Land Lines

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SPECIAL ANNIVERSARY ISSUE

Groundbreaking Solutions

75 YEARS

Land Lines

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THE LINCOLN INSTITUTE OF LAND POLICY seeks to improve quality of life through the effective use, taxation, and stewardship of land. A nonprofit private operating foundation whose origins date to 1946, the Lincoln Institute researches and recommends creative approaches to land as a solution to economic, social, and environmental challenges. Through education, training, publications, and events, we integrate theory and practice to inform public policy decisions worldwide.

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LINCOLN INSTITUTE OF LAND POLICY

SPECIAL ANNIVERSARY ISSUE

Cleveland, Ohio. Credit: Sean Pavone/iStock.

DEPARTMENTS

Aerial view of downtown Belo Horizonte, Brazil. Credit: AntonioSalaverry/iStock.

MESSAGE FROM THE CHAIR OF THE BOARD AND THE PRESIDENT

BY KATHRYN J. LINCOLN AND GEORGE W. McCARTHY

Celebrating 75 Years of Progress

“The association of poverty with progress is the great enigma of our times.”

THE POLITICAL ECONOMIST Henry George wrote those words in 1879, but they might just as easily be written today. To be sure, the enduring coexistence of great wealth and great poverty is less of an enigma than it once was, thanks to more than a century of research, policy, experience, and observation, but an undeniable gulf remains between, as George put it, “the House of Have and the House of Want.” The uneven effects of the global pandemic have made this divide both deeper and more apparent.

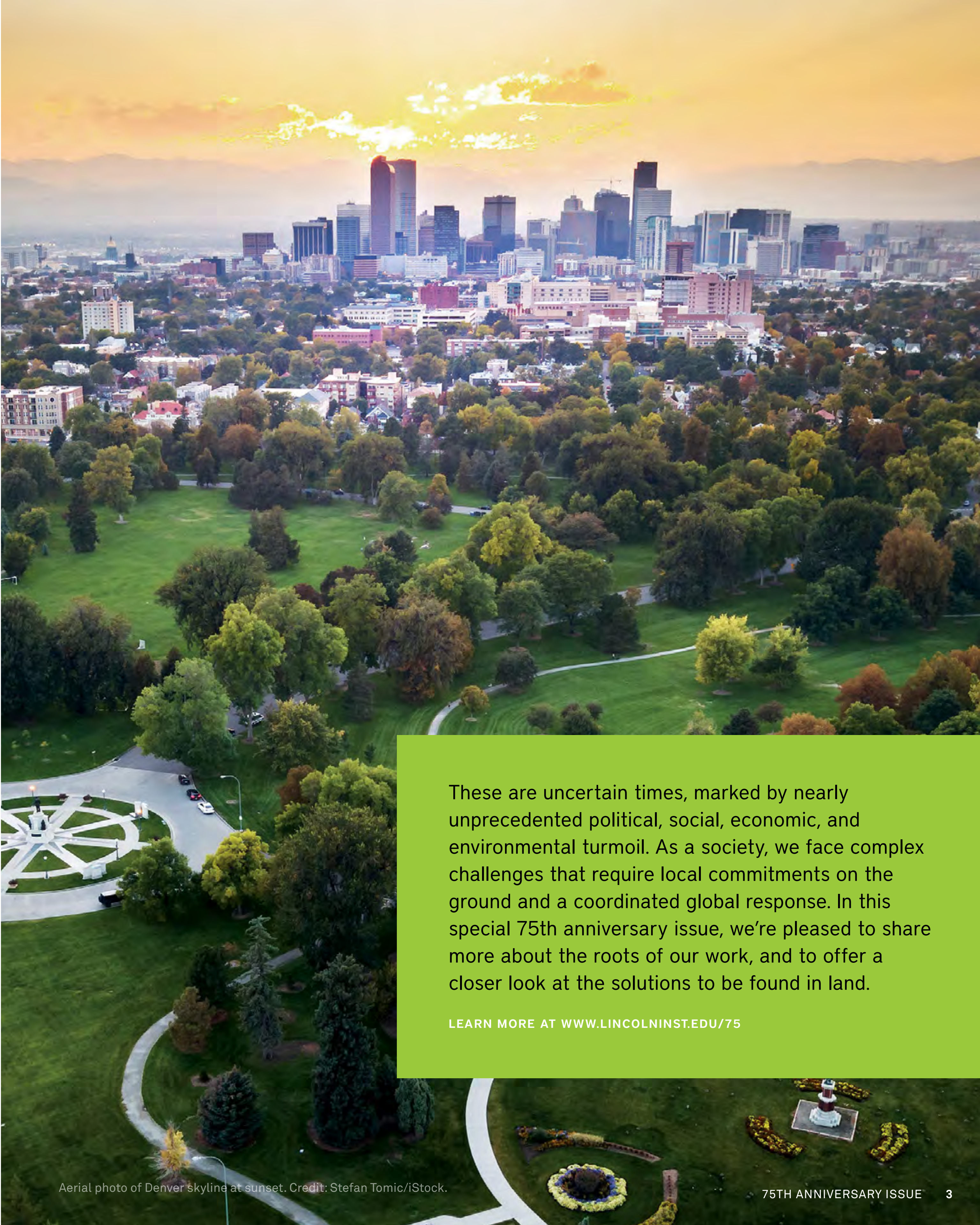
George’s observation that the rising tide of the Industrial Revolution simply wasn’t lifting all boats captured the imagination of the American public, including the young inventor and entrepreneur John C. Lincoln, who heard George speak in Cleveland in 1889. John cottoned to the suggestion that the solution to this pernicious problem lay in a single four-letter word: land. He launched the Lincoln Foundation in 1946 to support teaching and research related to the idea that changes to land ownership and taxation could effectively address social inequities.

Seventy-five years later, the Lincoln Institute of Land Policy—which was established by John’s son David in 1974 and merged with the original entity to become a private operating foundation in 2006—carries on that legacy. Our focus has broadened, but our commitment remains largely the same: to research and propose creative approaches to land as a solution to economic, social, and environmental challenges.

With offices in Cambridge, MA; Phoenix, AZ; Washington, DC; and Beijing, and with active programming and partners on six continents, we have become a global organization with a global impact. Whether we are teaching urban planning students about the finer points of municipal finance or advising policy makers in Latin America or China on land-based financing; whether we are convening an international network of conservation experts or guiding leaders of U.S. legacy cities through a scenario planning process, we do everything we can, everywhere we can, to promote the effective use, taxation, and stewardship of land. We demonstrate that the choices communities make about land policy can improve the quality of life for the people who call those places home.

These are uncertain times, marked by nearly unprecedented political, social, economic, and environmental turmoil. As a society, we face complex challenges that require local commitments on the ground and a coordinated global response. In this special 75th anniversary issue, we’re pleased to share more about the roots of our work, and to offer a closer look at the solutions to be found in land.

Explore the history of the Lincoln Institute in “The Life of an Idea,” page 4.



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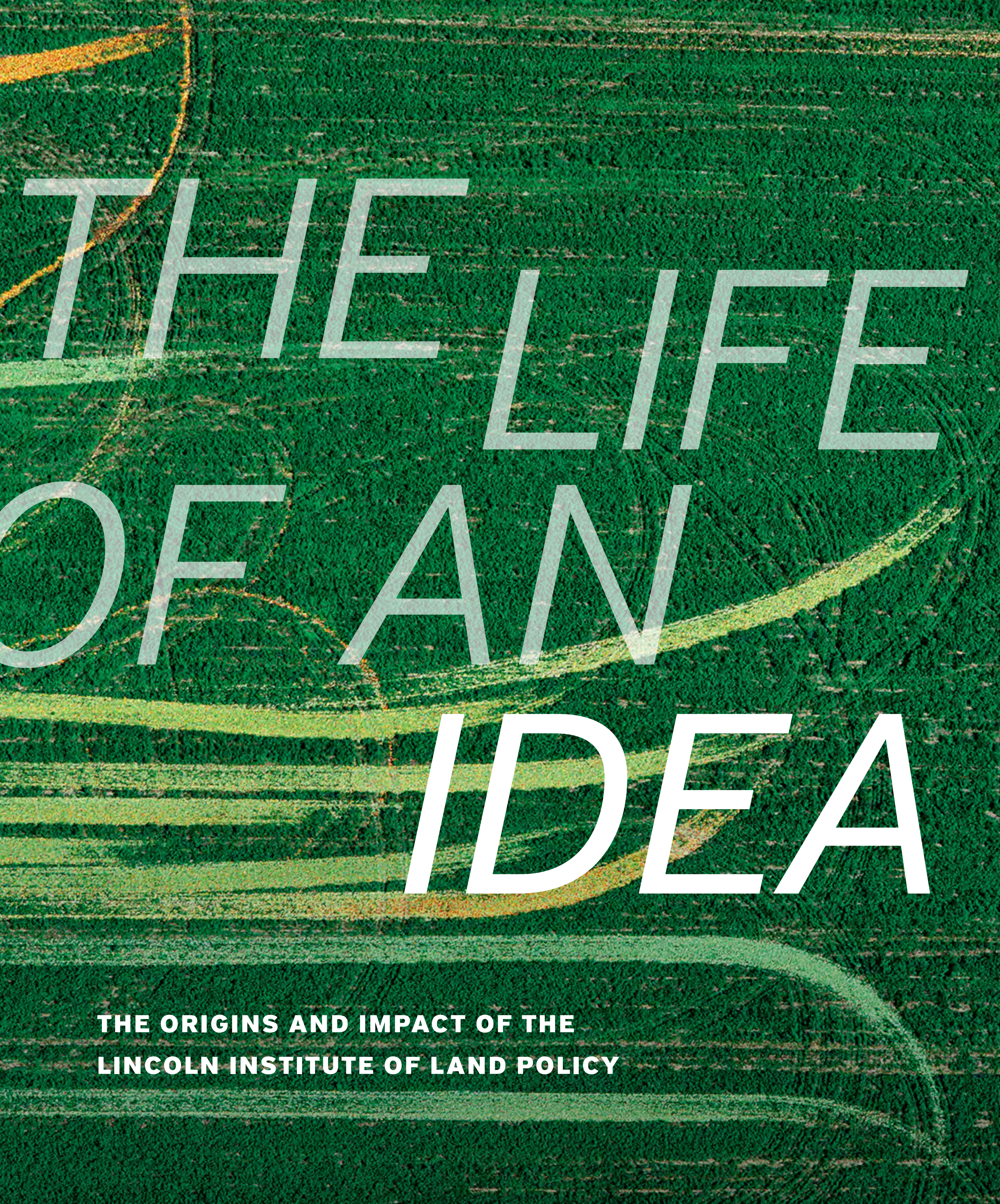
Aerial photo of Denver skyline at sunset. Credit: Stefan Tomic/iStock.



