon Eco-City in Tangerang Selatan	566–568
Tehran	Iran	4.D	The Challenges of Mitigation and Adaptation to Climate Change in Tehran	691–692
Tokyo	Japan	7.3	Raising Awareness of, Negotiating and Implementing Tokyo's Cap-and-Trade System	246
Faisalabad, Multan, Rawalpindi	Pakistan	11.3	Sheltering from a Gathering Storm: Temperature Resilience in Pakistan	419–421
Manila	Philippines	11.B	Climate Change Adaptation and Resilience-Building in Manila: Focus on Informal Settlements	739–742
Manila	Philippines	14.4	Operationalizing Urban Climate Resilience in Water and Sanitation Systems in Manila	539–541
Tacloban	Philippines	3.3	Preparedness, Response, and Reconstruction of Tacloban for Haiyan Super-Typhoon (ST) in the Philippines	86–88

Singapore	Singapore	8.7	Singapore's Ecosystem-Based Adaptation	294–296
Singapore	Singapore	12.5	The City of Singapore's 3D Energy Planning Tool as a Means to Reduce CO ₂ Emissions Effectively	476
New Songdo City	South Korea	5.C	New Songdo City: A Bridge to the Future?	703–704
Seoul	South Korea	2.5	Climate Extreme Trends in Seoul	46–47
Colombo	Sri Lanka	4.2	Pilot Application of Sustainability Benefits Assessment Methodology in Colombo Metropolitan Area	112–114
Colombo	Sri Lanka	9.B	Urban Wetlands for Flood Control and Climate Change Adaptation in Colombo	726–728
Matara	Sri Lanka	15.A	Closing the Loop in Waste Management in Southern Sri Lanka	752–753
Can Tho	Vietnam	14.1	Climate Adaptation through Sustainable Urban Development in Can Tho City	529–532

Australia

Brisbane	Australia	9.5	Adaptation Benefits and Costs of Residential Buildings in Greater Brisbane	342–343
Brisbane	Australia	10.4	Health Impacts of Extreme Temperatures in Brisbane	376–377
Canberra	Australia	12.4	The Benefits of Large-Scale Renewable Electricity Investment in Canberra	473–474
Melbourne	Australia	5.2	Adapting to Summer Overheating in Light Construction with Phase Change Materials in Melbourne	154–155
Sydney	Australia	2.D	Adaptation of the STEVE Tool (Screening Tool for Estate Environmental Evaluation) to Sydney Conditions	667–670

Europe

Vienna	Austria	15.4	Sustainable Waste Management: The Successful Example of Vienna	578–579
Antwerp	Belgium	2.A	The Urban Heat Island of Antwerp	659–661
Brussels	Belgium	2.1	Urban Heat Island in Brussels	32–33
Leuven	Belgium	4.C	Leuven Climate Neutral 2030 (LKN2030): An Ambitious Plan of a University Town	689–691
Middelfart	Denmark	14.5	New Citizen Roles in Climate Change Adaptation: The Efforts of the Middle-Sized Danish City of Middelfart	542–543
Helsinki	Finland	9.A	Climate Adaptation in Helsinki	723–725
Paris	France	16.F	City of Paris: 10 Years of Climate Comprehensive Strategy	771–773
Jena	Germany	4.3	Jena, Adaptation Strategy as an Essential Supplement to Climate Change Mitigation Efforts	115–118
Naples	Italy	3.C	Naples: Adaptive Design for an Integrated Approach to Climate Change and Geophysical Hazards	676–678
Naples	Italy	5.A	Urban Regeneration, Sustainable Water Management, and Climate Change Adaptation in East Naples	697–700
Rome	Italy	3.B	Climate Vulnerability Map of Rome 1.0	673–675
Venice	Italy	9.4	Venice: Human–Natural System Responses to Environmental Change	337–338

Rotterdam	Netherlands	5.D	Adaptation in Rotterdam's Stadshavens: Mainstreaming Housing and Education	705–707
Rotterdam	Netherlands	9.7	Rotterdam: Commitment for a Climate-Proof City	348–349
Rotterdam	Netherlands	14.B	Rotterdam's Infrastructure Experiments for Achieving Urban Resilience	747–748
Warsaw	Poland	16.E	Warsaw and City Sustainability Reporting	769–771
Almada	Portugal	9.C	Storm Surge in Costa da Caparica, Almada, in January 2014	728–732
Sintra	Portugal	4.F	Climate Change Adaptation and Mitigation in Sintra	695–697
Moscow	Russia	2.C	Temporal and Spatial Variability of Moscow's Urban Heat Island	664–667
Ebro Delta	Spain	8.1	Coastal Natural Protected Areas in Mediterranean Spain: The Ebro Delta and Empordà Wetlands	262–264
Glasgow	United Kingdom	5.1	Green Infrastructure as a Climate Change Adaptation Option for Overheating in Glasgow	152–153
London	United Kingdom	7.1	The London Climate Change Partnership: Investigating Public and Private Sector Collaboration	238–239
London	United Kingdom	13.3	London's Crossrail: Integrating Climate Change Mitigation in Construction and Operations	508–510
London	United Kingdom	15.C	Successful Actions of London Municipality	755–757
Manchester	United Kingdom	5.B	Realizing a Green Scenario: Sustainable Urban Design Under a Changing Climate in Manchester	701–703

North America

Calgary	Canada	10.A	Economic Cost and Mental Health Impact of Climate Change in Calgary	732–733
Toronto	Canada	10.C	City of Toronto Flood: A Tale of Flooding and Preparedness	736–737
Windsor	Canada	10.3	Windsor Heat Alert and Response Plan: Reaching Vulnerable Populations	374–375
Boulder	United States	3.1	The Boulder Floods – A Study of Decision-Centric Resilience	79–81
Chula Vista	United States	4.4	Sustainable Win-Win: Decreasing Emissions and Vulnerabilities in Chula Vista, California	118–119
Denver	United States	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538
Fort Lauderdale	United States	16.B	Fort Lauderdale: Pioneering the Way toward a Sustainable Future	761–762
Los Angeles	United States	2.2	Los Angeles Megacities Carbon Project	36–37
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Miami	United States	9.3	Coastal Hazard and Action Plans in Miami	333
New York	United States	6.1	Building Climate Justice in New York: NYC-EJA's Waterfront Justice Project, The Sandy Regional Assembly, and the People's Climate March	186–188
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New York	United States	8.2	New York's Staten Island Bluebelt	266–268
New York	United States	9.8	Preparing for Sea-Level Rise, Coastal Storms, and Other Climate Change-Induced Hazards in New York	351–352

New York	United States	10.B	New York's Million Trees NYC Project	734–735
New York	United States	12.3	Renewable Gas Demonstration Projects in New York	471–472
New York	United States	12.A	Consolidated Edison after Sandy: Planning for Energy Resilience	743–744
New York	United States	13.1	New York Metropolitan Transportation Authority's Adaptation Solutions	499–501
Norfolk	United States	9.1	Norfolk, Virginia: A City Dealing with Increased Flooding Now	323–326
Philadelphia	United States	2.B	Application of Satellite-Based Data for Assessing Vulnerability of Urban Populations to Heat Waves	661–664
Seattle	United States	8.8	Seattle's Thornton Creek Water Quality Channel	297–298
Seattle	United States	12.2	Climate Change and the Energy Supply System in Seattle	470
St. Peters	United States	8.C	St. Peters, Missouri, Invests in Nature to Manage Stormwater	720–722
Tucson	United States	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538

Latin America

Santa Fe	Argentina	3.2	Adaptation to Flooding in the City of Santa Fe, Argentina: Lessons Learned	83–84
Cubatão	Brazil	8.3	The Serra do Mar Project, Baixada Santista Metropolitan Region (BSMR), São Paulo State	272–274
Nova Friburgo	Brazil	10.2	Health Care and Social Cost: Nova Friburgo, State of Rio de Janeiro	373–374
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São Paulo	Brazil	4.B	São Paulo's Municipal Climate Action: An Overview from 2005 to 2014	686–688
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Santiago	Chile	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Santiago	Chile	16.1	Science-Policy Interface in Santiago de Chile: Opportunities and Challenges to Effective Action	599–600
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Medellín	Colombia	8.6	Medellín City: Transforming for Life	286–287
Santo Domingo	Dominican Republic	5.E	Climate Change Mitigation in a Tropical City: Santo Domingo	707–709
Quito	Ecuador	4.5	Integrating Mitigation and Adaptation in Climate Action Planning in Quito	122–123
Quito	Ecuador	8.A	Parque del Lago, Quito: Reclaiming and Adapting a City Center	715–718

Quito	Ecuador	12.7	Energy and Climate Change in Quito	480–482
Mexico City	Mexico	4.6	Climate Action Program in Mexico City 2008–2012	126
Lima	Perú	11.1	Water-Related Vulnerabilities to Climate Change and Poor Housing Conditions in Lima	407–408

Annex 4 Table C ARC3.2 Case Studies by Income Category (Gross National Income per Capita – US\$)

High Income (\$12,236 or more per capita)