THE LIFE OF AN IDEA

THE ORIGINS AND IMPACT OF THE LINCOLN INSTITUTE OF LAND POLICY

By Anthony Flint

FOR A YOUNG John Lincoln, growing up in the countryside of Michigan and Ohio, a knack for fixing and inventing things was as readily apparent as his entrepreneurial spirit. He enrolled in Ohio State University but left in his third year, having read nearly all the engineering books in the library, and went to work in the emerging field of electricity at the end of the 19th century, in the same era as Edison, Westinghouse, and Tesla.

In his twenties, working for a series of small companies based in Cleveland, Lincoln invented an electric brake for streetcars, securing the first of 55 patents. He also invented an electric motor. And one of the nation's first electric cars. And ultimately, a system for joining metals through arc welding that would help power the extraordinary industrial mobilization at the start of the 20th century.

In 1895, with $200 of his own savings, he founded the Lincoln Electric Company, which would grow into a multibillion-dollar global enterprise that transformed the design and construction of buildings, bridges, ships, manufacturing machinery, and military armaments. Along with his younger brother, James, he established progressive employee policies including incentives, paid leave, health care, and a lifelong employment guarantee.

For a young John Lincoln, growing up in the countryside of Michigan and Ohio, a knack for fixing and inventing things was as readily apparent as his entrepreneurial spirit.

Tomato fields, north central Ohio. Credit: Alex MacLean.

1866

John Cromwell Lincoln born in Painesville, Ohio, to Louisa Lincoln, an educator and trained physician, and William E. Lincoln, a preacher focused on temperance and abolition.

1888

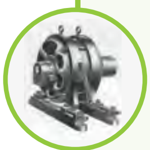
John Lincoln moves to the industrial hub of Cleveland and finds work electrifying city streetcar systems.

1889

Lincoln attends a speech by Henry George decrying the inequities of the Gilded Age. He later reads George's seminal work *Progress and Poverty*, igniting a lifelong interest in land use and policy.

1891

Lincoln invents an electric streetcar brake, securing the first of 55 lifetime patents.



1895

With $200 in capital, John Lincoln founds Lincoln Electric to develop and commercialize an electric motor. He also debuts one of the world's first electric cars.

1906

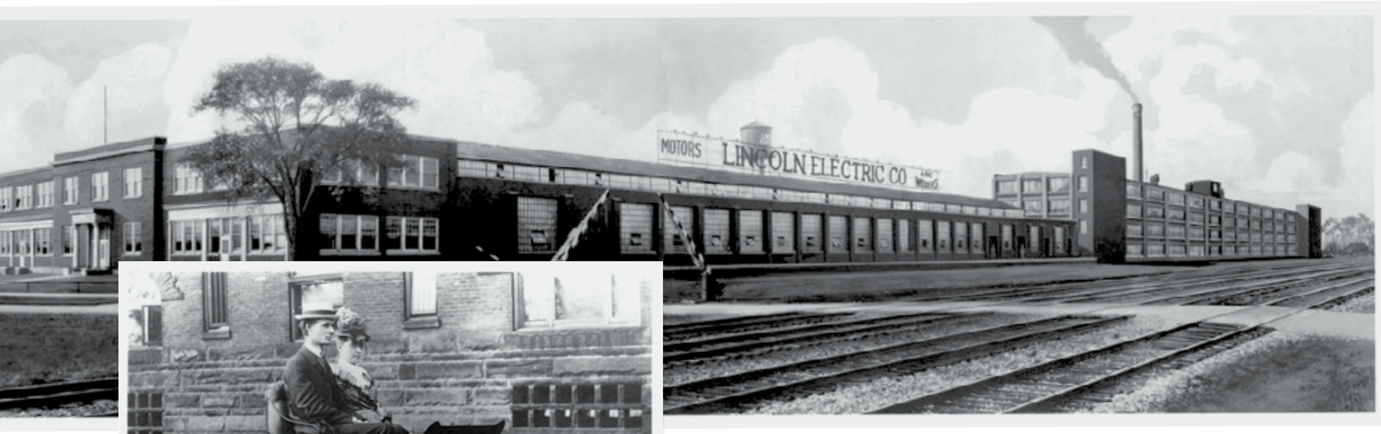
Lincoln Electric is incorporated. John soon hands the reins of the company—which would become known for its unique arc welding process and progressive employment policies—to his younger brother, James.

1913

John Lincoln earns an honorary degree from Ohio State, predated to 1888.

1924

John Lincoln is nominated by the Commonwealth Land Party to run for vice president of the United States, a mostly symbolic candidacy intended to bring attention to Georgist principles.



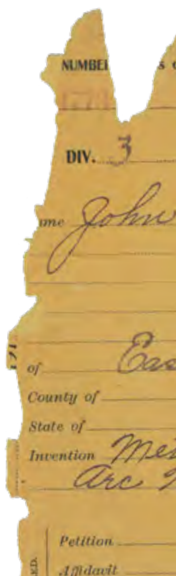
John C. Lincoln founded the Lincoln Electric Company in 1895 with $200 and "more nerve than knowledge." Among his inventions was a motor for an electric car (left). The company expanded quickly, moving into a former Cleveland automobile factory in 1923 (above). Lincoln Electric now has 58 facilities in 18 countries. Credits: LECO archives.

In any other biography, all of that would have been enough—the accomplishments of a lifetime. But Lincoln had another side, as a thinker, writer, and proponent of socioeconomic fairness in all its forms. Inspired by the political economist Henry George, he sought to address the growing gap between rich and poor. It was a rift fueled, to his mind, not so much by manufacturing and factories, but by his Gilded Age contemporaries enriching themselves through real estate speculation.

And so he turned his inventive mind to something else: establishing a tradition of education and research on land use and ownership, guided by principles of fairness. In 1946, he established the Lincoln Foundation, which later became the Lincoln Institute of Land Policy.

The audacious proposition underlying the Lincoln Institute—bringing together scholars and practitioners to investigate the unique importance of land in economies, government, and society at large—would live on through Lincoln's son and granddaughter, who became stewards of his legacy and innovators in their own right. Along the way, their vision has been embraced and advanced by dozens of board members, including fellow members of the Lincoln family; five chief executives; a faculty and staff that grew from a handful of scholars to a workforce of nearly 100 today; and a constellation of planners, authors, educators, and other partners. The Lincoln Institute has evolved to take on issues its founder could not have foreseen, from the climate crisis to the rapid urbanization of China. So it was that an idea sparked at the end of the 19th century became remarkably applicable for the 21st.

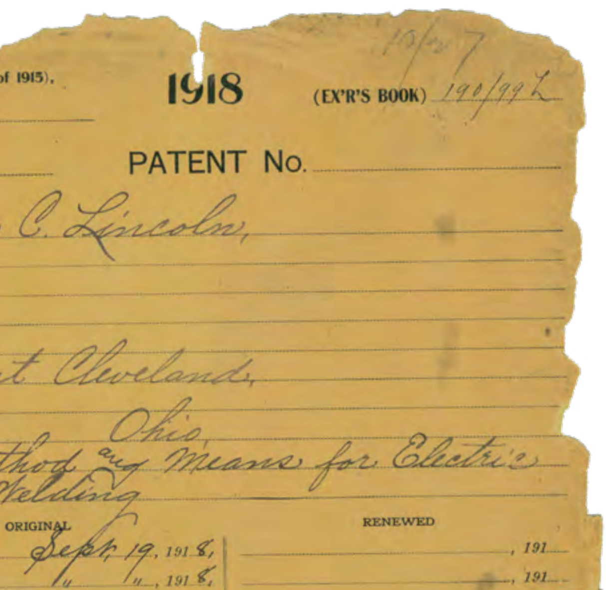
The niche that the Lincoln Institute works in—the role of land in society—is not always readily understood, says former Arizona governor, U.S. Department of the Interior secretary, and longtime Lincoln Institute board member Bruce Babbitt. "America does not have much of a land planning tradition," says Babbitt, for whom the Lincoln Institute's Babbitt Center for Land and Water Policy is named. The Lincoln Institute "is working on the frontiers of economics, science, conservation, and development . . . where innovation and risk-taking are essential to success."



"America does not have much of a land planning tradition. The Lincoln Institute is working on the frontiers of economics, science, conservation, and development . . . where innovation and risk-taking are essential to success."