Abu Dhabi	5.4	An Emerging Clean-Technology City: Masdar, Abu Dhabi	159–161
Almada	9.C	Storm Surge in Costa da Caparica, Almada, in January 2014	728–732
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Antwerp	2.A	The Urban Heat Island of Antwerp	659–661
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Jena	4.3	Jena, Adaptation Strategy as an Essential Supplement to Climate Change Mitigation Efforts	115–118
Jerusalem	8.5	Jerusalem Gazelle Valley Park Conservation Program	282–283
Leuven	4.C	Leuven Climate Neutral 2030 (LKN2030): An Ambitious Plan of a University Town	689–691
London	7.1	The London Climate Change Partnership: Investigating Public and Private Sector Collaboration	238–239
London	13.3	London's Crossrail: Integrating Climate Change Mitigation in Construction and Operations	508–510
London	15.C	Successful Actions of London Municipality	755–757
Los Angeles	2.2	Los Angeles Megacities Carbon Project	36–37

Los Angeles	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Manchester	5.B	Realizing a Green Scenario: Sustainable Urban Design under a Changing Climate in Manchester	701–703
Medellín	6.3	Growth Control, Climate Risk Management, and Urban Equity: The Social Pitfalls of the Green Belt in Medellín	194–196
Medellín	8.6	Medellín City: Transforming for Life	286–287
Ebro Delta	8.1	Coastal Natural Protected Areas in Mediterranean Spain: The Ebro Delta and Empordà Wetlands	262–264
Melbourne	5.2	Adapting to Summer Overheating in Light Construction with Phase-Change Materials in Melbourne	157–158
Miami	9.3	Coastal Hazard and Action Plans in Miami	333
Middelfart	14.5	New Citizen Roles in Climate Change Adaptation: The Efforts of the Middle-Sized Danish City of Middelfart	542–543
Mexico City	4.6	Climate Action Program in Mexico City 2008–2012	126
Naples	3.C	Naples: Adaptive Design for an Integrated Approach to Climate Change and Geophysical Hazards	676–678
Naples	5.A	Urban Regeneration, Sustainable Water Management, and Climate Change Adaptation in East Naples	697–700
New Songdo	5.C	New Songdo City: A Bridge to the Future?	703–704
New York	6.1	Building Climate Justice in New York: NYC-EJA's Waterfront Justice Project, The Sandy Regional Assembly, and the People's Climate March	186–188
New York	7.2	Public Enabling of Private Real Estate in New York	241–242
New York	8.2	New York's Staten Island Bluebelt	266–268
New York	9.8	Preparing for Sea-Level Rise, Coastal Storms, and Other Climate Change-Induced Hazards in New York	351–352
New York	10.B	New York's Million Trees NYC Project	734–735
New York	12.3	Renewable Gas Demonstration Projects in New York	471–472
New York	12.A	Consolidated Edison after Sandy: Planning for Energy Resilience	743–744
New York	13.1	New York, Metropolitan Transportation Authority's Adaptation Solutions	499–501
Norfolk	9.1	Norfolk, Virginia: A City Dealing with Increased Flooding	323–326
Paris	16.F	City of Paris: 10 Years of Climate Comprehensive Strategy	771–773
Philadelphia	2.B	Application of Satellite-Based Data for Assessing Vulnerability of Urban Populations to Heat Waves	661–664
Rio de Janeiro	2.3	Rio de Janeiro: Impacts of the Madden-Julian Oscillation	41–42
Rio de Janeiro	3.E	Digital Resilience: Innovative Climate Change Responses in Rio de Janeiro	681–683
Rio de Janeiro	4.E	Managing Greenhouse Gas Emissions in Rio de Janeiro: The Role of Inventories and Mitigation Actions Planning	693–694
Rio de Janeiro	10.2	Health Care and Social Cost: Nova Friburgo, State of Rio de Janeiro	373–374
Rio de Janeiro	12.1	Urban GHG Mitigation in Rio de Janeiro	466–467
Rio de Janeiro	15.1	Challenge of a Rapidly Developing Country: The Case of Rio de Janeiro	561
Rome	3.B	Climate Vulnerability Map of Rome 1.0	673–675
Rotterdam	5.D	Adaptation in Rotterdam's Stadshavens: Mainstreaming Housing and Education	705–707
Rotterdam	9.7	Rotterdam: Commitment for a Climate-Proof City	348–349