Practitioners have taken notice. The former chair of the planning and zoning commission in Hartford, Connecticut—a city that has wrestled with the loss of population and manufacturing jobs—says the Lincoln Institute has helped the city conjure a new future, one defined by assets like regional high-speed rail. The Lincoln Institute "framed the policy discussions that can transform the way we use land," says Sara Bronin, who now leads the land use equity coalition Desegregate Connecticut. It has been invaluable to have the insight and support of an organization that helps kindle greater ambitions, says Bronin: "It just expands everybody's thinking."

Copy of a 1918 patent application for the arc welding process pioneered by Lincoln Electric. The patent, one of 55 earned by John Lincoln during his lifetime, was granted in 1929. Credit: LECO archives.



1925

David Colvill Lincoln, future president of the Lincoln Foundation and founding chair of the Lincoln Institute, is born. He is the third child of John C. and Helen Colvill, who married in 1918.

1931

Lincoln family moves from Cleveland to Phoenix. John Lincoln is active in the area's early development and begins a long tradition of local philanthropy.

1936

John Lincoln becomes the single largest funder of the Henry George School of Social Science in New York City.

1946

The Lincoln Foundation is incorporated in Arizona to promote education and research on land ownership and taxation.

1952

Former FDR adviser Ray Moley becomes involved with the Lincoln Foundation. He would later write the biography *The American Century of John C. Lincoln.*

1959

John C. Lincoln dies at 92. David C. Lincoln takes the reins of the Lincoln Foundation.

1962

David Lincoln establishes Lincoln School of Public Finance at Claremont Men's College, beginning a long partnership with California higher-education institutions.

1966

John C. Lincoln Institute for Research in Land Economics, Public Finance, and Taxation is established at the University of Hartford in Connecticut.

> "The land value created by the community belongs to the community, just as surely as the wheat raised by the farmer belongs to the farmer," wrote John C. Lincoln.

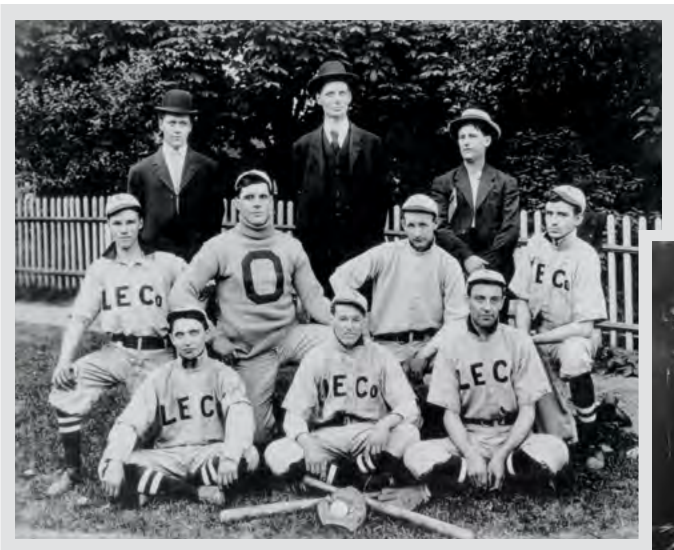
WHEN JOHN C. LINCOLN arrived in Cleveland in 1888, the city was a hub of technological innovation, not unlike Silicon Valley a century later. Lincoln started a family and his company there and, after he turned the operations of Lincoln Electric over to James and returned to the workbench, produced everything from a meat-curing apparatus to a wire-bending method for springs. And he read, and reread, *Progress and Poverty* by Henry George.

He had heard George speak in 1889, at a lecture he'd been invited to by a fellow inventor, Tom Johnson, who would later become mayor of Cleveland. He left that lecture hall convinced of a fundamental injustice: that landowners realized windfalls not by doing anything special or producing goods, but simply by holding land that increased in value because of government actions—like putting in a railroad line.

"The land value created by the community belongs to the community, just as surely as the wheat raised by the farmer belongs to the farmer," Lincoln wrote decades later in one of several pamphlets he published, this one titled "Stop Legal Stealing."

Lincoln rallied to George's cause, which is embraced today by leading economists. He even accepted a nomination from the Commonwealth Land Party to run for vice president of the United States in 1924, a mostly symbolic step intended to bring attention to Georgist principles and one he later deemed "a crazy thing to do."

He would spend little of the wealth he accrued from his inventions on creature comforts. Instead, he became the single largest benefactor of the Henry George School of Social Science, which was founded in 1932 in New York City and still operates today. In 1946, he established the Lincoln Foundation, which was to be "dedicated to education in its broadest sense," with a mission to "seek, through the dissemination of proven truth, to change the standards of economic education and of public opinion, and thus contribute to a more just and productive life for free men and women."



The Lincoln Electric baseball team (left); John Lincoln is in the back row, center, and his brother James is in the middle row, second from left. Below, the entire Lincoln Electric workforce in 1907. Credits: LECO archives.

Camelback Inn, Paradise Valley, Arizona. Credit: PicClick.com.

Having moved to Phoenix in 1931, primarily to improve the health of his wife, Helen, Lincoln engaged in new activities in the Southwest including mining and the fledgling tourism business. He cofounded the Camelback Inn in nearby Paradise Valley and became a major benefactor in health care and other civic initiatives; to this day, a street and a medical center in the area bear his name.

In the 1950s, things slowed down for the slender man a Cleveland newspaper had once dubbed “tougher than a mule,” after he had sprung into action to sever a downed trolley wire. John Lincoln reached the end of his life in Arizona in 1959. He left the legacy of the Lincoln Foundation to his progeny, who would guide it to the next levels of philanthropy, education, and research.

DAVID COLVILL LINCOLN, born in 1925, was the youngest of John and Helen’s three children. Like his father, David revealed an acumen in business, engineering, and philanthropy as a young man. When he took the reins of the Lincoln Foundation after his father’s death, he expanded the universe of grant recipients to include a school of public finance at the Claremont Men’s College in California, the University of Virginia, New York University, the University of Chicago, and the Urban Land Institute.

1968

David Lincoln expands activities internationally, cofounding Taiwan’s Land Reform Training Institute, now the International Center for Land Policy Studies and Training.

1974

David C. Lincoln launches the Lincoln Institute of Land Policy. The freestanding entity is funded by the Lincoln Foundation and welcomed to Cambridge, Massachusetts, by the president of Harvard University.

Its early work centers on the property tax, urban planning and development, land economics, and property rights. Arlo Woolery serves as the first executive director.

1975

Colloquium on Computer Assisted Mass Appraisal (CAMA) kicks off an era of leadership in the development of new methods for valuing property.

1979

Lewis Mumford receives the first Lincoln Institute of Land Policy Award; later recipients include Justice William Brennan and EPA Director William Reilly.

1980

Lincoln Institute holds a meeting of state tax judges, which becomes an annual national conference to share experiences and explore issues related to tax law.

1981

Representatives from 40 land trusts gather in Cambridge under the leadership of attorney and Lincoln Institute Fellow Kingsbury Browne. They go on to form the Land Trust Alliance; more than 1,000 member organizations have since protected 56 million acres and counting.

1986

Ronald L. Smith, dean of the School of Business Administration at Georgetown University, is named executive director.

David Lincoln, shown with a portrait of his father, launched the Lincoln Institute of Land Policy in 1974. At left, the organization's first offices in Cambridge, Massachusetts. Credits (l-r): Lincoln Institute archives, LECO archives.

The Lincoln Foundation had no staff then, and a 1963 annual report acknowledged that the first years "were measurably experimental." But David Lincoln collaborated with various advisers including Raymond Moley, a member of FDR's Brain Trust who had advised John Lincoln and made key introductions to scholars active in land economics. One such introduction was to the economist Archibald Woodruff, then the president of the University of Hartford. Woodruff became a board member of the foundation and offered a home to a new organization: the John C. Lincoln Institute, created in 1966.

Woodruff made further introductions, including to leaders at the Vatican and the United Nations, that led to discussions of land tenure and land reform internationally, and specifically in Asia. In 1968 the footprint of the Lincoln Foundation officially expanded with the establishment of the Land Reform Training Institute in Taiwan, now called the International Center for Land Policy Studies and Training and still a partner of the Lincoln Institute.

Still, David Lincoln had bigger dreams. The John C. Lincoln Institute in Hartford was a good start, but he and his board members envisioned a new entity that would be both far-reaching and freestanding. He wrote to at least a dozen university presidents proposing a collaboration on land use and land taxation issues. Derek Bok, then the president of Harvard University, was the only leader who wrote back, offering his assistance with the creation of a program in Cambridge, Massachusetts.

The Lincoln Institute of Land Policy was established in 1974 as a center for education on land use and land-related tax issues, funded by the Lincoln Foundation. Arlo Woolery, an expert on public utility regulation and valuation, served as its first executive director. The Lincoln Institute set up shop at a house on Trowbridge Street in

The Lincoln Foundation had no staff then, and a 1963 annual report acknowledged that the first years were "measurably experimental."

Cambridge, inviting professors from Harvard and MIT to help evaluate the research initiatives that could support practitioners and policy makers through the 1970s and beyond.

It was a welcome invitation at a time of great concern for the fate of struggling and conflict-riven cities, recalls William A. Doebele, the first curator of Harvard's Loeb Fellowship, which had been founded just a few years earlier, in 1970, to enlist mid-career professionals to help solve urban problems.

The idea of the Lincoln Institute "was to study the property tax in all of its forms—a hugely important source of income for municipal governments," says Doebele. "There were all kinds of studies about the income tax and other forms of taxation. But nobody was looking at property taxation."

David Lincoln, Doebele recalls, "was not someone who much liked being in the spotlight." He was unostentatious and frugal, toting around the same leather briefcase and driving the same car long past the time when most others would replace such things. But his understated demeanor belied a determination to push forward into new frontiers.

Just a year after its founding, the Lincoln Institute held a colloquium on Computer Assisted Mass Appraisal (CAMA), an emerging methodology to bring property valuation—still done with pencil and paper in many places then—into the digital era. The Lincoln Institute would go on to play a key role in making the tool widely accessible (see City Tech, page 26).

The fledgling institute was a welcoming place for up-and-coming scholars like Daphne Kenyon, a senior research associate at the Urban Institute, and Joan Youngman, who joined after doing groundbreaking work in taxation and law at Harvard. "It was not only open to new ideas, it also actively promoted and investigated new areas of research," says Kenyon, now resident fellow in tax policy at the Lincoln Institute. "I have certainly found it to be an intellectually stimulating place to work."

1988

Study of sprawl ramps up with a major forum on growth management in Phoenix. Subsequent research topics include smart growth, New Urbanism, regional planning, and "zombie" subdivisions. Lincoln Institute releases first major evaluation of smart growth policies in the United States.

1989

Land Lines first published as an eight-page internal newsletter.

1990

"Land Use and the Constitution" course launches. Early distance learning courses, including "Comprehensive Planning for Practitioners" and "New England's Forests," engage students nationwide.

1991

Lincoln Institute moves to current headquarters at 113 Brattle Street in Cambridge. The Queen Anne building was one of several once owned by the family of poet Henry Wadsworth Longfellow, and had been used as a school.

1992

First annual Journalists Forum held with reporters from 13 newspapers, including the *New York Times* and *Washington Post*.

1993

Program on Latin America and the Caribbean is established, tackling topics from informal settlements to cadastres. Training in land reform and the property tax begins in Eastern Europe.

1996

Kathryn Jo Lincoln, John Lincoln's granddaughter, becomes chair of the board and later chief investment officer. Harvard urban planning professor H. James Brown is named president.

Early areas of research at the Lincoln Institute included the fiscal and environmental impacts of sprawl. Credit: Duncan Rawlinson/Flickr CC BY-NC 2.0.

In addition to land and property taxation, land use was a major focus, as the Lincoln Institute explored the environmental and fiscal ramifications of suburban sprawl. This work "did help move the needle," says Richard Perkins, a founder of the real estate company LandVest and a former board member of the Lincoln Institute. Environmentally sensitive development was catching on with developers, but municipalities needed to know how to change the rules to encourage it. "That [influence] was huge," Perkins says. "It affects the entire world and how we live."

The study of sprawl continued under the next executive director, Ronald L. Smith, who arrived in 1986 after a stint as dean of the School of Business Administration at Georgetown University. In 1988, the Lincoln Institute hosted a major forum on growth management in Phoenix. This ultimately led to research on smart growth, New Urbanism, regional planning, "zombie" subdivisions, and the release of the first major evaluation of smart growth policies in the United States.

The cutting-edge movement for sustainable development drew strength from the Lincoln Institute's research and assessment, says Armando Carbonell, who led a regional land use planning system for Cape Cod, Massachusetts, before joining the Lincoln Institute to manage its urban programs. "We took a rigorous, evidence-based approach to look at what policies worked or didn't work," he says.

In the 1980s, financing land conservation became another critical part of the Lincoln Institute's growing portfolio. Boston attorney and Lincoln Institute Fellow Kingsbury Browne convened some 40 representatives of land trusts to engage in open-ended discussions, with the goal of establishing best practices for conservation easements and land purchases. That gathering gained both momentum and national

A 1983 meeting of land trust leaders. Lincoln Institute Fellow Kingsbury Browne is in the third row, left, and future Land Trust Alliance President Jean Hocker is standing, second from right. Credit: Files of Jean Hocker.

influence, much as the start-up work in CAMA had. The group became the Land Trust Alliance, whose more than 1,000 member organizations have protected 56 million acres and counting.

Convening practitioners, holding workshops, and fostering networks would become a hallmark of the Lincoln Institute. Journalists writing about cities and urban growth in the United States and Latin America, state tax judges, city planners, property rights scholars, international ministers, and mayors of post-industrial legacy cities have all come together regularly over the years, exchanging ideas and forming networks that advance policies and practices on the ground.

Nan Whaley, the mayor of Dayton, Ohio, has participated in workshops with fellow chief executives of struggling postindustrial cities. “It’s a nice relationship between listening and telling,” Whaley says, noting that the events she has participated in are designed “not to tell practitioners what to do, but to take into account what challenges each community is facing.”

Many other political leaders came to appreciate the bridge between research and training, and between policy and practice. “This was one of the first institutions of its kind that stepped back and looked at what we were doing in terms of the environment, land conservation, planning,” says former Massachusetts governor and presidential candidate Michael Dukakis. “Thoughtful analysis of what we were doing to our natural and urban environment—for guys like me, it was one place you could get sensible information about what was actually going on, during a time of massive disinvestment in cities. Now, we have lots of folks who are into this. But not then. It has been a real contribution.”

“This was one of the first institutions of its kind . . . . It was one place you could get sensible information about what was actually going on, during a time of massive disinvestment in cities.”

2000

First annual gathering of U.S. urban planners, which becomes the Big City Planning Directors Institute, held with the American Planning Association and Harvard Graduate School of Design. David C. Lincoln Fellowships in the study of land value taxation established.

2003

New program established in China, dedicated to studying environmental issues, rapid urbanization, and municipal finance. Joint venture with Sonoran Institute launches, focusing on planning and environmental issues in the American West. Superstition Vistas demonstration project uses scenario planning in the design of a major development outside of Phoenix.

2005

Gregory K. Ingram, director general of evaluations at the World Bank, is named president; launches annual Land Policy Conference (2006–2014) and associated publications on topics including property rights, climate change, and value capture.

2006

Lincoln Foundation and Lincoln Institute merge to become a private operating foundation.

First engagement at the United Nations World Urban Forum, followed by participation in UN conferences in Rio de Janeiro, Quito, and Abu Dhabi. *Making Sense of Place*, a trilogy looking at urban issues in Cleveland, Phoenix, and Portland, Oregon, premieres on public television. *Shifting Ground*, a parallel outreach effort about place and land, later debuts on National Public Radio. Kingsbury Browne Fellowship established for conservation leadership in partnership with the Land Trust Alliance.

2007

Award-winning website Visualizing Density, a companion to the book of the same title, launches as part of an effort to produce freely available databases to drive evidence-based decision making. Later databases include the award-winning Significant Features of the Property Tax.

Lincoln Institute Chair and Chief Investment Officer Kathryn Lincoln with Peking University President Ping Hao. Credit: Tao Jin.

The Program on Latin America and the Caribbean, launched in 1993, has conducted policy and education work in cities throughout the region, including Bogotá, Colombia. Credit: Arturo Rosenow/iStock via Getty Images Plus.

KATHRYN JO LINCOLN was born in 1954 on Long Island, New York, where David was working as an engineer for Sperry Rand. Katie Lincoln, as she is nearly universally known, was the second of four children born to David and his wife, Joan. A professionally trained actor and arts administrator who also earned an MBA, she became chair of the board of the Lincoln Institute in 1996. That same year a new president was named: H. James Brown, chair of the City and Regional Planning department at Harvard and director of the MIT–Harvard Joint Center for Urban Studies.

John Lincoln's granddaughter, who also sits on the board of the company he founded, Lincoln Electric, set about to sharpen the mission of the Lincoln Institute. She built on priorities identified earlier in the 1990s, which included the taxation and regulation of land; the functioning of land markets; transportation and land use; and community and individual rights and responsibilities in land. Those themes would soon be aligned with an expanded geography; as the new millennium approached, the Lincoln Institute's research and expertise were increasingly in demand overseas.

With the fall of the Soviet Union, newly independent Eastern European nations undertook land reform and property taxation as they made the transition to a free-market economy. A team from the Lincoln Institute tax department began traveling to Lithuania and other locations each year to teach the basics of the property tax.

Half a world away, fast-growing Latin America was struggling with urbanization and slums. After holding international conferences that included discussions of urban challenges in Mexico, which had been an area of special interest for David Lincoln, and testing the waters with a program on land use and development in Cuba, the Lincoln Institute launched the Program on Latin America and the Caribbean in 1993. Its focus included informal settlement, better-functioning land markets, and technology-enhanced cadastres.

The region, in particular Colombia and Brazil, was also experimenting with land value capture—returning increases in land value that resulted from government actions and public investments to the community, just as Henry George had described. Those experiments further fueled the Lincoln Institute's interest in that topic, ultimately leading to the report *Implementing*

Value Capture in Latin America: Policies and Tools for Urban Development.

By the turn of the 21st century, another part of the world was also rapidly urbanizing. The Lincoln Institute had been engaged with land policy work in Asia at least since the start of the training center in Taiwan in 1968, and now it began developing research programs in China, looking at topics including land use, housing markets, and land taxation. The board of the Lincoln Institute reached an agreement with top officials in China, through the influential Ministry of Land and Resources, to create a formal relationship. The Program on the People's Republic of China, established in 2003, was dedicated to studying environmental issues, rapid urbanization, and municipal finance. Four years later, the Peking University–Lincoln Institute Center for Urban Development and Land Policy launched in Beijing. Early projects ranged from training Chinese senior government officials and young scholars to producing and sponsoring hundreds of data-driven policy reports, says Joyce Man, the center's first director. Man notes that China has much to teach the United States and the rest of the world about sustainability, land-based financing of public infrastructure, and urban redevelopment. "The exchanges can go two ways," she says.