Rotterdam	14.B	Rotterdam's Infrastructure Experiments for Achieving Urban Resilience	747–748
Santa Fe	3.2	Adaptation to Flooding in the City of Santa Fe, Argentina: Lessons Learned	83–84
Santiago	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Santiago	16.1	Science-Policy Interface in Santiago de Chile: Opportunities and Challenges to Effective Action	599–600
Seattle	8.8	Seattle's Thornton Creek Water Quality Channel	297–298
Seattle	12.2	Climate Adaptation and the Energy Supply System in Seattle	470
Seattle	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538
Seoul	2.5	Climate Extreme Trends in Seoul	46–47
Singapore	8.7	Singapore's Ecosystem-Based Adaptation	294–296
Singapore	12.5	The City of Singapore's 3D Energy Planning Tool as a Means to Reduce CO ₂ Emissions Effectively	476
Sintra	4.F	Climate Change Adaptation and Mitigation in Sintra	695–697
St. Peters	8.C	St. Peters, Missouri, Invests in Nature to Manage Stormwater	720–722
Sydney	2.D	Adaptation of the STEVE Tool (Screening Tool for Estate Environmental Evaluation) to Sydney Conditions	667–670
Tokyo	7.3	Raising Awareness of, Negotiating and Implementing Tokyo's Cap-and-Trade System	246
Toronto	10.C	City of Toronto Flood: A Tale of Flooding and Preparedness	736–737
Tucson	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538
Venice	9.4	Venice: Human–Natural System Responses to Environmental Change	337–338
Vienna	15.4	Sustainable Waste Management: The Successful Example of Vienna	578–579
Warsaw	16.E	Warsaw and City Sustainability Reporting	769–771
Windsor	10.3	Windsor Heat Alert and Response Plan: Reaching Vulnerable Populations	374–375

Upper Middle Income (\$3,956 to \$12,235 per capita)

Cairo	6.2	Citizen-Led Mapping of Urban Metabolism in Cairo	190–192
Colombo	4.2	Pilot Application of Sustainability Benefits Assessment Methodology in Colombo Metropolitan Area	112–114
Faisalabad, Multan, Rawalpindi	11.3	Sheltering from a Gathering Storm: Temperature Resilience in Pakistan	419–421
Johannesburg	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Kunshan	10.6	Kunshan Eastern Health Care Center, Kunshan City	387
Lima	11.1	Water-Related Vulnerabilities to Climate Change and Poor Housing Conditions in Lima	407–408
Moscow	2.C	Temporal and Spatial Variability of Moscow's Urban Heat Island	664–667
Quito	4.5	Integrating Mitigation and Adaptation in Climate Action Planning in Quito	122–123
Quito	8.A	Parque Del Lago, Reclaiming and Adapting a City Center	715–718
Quito	12.7	Energy and Climate Change in Quito	480–482

Santo Domingo	5.E	Climate Change Mitigation in a Tropical City: Santo Domingo	707–709
São Paulo	4.B	São Paulo’s Municipal Climate Action: An Overview, from 2005 to 2014	686–688
São Paulo	8.B	São Paulo 100 Parks Program	719–720
São Paulo	14.C	Environmental Impacts in São Paulo City	749–751
Shenzhen	16.A	Low-Carbon Transition in Shenzhen	758–760
Tacloban	3.3	Preparedness, Response, and Reconstruction of Tacloban for Haiyan Super-Typhoon (ST) in the Philippines	86–88
Tangerang Selatan	15.3	Integrated Community-Based Waste Management towards a Low-Carbon Eco-City in Tangerang Selatan	566–568
Tehran	4.D	The Challenges of Mitigation and Adaptation to Climate Change in Tehran	691–692

Lower Middle Income (\$1,006 to \$3,955 per capita)

Accra	15.B	Accra: The Challenge of Developing a City	753–755
Ahmedabad	10.1	Participative Development of a Heat-Health Action Plan in Ahmedabad	370–371
Bangalore	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Can Tho	14.1	Climate Adaptation through Sustainable Urban Development in Can Tho City	529–532
Delhi	12.6	Managing Polluting and Inadequate Infrastructure Systems and Multiple Environmental Health Risks in Delhi	477–478
Dhaka	6.B	Participatory Integrated Assessment of Flood Protection Measures for Climate Adaptation in Dhaka	712–715
Gorakhpur	3.A	Integrating Climate Change Concerns in District Disaster Management Plans (DDMP): Case of Gorakhpur	670–672
Hyderabad City	4.A	Climate Change Adaptation and Mitigation for Hyderabad City	684–686
Jakarta	6.A	The Community-Driven Adaptation Planning: Examining Ways of Kampongs in North Coastal Jakarta	710–712
Kedarnath	10.5	Kedarnath: Flood and Humanitarian Loss in Uttarakhand Districts in India	381–382
Khulna	6.4	Individual, Communal, and Institutional Responses to Climate Change by Low-Income Households in Khulna	200–202
Khulna	9.2	Vulnerabilities and Adaptive Practices in Khulna	327–328
Lagos	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Makassar	14.A	How Can Research Assist Water Sector Adaptation in Makassar City?	744–746
Manila	11.B	Climate Change Adaptation and Resilience Building in Manila: Focus on Informal Settlements	739–742
Manila	14.4	Operationalizing Urban Climate Resilience in Water and Sanitation Systems in Manila	539–541
Matara	15.A	Closing the Loop in Waste Management in Southern Sri Lanka	752–753
Nairobi	2.4	Will Climate Change Induce Malaria Epidemics in Nairobi?	43–44
Surat	3.D	Surat: The Value of Ad-Hoc Cross-Government Bodies	679–681