Katie Lincoln and Gregory K. Ingram, Brown's successor as president and a former World Bank executive, began traveling extensively to nurture relationships in China and other corners of the world. In the early aughts of the new century, the Lincoln Institute became a major partner in the United Nations Human Settlements Programme, known as UN-Habitat, and contributed to international summits from Nairobi to Kuala Lumpur. The Lincoln Institute was now fully operating on the international stage, taking its place alongside much larger philanthropic foundations and nongovernmental organizations, and would soon expand even further.

2007

Peking University–Lincoln Institute Center for Urban Development and Land Policy launches. Joint venture with the Regional Plan Association helps produce America 2050 initiative, centered on planning infrastructure at the scale of megaregions.

2008

Community Land Trust initiative fosters partnerships with municipalities to create sustainable affordable housing, ultimately spinning off to become National CLT Network.

2009

Publication of *Urban Planning Tools for Climate Mitigation* continues exploration of connections between climate change and land, with a focus on resilience, managed retreat, and green infrastructure.

2010

First 50-state property tax report issued in partnership with Minnesota Center for Fiscal Excellence.

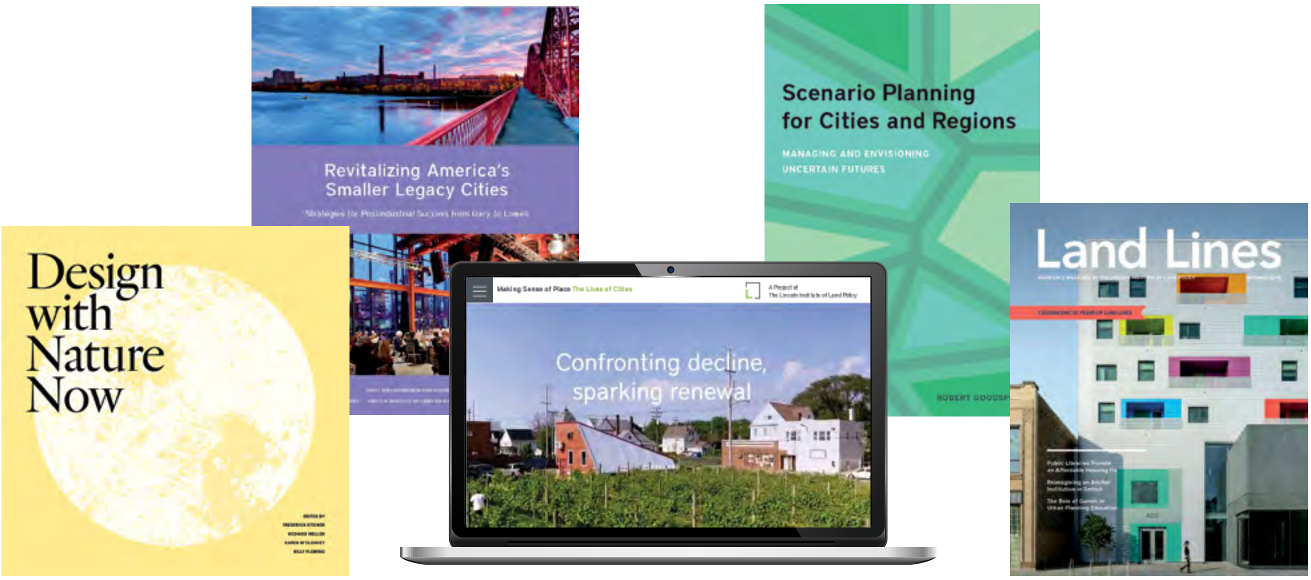
Other key tax-related publications focus on the land value tax, payments in lieu of taxes, use-value assessment of rural land, and tax breaks for business location. Dissertation support named C. Lowell Harriss Fellows in honor of longtime board member and Georgist scholar.

2011

Property in Land and Other Resources, coedited by Nobel Prize winner Elinor Ostrom, details how property rights systems affect scarce natural resources.

2012

The Atlas of Urban Expansion, a comprehensive online visual guide to global urbanization, follows the publication of *Planet of Cities*.



The Lincoln Institute makes land use research accessible to broad audiences through books, reports, videos, and podcasts. Credits: Lincoln Institute.

IN 2006, the Lincoln Foundation and the Lincoln Institute of Land Policy merged to form a private operating foundation. Katie Lincoln became its chief investment officer, overseeing the Lincoln Institute endowment. She diversified the portfolio and added mission-related investments, including the wetlands restoration company Ecosystem Investment Partners and an infrastructure fund for Africa. "I view this as a perpetual book that will live past my children, and my children's children," Lincoln says. "My responsibility is to make sure it is structured in such a way that we have an eye on long-term growth, but have enough income to support the work we're doing."

The new era also saw a renewed focus on outreach, with the establishment of a formal communications and publications program that produces books, reports, working papers, policy briefs, and *Land Lines* magazine. "It was important that we do the work, we do the research, but we present it in a way that made it accessible," says Lincoln, who worried about overly technical books sitting unread on the shelf. "I'm not the economist in the room, but someone like me has to understand what we do in order for us to be successful."

Today, Lincoln Institute publications are available in print and online; a distribution partnership with Columbia University Press ensures that they reach a broad audience. Multimedia projects have also been a priority: with Northern Light Productions, the Lincoln Institute launched a documentary film series, *Making Sense of Place*, examining urban issues in Phoenix, Cleveland, and Portland, Oregon. The one-hour films have been broadcast on public television and were recently updated and given new life as a website. The five-part *Shifting Ground* series, looking at land use conflicts and compromises across the nation, aired on public radio, and two podcast series—*Land Matters*, recorded in English, and *Estación Ciudad*, in Spanish—address key themes.

In another effort to make research more freely available, the Lincoln Institute assembled data on topics from municipal budgets to urban growth, creating tools that can be used by scholars, policy makers, journalists, citizen activists, and others. One database, Significant Features of the Property Tax, essentially replaced an annual report by the federal government that had been discontinued. Other databases, including Fiscally Standardized Cities and the Atlas of Urban Expansion, facilitated research on density, global urbanization, and municipal finance. With these and other projects, the goal has been to take advantage of advances in technology to bring more attention to the wealth of information that the Lincoln Institute has built up over the years and to help guide evidence-based decision making.

George "Mac" McCarthy, current president of the Lincoln Institute, during a press interview at the UN-Habitat conference in Quito, Ecuador, in 2016. Credit: Courtesy of *Next City*.

2012

Release of a major Lincoln Institute report on scenario planning plants seeds for the later establishment of the Consortium for Scenario Planning.

2013

Partnership with Consensus Building Institute promotes better communication about local land use with the release of *Land in Conflict: Managing and Resolving Land Use Disputes*.

2014

Economist George W. McCarthy, director of the Metropolitan Opportunity program at the Ford Foundation, is named president.

2015

International Land Conservation Network established to connect and engage conservation practitioners. *Inclusionary Housing: Creating and Maintaining Equitable Communities* published, part of a continuing effort to address spatial equity, affordable housing, and gentrification. Campaign promoting municipal fiscal health launched. Fiscally Standardized Cities database launches, allowing users to compare local information for 150 U.S. cities across more than 120 fiscal categories. *Financing Metropolitan Governments in Developing Countries* provides analysis for fast-growing urban areas.

2016

A Good Tax: Legal and Policy Issues for the Property Tax in the United States defends the tax as a mainstay of democratic, stable, and efficient local government.

2017

Center for Community Investment created to help communities mobilize capital to achieve economic, social, and environmental goals. Babbitt Center for Land and Water Policy founded to promote the integration of land and water policy. Lincoln Institute embarks on partnerships with OECD and Champion Mayors.

The annual Big City Planning Directors Institute gives participants an opportunity to share best practices and compare notes on urban issues. Convening practitioners is a core element of the Lincoln Institute's work. Credit: Amy Cotter.

Reinvention was again at hand as George W. "Mac" McCarthy, director of the Metropolitan Opportunity program at the Ford Foundation, was named the Lincoln Institute's fifth chief executive in 2014. McCarthy launched a strategic planning process that identified six "pathways to impact," organizational goals that address global social, environmental, and economic challenges through the lens of land policy (see Our Goals, page 20).

Under McCarthy, the Lincoln Institute became active in Africa, working with partners there to strengthen the planning capacity of local governments, develop and deliver curricula on the property tax, and foster the exchange of knowledge and ideas with other regions.

Three new centers also came into being. The Center for Community Investment helps communities mobilize capital to achieve their economic, social, and environmental priorities. The Babbitt Center for Land and Water Policy promotes and strengthens the critical links between land and water management, with an initial focus on the Colorado River Basin. The Center for Geospatial Solutions provides data, expertise, and services to expand access to technologies that can inform land use decisions around the world.

FROM THE BEGINNING, the idea of the Lincoln Foundation, and in turn the Lincoln Institute, was to use research and education to help address the toughest challenges of the day. The gap between rich and poor that was an affront to John Lincoln persists, and translates into current issues including affordable housing, fiscal stability, and social justice.

"The relevance is probably always going to be there, as long as there are people in cities and communities working to improve the quality of life, reduce poverty, and build wealth," says Andrea Taylor, a long-serving Lincoln Institute board member who is now the chief diversity officer at Boston University. Taylor adds that the Lincoln Institute is "constantly thinking about how it can continue to reinvent itself in response to what is happening in our societies, both domestically and across the world."

As the world confronts the challenge of climate change, with severe drought and rising seas potentially reshaping land and land use in myriad ways, and as it contends with the social and economic consequences of the coronavirus pandemic, the notion of putting land on center stage seems especially prescient. These crises are prompting new thinking about density and land use, housing, transportation—

From the beginning, the idea of the Lincoln Foundation, and in turn the Lincoln Institute, was to use research and education to help address the toughest challenges of the day.

and, ultimately, how to better express the fundamental principle that inspired the founding of the Lincoln Institute: fairness.

Taylor describes the current moment as an opportunity to rethink equity and access to resources, including land, and to create resilience by finding new ways to build community. "Nothing is static in land and land use—there are always new opportunities for solving problems," Taylor says. "The specific issues may change, but the underlying premise is based on people and place and space. I would think 75 years from now there will still be a big role for the Lincoln Institute to play, because these issues aren't going away."

Anthony Flint is a senior fellow at the Lincoln Institute and a contributing editor of *Land Lines*.

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2018

Place Database unveiled, drawing on a variety of sources to provide nationwide data visualization tools.

Global value capture campaign launches, stemming from *Implementing Value Capture in Latin America* and other work.

David C. Lincoln dies at 92 in Paradise Valley, Arizona.

2019

New partnership with Columbia University Press ensures global distribution of more than 200 book and report titles. *Design with Nature Now* revisits and celebrates Ian McHarg's *Design with Nature* and expands the message of *Nature and Cities: The Ecological Imperative in Urban Design and Planning* (2016). *Land Matters* podcast launches, as does Spanish-language podcast, *Estación Ciudad*. Major reorganization matches strategic goals with global geographies to broaden the impact of the Lincoln Institute's work.

2020

Making Sense of Place video series revamped as interactive website. Launch of Legacy Cities Initiative, dedicated to helping postindustrial areas regenerate equitably. Launch of Center for Geospatial Solutions to expand access to data and technologies that can inform global land and water management decisions.

2021

Lincoln Institute celebrates 75th anniversary with special events, publications, and celebrations.

WWW.LINCOLNINST.EDU/75

Our Global Reach

UNITED STATES & CANADA

Finding answers in land to improve the quality of life

With programming and partners on six continents, the Lincoln Institute is a global organization with a global impact. This map illustrates the broad geographies our program areas encompass. Icons indicate the goals that best align with our work in each place.

OUR OFFICES

LATIN AMERICA & THE CARIBBEAN

OUR GOALS

Low-Carbon, Climate-Resilient Communities and Regions

Reduced Poverty and Spatial Inequality

Fiscally Healthy Communities and Regions

Sustainable Land and Water Management

Functional Land Markets and Reduced Informality

Efficient and Equitable Tax Systems

OUR ACTIVITIES

Research

Produce quality data and findings to inform land policy and grow the field of research

Capacity Building

Build the capacity of decision makers and practitioners to make and implement effective land policies and practices

Communication

Foster recognition of land policy as a tool to address important social, economic, and environmental challenges

Credit: Kate Gallego/Twitter.

Phoenix is the fifth-largest U.S. city and the fastest-growing metropolis in the country. For Mayor Kate Gallego—the second elected female mayor in Phoenix history and, at 39, the youngest big-city mayor in the United States—navigating that growth means prioritizing economic diversity, investments in infrastructure, and sustainability. As a member of the Phoenix City Council, Gallego led the campaign to pass a citywide transportation plan extending to 2050, the country's largest local government commitment to transportation infrastructure when it passed in 2015. Before entering politics, Gallego worked on economic development for the Salt River Project, a nonprofit water and energy utility that serves more than two million people in central Arizona. Shortly after being elected to a second term, Mayor Gallego spoke with Senior Fellow Anthony Flint, kicking off a series of 75th anniversary interviews with mayors of cities that are especially significant to the Lincoln Institute. An edited transcript of their conversation follows.

Sustainability and Urban Form in Phoenix

ANTHONY FLINT: **Congratulations on your re-election. What issues do you think motivated voters most in these tumultuous times?**

KATE GALLEGO: Voters were looking for candidates who would deliver real data-driven leadership and science-based decision making. I come to this job with a background in economic development and an undergraduate environmental degree. My chemistry professor told us that the more chemistry courses you take, the less likely you [are] to move up in electoral politics. But I think 2020 may have been a different year, when science mattered to voters . . . Arizona voters wanted leadership that would take COVID-19 seriously, as well as challenges such as climate change and economic recovery.

For younger voters in particular, climate change was a very important issue. I ran for office as our community faced the hottest summer on record. In some communities, climate change may be a future issue, but in Phoenix, it is an issue facing us right now. Different generations describe it differently. So my dad tells me, if you can just do something about the heat in the summer here, you'll definitely be reelected. A different lens, but I think the outcome is the same.

"I ran for office as our community faced the hottest summer on record. In some communities, climate change may be a future issue, but in Phoenix, it is an issue facing us right now."

AF: **How has the pandemic affected your urban planning efforts? Did it surface any unexpected opportunities?**

KG: The pandemic has really changed how people interact with their communities. We saw recreational biking and walking increase. What people tell us is they didn't realize how much they enjoyed that form of moving about the community, and they intend to keep some of those behavior changes. . . . We're currently looking at how we can create more public spaces. Can we expand outdoor dining and let people interact more with each other?

Dr. Anthony Fauci has told us that the more time we can spend outdoors, the better for fighting COVID-19. But that also has other great benefits. I serve as mayor of the city with the most acres of parks of any United States city, and this has been a record year for us enjoying those Phoenix parks. . . . You can be in the middle of Phoenix on a hiking trail, and some days you don't see anyone else. So those amenities and the focus of our planning around parks have really improved this year.

We also continue to invest in our transportation system. We've decided to speed up investment in transit, a decision that we did have real debate over, which I think will allow us to move toward a more urban form. We've actually seen increased demand for urban living in Phoenix. We have more cranes in our downtown than ever before, and we are regularly seeing applications for taller buildings than we have seen before. I understand there's a real national dialogue about whether everyone will want to be in a suburban setting, but the market is going in a different direction in our downtown right now.

COVID-19 has also made us look at some of the key challenges facing our community, such as affordable housing, the digital divide, and food security, and we've made significant investments in those areas as well.

"We've actually seen increased demand for urban living. We have more cranes in our downtown than ever before, and we are regularly seeing applications for taller buildings than we have seen before."

Phoenix is the fifth-largest and fastest-growing city in the United States. Credit: Alan Stark/Flickr CC BY 2.0.

AF: Many people may think of Phoenix as a place with abundant space for single-family homes, where a house with a small yard and driveway is relatively affordable. Yet the city has a big problem with homelessness. How did that happen?

KG: Phoenix competes for labor with cities such as San Francisco and San Diego and others that have much more expensive costs of housing than we do. But affordable housing has been a real challenge for our community. Phoenix has been the fastest-growing city in the country. Although we have seen pretty significant wage growth, it has not kept up with the huge increases in mortgage and rent costs that our community has faced. It's good that people are so excited about our city and want to be part of it, but it has been very difficult for our housing market.

The council just passed a plan on affordable housing that includes a goal to create or preserve 50,000 units in the next decade. We are looking at a variety of policy tools, and multi-family housing will have to be a big part of the solution if we are going to get the number of units that we need. So again, that may be moving us toward a more urban form of development.

AF: Opponents of the recent light rail expansion argued it would cost too much, but there also seemed to be some cultural backlash against urbanizing in that way. What was going on there?

KG: Our voters have voted time and time again to support our light rail system. The most recent time was a ballot proposition [to ban light rail] in 2019, shortly after I was elected. It failed in every single one of the council districts; it failed in the most Democratic precinct and the most Republican precinct in the city. Voters sent a strong message that they do want that more urban form of development and the opportunity that comes with the light rail system. We've seen significant investments in health-care assets and affordable housing along the light rail. We've also seen school districts that can put more money into classrooms and teacher salaries because they don't have to pay for busing a significant number of students. We have really been pleased with the impact of light rail on our city when we have businesses come to our community. They often ask for locations along light rail because they know it's an amenity that their employees appreciate. So I consider it a success, but I know we're going to keep talking about how and where we want to grow in Phoenix.

By providing an alternative to private cars, the Valley Metro light rail system reduces airborne emissions by as much as 12 tons per day. The transit line has spurred economic development and earned broad support from voters. Credit: Jasperdo/ Flickr CC BY 2.0.

“We’ve seen significant investments in health-care assets and affordable housing along the light rail. . . . [Businesses coming to Phoenix] often ask for locations along the light rail because they know it’s an amenity that their employees appreciate.”

AF: We can’t talk about Phoenix and Arizona without talking about water. Where is the conversation currently in terms of innovation, technology, and conservation in the management of that resource?

KG: Speaking of our ambitious voters, they passed a plan for the City of Phoenix setting a goal to be the most sustainable desert city. Water conservation has been a value here and will continue to be. The city already reuses nearly all wastewater on crops, wetlands, and energy production. We’ve done strong programs in banking water, repurposing water, and efficiency and conservation, many of which have become models for other communities.