Low Income (\$1,005 or less per capita)

Addis Ababa	15.2	Challenge of Developing Cities: Case of Addis Ababa	562–563
Bobo-Dioulasso	16.D	Building a Participatory Risks Management Framework in Bobo-Dioulasso	766–768
Dar es Salaam	9.6	Adapting to Climate Change in Coastal Dar es Salaam	345–347
Dar es Salaam	11.2	Vulnerability and Climate-Related Risks on Land, Housing, and Informal Settlements in Dar es Salaam	412–413
Maputo	6.5	Public-Private-People Partnerships for Climate Compatible Development (4PCCD) in Maputo	203–205
Pikine/Dakar	11.A	Peri-Urban Vulnerability, Decentralization, and Local-Level Actors: The Case of Flooding in Pikine/Dakar	737–739

Annex 4 Table D ARC3.2 Case Studies by Climate Zone

Equatorial

Equatorial Fully Humid (Af)

Colombo	4.2	Pilot Application of Sustainability Benefits Assessment Methodology in Colombo Metropolitan Area	112–114
Colombo	9.B	Urban Wetlands for Flood Control and Climate Change Adaptation in Colombo	726–728
Cubatão	8.3	The Serra do Mar Project, Baixada Santista Metropolitan Region (BSMR), São Paulo State	272–274
Fort Lauderdale	16.B	Fort Lauderdale: Pioneering the Way toward a Sustainable Future	761–762
Manila	11.B	Climate Change Adaptation and Resilience Building in Manila: Focus on Informal Settlements	739–742
Manila	14.4	Operationalizing Urban Climate Resilience in Water and Sanitation Systems in Manila	539–541
Matara	15.A	Closing the Loop in Waste Management in Southern Sri Lanka	752–753
Singapore	8.7	Singapore's Ecosystem-Based Adaptation	294–296
Singapore	12.5	The City of Singapore's 3D Energy Planning Tool as a Means to Reduce CO ₂ Emissions Effectively	476
Tacloban	3.3	Preparedness, Response, and Reconstruction of Tacloban for Haiyan Super-Typhoon (ST) in the Philippines	86–88
Tangerang Selatan	15.3	Integrated Community-Based Waste Management towards a Low-Carbon Eco-City in Tangerang Selatan	566–568

Equatorial Monsoonal (Am)

Jakarta	6.A	The Community-Driven Adaptation Planning: Examining Ways of Kampongs in North Coastal Jakarta	710–712
	4.E	Managing Greenhouse Gas Emissions in Rio de Janeiro: The Role of Inventories and Mitigation Actions Planning	693–694
Makassar	14.A	How Can Research Assist Water Sector Adaptation in Makassar City?	744–746
Medellín	6.3	Growth Control, Climate Risk Management, and Urban Equity: The Social Pitfalls of the Green Belt in Medellín	194–196
Medellín	8.6	Medellín City: Transforming for Life	286–287

Rio de Janeiro	2.3	Rio de Janeiro: Impacts of the Madden-Julian Oscillation	41–42
Rio de Janeiro	3.E	Digital Resilience: Innovative Climate Change Responses in Rio de Janeiro	681–683
Rio de Janeiro	10.2	Health Care and Social Cost: Nova Friburgo, State of Rio de Janeiro	373–374
Rio de Janeiro	12.1	Urban GHG Mitigation in Rio de Janeiro	466–467
Rio de Janeiro	15.1	Challenge of a Rapidly Developing Country: The Case of Rio de Janeiro	561

Equatorial Winter Dry (Aw)

Bangalore	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Bobo-Dioulasso	16.D	Building a Participatory Risks Management Framework in Bobo-Dioulasso	766–768
Can Tho	14.1	Climate Adaptation through Sustainable Urban Development in Can Tho City	529–532
Dar es Salaam	9.6	Adapting to Climate Change in Coastal Dar es Salaam	345–347
Dar es Salaam	11.2	Vulnerability and Climate-Related Risks on Land, Housing, and Informal Settlements in Dar es Salaam	412–413
Dhaka	6.B	Participatory Integrated Assessment of Flood Protection Measures for Climate Adaptation in Dhaka	712–715
Khulna	6.4	Individual, Communal, and Institutional Responses to Climate Change by Low-Income Households in Khulna	200–202
Khulna	9.2	Vulnerabilities and Adaptive Practices in Khulna	327–328
Lagos	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Maputo	6.5	Public-Private-People Partnerships for Climate Compatible Development (4PCCD) in Maputo	203–205
Miami	9.3	Coastal Hazard and Action Plans in Miami	333
Surat	3.D	Surat: The Value of Ad-Hoc Cross-Government Bodies	679–681

Arid

Arid Steppe Hot Arid (Bsh)

Accra	15.B	Accra: The Challenge of a Developing a City	753–755
Ahmedabad	10.1	Participative Development of a Heat-Health Action Plan in Ahmedabad	370–371
Dakar	11.A	Peri-Urban Vulnerability, Decentralization, and Local-Level Actors: The Case of Flooding in Pikine/Dakar	737–739
Delhi	12.6	Managing Polluting and Inadequate Infrastructure Systems and Multiple Environmental Health Risks in Delhi	477–478
Hyderabad	4.A	Climate Change Adaptation and Mitigation for Hyderabad City	684–686
Tucson	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538

Arid Steppe Cold Arid (Bsk)

Boulder	3.1	The Boulder Floods: A Study of Decision-Centric Resilience	79–81
Chula Vista	4.4	Sustainable Win-Win: Decreasing Emissions and Vulnerabilities in Chula Vista, California	118–119
Kedarnath	10.5	Kedarnath: Flood and Humanitarian Loss in Uttarakhand Districts in India	381–382
Johannesburg	13.2	Bus Rapid Transit in Lagos and Johannesburg: Establishing Formal Public Transit in Sub-Saharan Africa	506
Tehran	4.D	The Challenges of Mitigation and Adaptation to Climate Change in Tehran	691–692

Arid, Desert, Hot Arid (Bwh)

Abu Dhabi	5.4	An Emerging Clean-Technology City: Masdar, Abu Dhabi	159–161
Cairo	6.2	Citizen-led Mapping of Urban Metabolism in Cairo	190–192
Faisalabad, Multan, Rawalpindi	11.3	Sheltering from a Gathering Storm: Temperature Resilience in Pakistan	419–421
Lima	11.1	Water-Related Vulnerabilities to Climate Change and Poor Housing Conditions in Lima	407–408

Dry, Arid, Mid-Latitudes (Bwk)

Antofagasta	16.C	Democratizing Urban Resilience in Antofagasta	763–766
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Warm Temperate*Warm Temperate, Fully Humid, Hot Summer (Cfa)*

Faisalabad, Multan, Rawalpindi	11.3	Sheltering from a Gathering Storm: Temperature Resilience in Pakistan	419–421
Hong Kong	5.3	Application of Urban Climatic Map to Urban Planning of High-Density Cities: An Experience from Hong Kong	157–158
Kunshan	10.6	Kunshan Eastern Health Care Center, Kunshan City	387
Norfolk	9.1	Norfolk, Virginia: A City Dealing with Increased Flooding	323–326
Santa Fe	3.2	Adaptation to Flooding in the City of Santa Fe, Argentina: Lessons Learned	83–84
Shenzhen	16.A	Low-Carbon Transition in Shenzhen	758–760
Tokyo	7.3	Raising Awareness of, Negotiating, and Implementing Tokyo's Cap-and-Trade System	246
Venice	9.4	Venice: Human–Natural System Responses to Environmental Change	337–338

Warm Temperate, Fully Humid, Warm Summer (Cfb)

Addis Ababa	15.2	Challenge of Developing Cities: The Case of Addis Ababa	562–563
Antwerp	2.A	The Urban Heat Island of Antwerp	659–661
Brussels	2.1	Urban Heat Island in Brussels	32–33
Canberra	12.4	The Benefits of Large-Scale Renewable Electricity Investment in Canberra	473–474
Cape Town	8.4	Ecosystem-Based Climate Change Adaptation in the City of Cape Town	276–278
Glasgow	5.1	Green Infrastructure as a Climate Change Adaptation Option for Overheating in Glasgow	152–153
Jena	4.3	Jena, Adaptation Strategy as an Essential Supplement to Climate Change Mitigation Efforts	115–118
Leuven	4.C	Leuven Climate Neutral 2030 (LKN2030): An Ambitious Plan of a University Town	689–691
London	7.1	The London Climate Change Partnership: Investigating Public and Private Sector Collaboration	238–239
London	13.3	London's Crossrail: Integrating Climate Change Mitigation in Construction and Operations	508–510
London	15.C	Successful Actions of London Municipality	755–757
Manchester	5.B	Realizing a Green Scenario: Sustainable Urban Design under a Changing Climate in Manchester	701–703
Melbourne	5.2	Adapting to Summer Overheating in Light Construction with Phase-Change Materials in Melbourne	157–158
Mexico City	4.6	Climate Action Program in Mexico City 2008–2012	126
Paris	16.F	City of Paris: 10 Years of Climate Comprehensive Strategy	771–773
Rotterdam	5.D	Adaptation in Rotterdam's Stadshavens: Mainstreaming Housing and Education	705–707
Rotterdam	9.7	Rotterdam: Commitment for a Climate-Proof City	348–349
Rotterdam	14.B	Rotterdam's Infrastructure Experiments for Achieving Urban Resilience	747–748
Sydney	2.D	Adaptation of the STEVE Tool (Screening Tool for Estate Environmental Evaluation) to Sydney Conditions	667–670