We are planning ahead. Many portions of our city are dependent on the Colorado River, and that river system faces drought and may have even larger challenges in the future. So we’re trying to plan ahead and invest in infrastructure to address that, but also look at our forest ecosystem and other solutions to make sure that we can continue to deliver water and keep climate change front of mind. We’ve also had good luck with green and sustainable bonds, which the city recently issued. It was time to invest in our infrastructure, and . . . partnerships with The Nature Conservancy and others have helped us look at how we manage water in a way that takes advantage of the natural ecosystem, whether stormwater filtration or how we design our pavement solutions. So we’ve had some neat innovation. We have many companies in this community that are at the forefront of water use, as you would expect from a desert city, and I hope Phoenix will be a leader in helping other communities address water challenges.

AF: Finally, if you’ll indulge us: our founder established the Lincoln Foundation in 1946 in Phoenix, where he was active in local philanthropy. Would you comment on the ways that the stories of Phoenix and the Lincolns and this organization are intertwined?

KG: Absolutely. The Lincoln family has made a huge impact on Phoenix and our economy. One of our fastest-growing areas in terms of job growth has been our health-care sector, and the HonorHealth network owes its heritage to John C. Lincoln. The John C. Lincoln Medical Center has been investing and helping us get through so many challenges, from COVID-19 to all the challenges facing a quickly growing city.

I want to recognize one family member in particular: Joan Lincoln, who was one of the first women to lead an Arizona city [as mayor of Paradise Valley, 1984 to 1986; Joan was the wife of longtime Lincoln Institute Chair David C. Lincoln and mother of current Chair Kathryn Lincoln]. When I decided to run for mayor, none of the 15 largest cities in the country had a female mayor; many significant cities, such as New York and Los Angeles, still have not had one. But in Arizona, I’m nothing unusual. I’m not the first [woman to serve as] Phoenix mayor and I’m one of many [female] mayors throughout the valley. That wasn’t true when Joan paved the way. She really was an amazing pioneer, and she has made it more possible for candidates like myself to not be anything unusual. I’m grateful for her leadership.

Anthony Flint is a senior fellow at the Lincoln Institute and a contributing editor of *Land Lines*.

Listen to the full interview on the *Land Matters* podcast: ***www.lincolninst.edu/podcast/kate-gallego***
Explore the *Making Sense of Place* film series to learn more about Phoenix: ***http://msop.lincolninst.edu/city/phoenix***

How the Lincoln Institute Helped Bring Property Taxes into the Computer Age

IN THE EARLY 1970s, the property tax was one of America's favorite villains. Homeowners had seen their tax bills soar to new heights. Stories of corrupt assessors filled the news. And policy makers across the spectrum concluded that local governments were maladministering the property tax at the expense of the residents they were supposed to serve.

In his 1972 State of the Union address, President Richard Nixon called the property tax "oppressive and discriminatory." In the presidential election that year, all the major candidates addressed the property tax during their campaigns. After the election, Senator Edmund Muskie of Maine, who had been defeated in the Democratic primary, commissioned a detailed investigation of state and local property taxes.

"The perpetuation of archaic, unfair—and too often secretive—systems of property taxation undermines the credibility of government at all levels," Muskie said at a Senate hearing in 1973, shortly after the study was complete. "It is a national outrage that in an age of computer technology, most governments fail to administer property taxes fairly."

Over the course of the next decade, the technology Muskie had alluded to evolved dramatically. Major advances in computing power, along with the emergence of a generation of well-trained, tech-savvy assessors who could harness it, revolutionized one of the most bedeviling aspects of the property tax: determining the market value of every property. At the center of this revolution was a small organization that had been established in 1974 in Cambridge, Massachusetts, to study and teach land policy.

Major advances in computing power would revolutionize one of the most bedeviling aspects of the property tax: determining the market value of every property. At the center of this revolution was a small organization that had been established in 1974 in Cambridge, Massachusetts, to study and teach land policy.

As much an art as a science, the assessment of real estate values—also known as valuation, or appraisal—has been a challenge of the property tax for centuries. In 17th-century England, government officials conducted assessments by counting the hearths and stoves in each home. Later, a tax on every window was intended to function in much the same way, but it spurred people to board up windows or build houses with fewer of them. Parliament repealed the tax in 1851.

Receipt for a tax on windows in an English dwelling, 1755. Credit: The National Archives/UK.

By the early 20th century, assessors typically used one of three basic methods of determining a property's value, all of which are still in use today. The first compares each property to recently sold properties nearby. The second looks at the income the owner could receive by leasing the property. And the third estimates the cost, in labor and materials, of rebuilding a given structure, plus the value of the underlying land.

The third method, known as the "cost approach," was widely adopted in the 1920s and 1930s. To calculate the value of the land, assessors relied on the price of recently sold vacant parcels in the same area. These were common in rural areas or new suburbs, but rare in established cities.

"Land value sales are like hen's teeth—you can hardly find them," said Jerry German, who became an assessor in Cleveland, Ohio, in 1974, when many calculations were still done manually. "You'd lay the map of the jurisdiction on the floor or some giant table. Appraisers would look at the map and say, 'It appears in this area, land is going for about a dollar per square foot.' . . . I can remember our senior appraisers walking around with little slide rules in their pocket to do calculations."

What all three valuation methods had in common is that assessors made individual calculations for every property and recorded them by hand on property record cards, which were often stored in long rows of filing cabinets. The process was vulnerable to errors, inconsistencies, and corruption, with little transparency as to who decided each property's value, how the calculation was made, or who else might have influenced the decision.

By the time German arrived in Cleveland, a handful of cities had been quietly laying the groundwork for computerized assessment for more than a decade. During the 1960s, advances in computer technology collided with new data requirements, as many states mandated the accurate disclosure of real estate sale prices for the first time. Assessors used the data to identify the characteristics of a property that influenced its price, such as square footage, the number of bathrooms, and location. Large jurisdictions that could afford early computers—and consultants with the special expertise to program them—could now calculate property values automatically. The new practice, Computer Assisted Mass Appraisal (CAMA), represented a leap forward, but it also had serious drawbacks.

"The worst thing for the assessor, aside from the expense, was the inflexibility of it," German said. "Everything was hard-coded in there, and once you . . . set your path and programmed everything in, it was hell and high water to get anything changed."

A property tax assessor on the ground in Connecticut, 1972.
Credit: Ralph Morse/The LIFE Picture Collection via Getty Images.

When the Lincoln Institute of Land Policy was founded as a school in 1974, its first executive director, Arlo Woolery, saw an opportunity. One of the organization's priorities was promoting a well-functioning property tax. By helping assessors computerize their work, the Lincoln Institute could provide the kind of support that had the potential to change local practices.

The Lincoln Institute held its first Colloquium on Computer Assisted Mass Appraisal in 1975. Only a handful of the roughly 13,500 assessing jurisdictions in the United States used computers to conduct mass appraisals then—"probably no more than 400 and possibly fewer than 200 jurisdictions," the appraisal expert Richard Almy estimated in a paper prepared for the colloquium. The Lincoln Institute's director of education, Charles Cook, who had worked previously for a private mass appraisal firm, began to convene and train assessors in an initiative to improve computerized appraisal and expand its use.

Recognizing that the cost and inflexibility of assessing software put it out of reach for most cities and towns, the Lincoln Institute developed software in the early 1980s called SOLIR (Small On-Line Research), which assessors could use and customize themselves with an off-the-shelf Radio Shack TRS-80 computer. This represented a breakthrough. For the first time, CAMA was accessible to local assessing offices without large budgets or computer programming skills. The Lincoln Institute provided SOLIR free to assessors who took a weeklong training course, releasing regular updates to the software for several years.

The project made the Lincoln Institute feel less like a research organization and more like "a computer startup company," said Dennis Robinson, who recently retired as the Lincoln Institute's executive vice president and chief financial officer. Robinson was hired in 1982 to oversee software development and training. He remembered "a coffee-stained, dirty, wrinkled carpet. That was our computer room. There was a bank of eight or so Radio Shack computers with programmers in there working on SOLIR."

The first assessors to use the software helped to improve it by testing its limits and recommending new features. At their request, the Lincoln Institute created a module that could help determine the value of land separate from any buildings—a critical function for maintaining up-to-date assessments.

Recognizing that the cost and inflexibility of assessing software put it out of reach for most cities and towns, the Lincoln Institute developed software in the early 1980s called SOLIR (Small On-Line Research), which assessors could use and customize with an off-the-shelf Radio Shack TRS-80 computer (right). This represented a breakthrough.

Credit: Zalasem1/Wikimedia Commons CC BY SA 4.0.

Computerized assessment, which the Lincoln Institute helped usher in during the 1970s and 1980s, has led to a more equitable property tax system. Credit: Courtesy of Data Cloud Solutions, LLC.

By the late 1980s, private software and consulting companies were incorporating the SOLIR technology into their own products, and the Lincoln Institute stopped developing its own software. But the Lincoln Institute continued to conduct research on innovative applications of CAMA and to convene and train assessors as the technology advanced. In the 1990s, assessors began using geographic information systems (GIS) software to develop location-based property records. By integrating these records with their CAMA systems, they could, among other things, measure the effects of neighborhood features, such as schools or parks, on the value of land. "They took these tools and did very creative, sophisticated things," Robinson said.

Today, CAMA has become central to property tax systems in the United States, Canada, and Western Europe. Many governments in Eastern Europe, Latin America, Asia, and Africa have also adopted some version of the tool, in some cases using satellite imagery or aerial photography to leapfrog over the paper records that undergirded the first CAMA systems.

In China, which is preparing to institute its first property tax, local officials in the fast-growing technology hub of Shenzhen recently developed cutting-edge applications of CAMA. They pioneered a system known as GAMA, which combines GIS with CAMA to build detailed three-dimensional models that account for factors such as views and the paths of light and sound. These added considerations can create differences of up to 20 percent in the value of apartments or condominiums within the same building.