Warm Temperate, Summer Dry, Hot Summer (Csa)

Almada	9.C	Storm Surge in Costa da Caparica, Almada, in January 2014	728–732
Brisbane	9.5	Adaptation Benefits and Costs of Residential Buildings in Greater Brisbane	342–343
Brisbane	10.4	Health Impacts of Extreme Temperatures in Brisbane	376–377
Durban	4.1	Synergies, Conflicts, and Tradeoffs between Mitigation and Adaptation in Durban	111–112
Ebro Delta	8.1	Coastal Natural Protected Areas in Mediterranean Spain: The Ebro Delta and Empordà Wetlands	262–264
Jerusalem	8.5	Jerusalem Gazelle Valley Park Conservation Program	282–283
Los Angeles	2.2	Los Angeles Megacities Carbon Project	36–37
Los Angeles	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Naples	3.C	Naples: Adaptive Design for an Integrated Approach to Climate Change and Geophysical Hazards	676–678
Naples	5.A	Urban Regeneration, Sustainable Water Management, and Climate Change Adaptation in East Naples	697–700
Rome	3.B	Climate Vulnerability Map of Rome 1.0	673–675
Sintra	4.F	Climate Change Adaptation and Mitigation in Sintra	695–697

Warm Temperate, Summer Dry, Warm Summer (Csb)

Nairobi	2.4	Will Climate Change Induce Malaria in Nairobi?	43–44
Quito	4.5	Integrating Mitigation and Adaptation in Climate Action Planning in Quito	122–123
Quito	8.A	Parque del Lago, Quito: Reclaiming and Adapting a City Center	715–718
Quito	12.7	Energy and Climate Change in Quito	480–482
Santiago	14.2	Using a Basin-Level Approach to Address Climate Change Adaptation of Urban Water Supply: The Case of Santiago, Los Angeles, and Bangalore	533–535
Santiago	16.1	Science-Policy Interface in Santiago de Chile: Opportunities and Challenges to Effective Action	599–600
São Paulo	4.B	São Paulo’s Municipal Climate Action: An Overview from 2005 to 2014	686–688
São Paulo	8.B	São Paulo 100 Parks Program	719–720
São Paulo	14.C	Environmental Impacts in São Paulo City	749–751
Seattle	8.8	Seattle’s Thornton Creek Water Quality Channel	297–298
Seattle	12.2	Climate Change and the Energy Supply System in Seattle	470
Seattle	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538

Warm Temperate, Desert, Hot Summer Climate (Cwa)

Gorakhpur	3.A	Integrating Climate Change Concerns in District Disaster Management Plans (DDMP): Case of Gorakhpur	670–672
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Snow***Snow, Fully Humid, Hot Summer (Dfa)***

Denver	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538
New Songdo City	5.C	New Songdo City: A Bridge to the Future?	703–704
New York	6.1	Building Climate Justice in New York: NYC-EJA’s Waterfront Justice Project, The Sandy Regional Assembly, and the People’s Climate March	186–188
New York	7.2	Public Enabling of Private Real Estate in New York	241–242
New York	8.2	New York’s Staten Island Bluebelt	266–268
New York	9.8	Preparing for Sea-Level Rise, Coastal Storms, and Other Climate Change-Induced Hazards in New York	351–352
New York	10.B	New York’s Million Trees NYC Project	734–735
New York	12.3	Renewable Gas Demonstration Projects in New York	471–472
New York	12.A	Consolidated Edison after Sandy: Planning for Energy Resilience	743–744
New York	13.1	New York Metropolitan Transportation Authority’s Adaptation Solutions	499–501
Philadelphia	2.B	Application of Satellite-Based Data for Assessing Vulnerability of Urban Populations to Heat Waves	661–664
Seoul	2.5	Climate Extreme Trends in Seoul	46–47
St. Peters	8.C	St. Peters, Missouri, Invests in Nature to Manage Stormwater	720–722
Windsor	10.3	Windsor Heat Alert and Response Plan: Reaching Vulnerable Populations	374–375

Snow, Fully Humid, Warm Summer (Dfb)

Calgary	10.A	Economic Cost and Mental Health Impact of Climate Change in Calgary	732–733
Helsinki	9.A	Climate Adaptation in Helsinki	723–725
Middelfart	14.5	New Citizen Roles in Climate Change Adaptation: The Efforts of the Middle-Sized Danish City of Middelfart	542–543
Moscow	2.C	Temporal and Spatial Variability of Moscow’s Urban Heat Island	664–667
Toronto	10.C	City of Toronto Flood: A Tale of Flooding and Preparedness	736–737
Vienna	15.4	Sustainable Waste Management: The Successful Example of Vienna	578–579
Warsaw	16.E	Warsaw and City Sustainability Reporting	769–771

Annex 4 Table E ARC3.2 Case Studies by City Population**Less than 100,000**

Leuven	4.C	Leuven Climate Neutral 2030 (LKN2030): An Ambitious Plan of a University Town	689–691
Ebro Delta	8.1	Coastal Natural Protected Areas in Mediterranean Spain: The Ebro Delta and Empordà Wetlands	262–264
Middelfart	14.5	New Citizen Roles in Climate Change Adaptation: The Efforts of the Middle-Sized Danish City of Middelfart	542–543

Small (100,000–500,000)

Antofagasta	16.C	Democratizing Urban Resilience in Antofagasta	763–766
Boulder	3.1	The Boulder Floods: A Study of Decision-Centric Resilience	79–81
Canberra	12.4	The Benefits of Large-Scale Renewable Electricity Investment in Canberra	473–474
Nova Friburgo	10.2	Health Care and Social Cost: Nova Friburgo, State of Rio de Janeiro	373–374
Santa Fe	3.2	Adaptation to Flooding in the City of Santa Fe, Argentina: Lessons Learned	83–84
Tacloban	3.3	Preparedness, Response and Reconstruction of Tacloban for Haiyan Super-Typhoon (ST) in the Philippines	86–88
Windsor	10.3	Windsor Heat Alert and Response Plan: Reaching Vulnerable Populations	374–375

Intermediate (500,000–1 million)

Gorakhpur	3.A	Integrating Climate Change Concerns in District Disaster Management Plans (DDMP): Case of Gorakhpur	670–672
Jena	4.3	Jena, Adaptation Strategy as an Essential Supplement to Climate Change Mitigation Efforts	115–118
Jerusalem	8.5	Jerusalem Gazelle Valley Park Conservation Program	282–283
Khulna	6.4	Individual, Communal, and Institutional Responses to Climate Change by Low-Income Households in Khulna	200–202
Khulna	9.2	Vulnerabilities and Adaptive Practices in Khulna	327–328

Masdar	5.4	An Emerging Clean-Technology City: Masdar, Abu Dhabi	159–161
Matara	15.A	Closing the Loop in Waste Management in Southern Sri Lanka	752–753
Tucson	14.3	Denver, Seattle, Tucson: How Can Climate Research Be Useful for Urban Water Utility Operations?	537–538
Venice	9.4	Venice: Human–Natural System Responses to Environmental Change	337–338

Big (1–5 million)

Accra	15.B	Accra: The Challenge of a Developing a City	753–755
Addis Ababa	15.2	Challenge of Developing Cities: The Case of Addis Ababa	562–563
Almada	9.C	Storm Surge in Costa da Caparica, Almada, in January 2014	728–732
Antwerp	2.A	The Urban Heat Island of Antwerp	659–661
Bobo-Dioulasso	16.D	Building a Participatory Risks Management Framework in Bobo-Dioulasso	766–768
Brisbane	9.5	Adaptation Benefits and Costs of Residential Buildings in Greater Brisbane	342–343
Brisbane	10.4	Health Impacts of Extreme Temperatures in Brisbane	376–377
Brussels	2.1	Urban Heat Island in Brussels	32–33
Calgary	10.A	Economic Cost and Mental Health Impact of Climate Change in Calgary	732–733
Can Tho	14.1	Climate Adaptation through Sustainable Urban Development in Can Tho City	529–532
Cape Town	8.4	Ecosystem-Based Climate Change Adaptation in the City of Cape Town	276–278
Chula Vista	4.4	Sustainable Win-Win: Decreasing Emissions and Vulnerabilities in Chula Vista, California	118–119
Colombo	4.2	Pilot Application of Sustainability Benefits Assessment Methodology in Colombo Metropolitan Area	112–114
Colombo	9.B	Urban Wetlands for Flood Control and Climate Change Adaptation in Colombo	726–728
Cubatão	8.3	The Serra do Mar Project, Baixada Santista Metropolitan Region (BSMR), São Paulo State	272–274
Dakar	11.A	Peri-Urban Vulnerability, Decentralization, and Local-Level Actors: The Case of Flooding in Pikine/Dakar	737–739
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Dar es Salaam	11.2	Vulnerability and Climate-Related Risks on Land, Housing, and Informal Settlements in Dar es Salaam	412–413
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Large (5–10 million)

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