Altogether, the advances in CAMA over the past few decades created a sea change in the administration of the property tax. "Computerized assessment might seem obvious today," said Lincoln Institute Senior Fellow Joan Youngman. "But it provided the infrastructure needed to assess every property at its true market value—the underpinning of any fair and equitable property tax system."

Will Jason is director of communications at the Lincoln Institute of Land Policy.

Read about three cities that improved their property tax systems in "Making a Good Tax Better," page 42.

A LEGACY OF INNOVATION

How Leaders in Cleveland Reimagined and Rebuilt Their City After Decades of Decline

By Anna Clark

CLEVELAND REACHED for the sky. It took years of sweat and more excavated dirt than the Panama Canal, but when Terminal Tower celebrated its grand opening in 1930, it became an instant icon of Beaux Arts elegance in a soaring city. While initial plans for the project had called for a 14-story building atop an interurban rail station, that vision was scrapped by the project's developers in favor of a more ambitious concept: 52 stories of sandstone and steel in the heart of Public Square. That made Terminal Tower the second-tallest building in the world.

As a hub, Terminal Tower connected Cleveland to that world: every train headed in or out of the city traveled through the station. So did a lot of people. The interior was a bustling palace of lobbies, shops, and brass-railed stairways. On the day of its debut, the facade glittered with spotlights, beginning a tradition of artful lighting still frequently used today.

Nearly a century later, it's not hard to see what made Clevelanders inclined to mark their skyline. With its location on Lake Erie, proximity to Canada and the Erie Canal, and access to a network of railroads and highways linking it to Pittsburgh, Akron, Detroit, and other boomtowns, Cleveland was an ideal location for shipping and industry. Around the time of Terminal Tower's construction, the local economy was built of cars, steel, electric equipment, and machine tools, as well as consumer goods: coffeemakers, greeting cards, paint, and much more. The streetlight was invented here, and the city earned international fame for the innovative Cleveland Clinic research hospital, founded in 1921, and the Cleveland Orchestra, which released music with Columbia Records. Well-regarded art and natural history museums, jazz clubs, and vaudeville thrived in Cleveland, as did the Play House, the first professional regional theater in the United States, and Karamu House, the country's oldest Black theater company, which premiered works by Clevelander Langston Hughes.

During the first half of the 20th century, the city drew hundreds of thousands of newcomers, including a surge of immigrants from southern and Eastern Europe in the early decades and, in the 1920s and 1930s, thousands of Black migrants from the South. To promote continued growth, the local electric company coined a slogan in 1944: "The Best Location in the Nation." The population continued booming until it peaked at 914,000 residents in 1950, making Cleveland the seventh-largest city in the country.

Map of Cleveland, 1898.
Credit: THEPALMER/iStock.

Opposite: The Cleveland skyline, including Terminal Tower (second from right).
Credit: tifonimages/iStock.

That “Best Location” catchphrase stuck around for decades, but the people didn’t. As the century wore on, the dazzling successes of the first 50 years gave way to staggering losses—of population, of industry, of jobs, and of prestige. Before long, Cleveland had another nickname, one far less flattering. Years of chronic disinvestment in the city, coupled with a rise in pollution and crime, inspired the unhappy moniker “Mistake on the Lake.”

Over the years, Cleveland became “the butt of an awful lot of jokes,” said Anthony Coyne, a native of the city who is a lawyer, former chair of its planning commission, and a board member of the Lincoln Institute. “We took a lot of hits on the chin from late-night hosts.” But Coyne said those jabs belie what is very much alive in Cleveland: “We’re really trying to embrace a quality-of-life agenda,” he said, pointing to a diversity of employers in health care, banking, higher education, and manufacturing, as well as revitalized public spaces serving both locals and visitors, including Public Square. “That’s kind of exciting to see [these spaces] refreshed after being dormant for many years.”

Strong leadership and tactical urbanism are transforming the relationship between this city and its residents. While much work remains, significant investments in an ambitious waterfront revival, affordable housing, and multimodal transit are positioning Cleveland for a new era.

Embracing the Waterfront

The Cuyahoga River is notorious for catching fire in 1969, but in that era, it was hardly uncommon for waterways to burst into flames. The United States had no enforceable water regulations, and rivers were frequently treated as open sewers. In this case, the blaze ignited when a spark from a passing train landed on a floating oil slick. *Time* magazine published a story about the fire alongside a jaw-dropping photo—but that image was from an earlier conflagration. The Cuyahoga had burned 13 times.

This time, the burning waterway catalyzed a nationwide movement for change. Cleveland’s mayor, Carl Stokes—who had made history two years earlier as the first Black mayor elected to lead a major U.S. city and who subsequently convinced voters to pass a $100 million bond for sewer upgrades—took reporters on a “pollution tour” the day after the fire. Stokes talked to the press about the effects of pollution on residents, and about how cities had few tools to address the issue, particularly when waterways crossed several jurisdictions. He also testified to Congress about the need for federal regulation: “We have the kind of air and water pollution problems in these cities that are every bit as dangerous to the health and safety of our citizens as any intercontinental ballistic missile that’s so dramatically poised 5,000 miles from our country.”

In the 1970s, Mayor Stokes testified to Congress about the need for federal regulation: “We have the kind of air and water pollution problems in these cities that are every bit as dangerous to the health and safety of our citizens as any intercontinental ballistic missile that’s so dramatically poised 5,000 miles from our country.”

Industrial buildings along the Cuyahoga River in the early 1900s. Credit: Detroit Publishing Company photograph collection, Library of Congress.

A partially submerged truck in Lake Erie, 1968. The truck is labeled *City of Cleveland*. Credit: Alfred Eisenstaedt/ The LIFE Picture Collection via Getty Images.

The fire and the conditions that led to it inspired a radically new approach to urban waterways, leading to the formation of the Environmental Protection Agency in 1970 and the passage of the Clean Water Act two years later. In Ohio, local leaders also developed the Northeast Ohio Regional Sewer District (NEORSD), a multijurisdictional management system that helped address industrial discharge and improved wastewater treatment.

Cleveland carries a heavy burden for its historical association with pollution, not only in the Cuyahoga, but in Lake Erie too. As the shallowest of the five Great Lakes, it is often the first to reveal the dangers of runoff from farming, sewage, and industry, including toxic algae blooms. Parts of the lake have been declared "dead." At one point in the late 1960s, the city installed weighted curtains in the lake in an attempt to create pockets of water clean enough for swimming. Dr. Seuss took a swipe at the situation in the original edition of his 1971 book *The Lorax*; he wrote of humming fish "in search of some water that isn't so smeary. I hear things are just as bad up in Lake Erie."

Like Cleveland's signature river, Lake Erie benefited from national and local policy changes, including the Clean Water Act and the Great Lakes Water Quality Agreement, a deal struck between the United States and Canada in 1972. By 1985, the water quality had improved so much that two graduate students asked Dr. Seuss to revise *The Lorax*. The author agreed, replying, "I should no longer be saying bad things about a body of water that is now, due to great civic and scientific effort, the home of happy smiling fish" (Egan 2017).

About 20 years ago, Lincoln Institute Chair and Chief Investment Officer Kathryn Lincoln worked with the Cleveland Foundation to make a film about the city for the Lincoln Institute documentary series *Making Sense of Place*, which was recently updated (LILP 2020). Interviewers asked community stakeholders what they saw as Cleveland's crown jewel, said Lincoln, who spent eight years of her childhood in Cleveland and serves on the board of Cleveland-based Lincoln Electric (see sidebar page 35). "We could see the lake from where we were sitting," Lincoln recalled. People pointed to the city's orchestra, or its neighborhoods, or its ethnic diversity, but "not a single person said Lake Erie."

Lincoln attributes the oversight to the way the lakefront has been separated from the downtown by train tracks, highways, and other barriers, including storm defenses like concrete, rocks, and steel. "You can't just leave the Key Bank office tower and walk along the lakefront," she said, referring to the city's tallest building, which claimed that title from Terminal Tower in 1991. "At least, you can't do it easily."

Lakefront access is especially scarce on the city's East Side, where most residents are Black and lower-income. For more than a century, a coal-burning power plant loomed along the waterfront there, blocking views and access while polluting the air. The plant, built in 1911 by the same company that later coined the "Best Location in the Nation" slogan, was torn down in 2017. That has inspired dreams of creating open space; the boldest imaginings involve relocating a section of Interstate 90 that cuts the lakefront off from 122-acre Gordon Park. Proponents say this concept, which is being studied by Cleveland Metroparks and other partners, would improve livability in nearby neighborhoods and increase the economic potential of vacant parcels.

When Jane Campbell became Cleveland's mayor in 2002, "the lakefront was not really embraced as the incredible resource it is," she confirmed. Campbell, who also serves on the board of the Lincoln Institute, said a visit to Chicago's waterfront and a conversation with that city's mayor, Richard M. Daley, inspired her administration to make changes at home. In 2004, with Campbell in the mayor's office and Coyne heading the planning commission, the city adopted a Waterfront District Plan, an ambitious proposal to unify and reinvent its eight-mile lakeside shoreline. The plan, supported by foundation money and fueled by community input, has a price tag of about $1 billion and has proceeded as funding has become available. "I haven't been mayor in 15 years, and our lakefront plan is still used as a guide," Campbell said. "That to me is a great accomplishment."

The city adopted a Waterfront District Plan in 2004, an ambitious proposal to unify and reinvent its eight-mile lakeside shoreline.

Changes have included the renovation of several pedestrian tunnels under a lakefront railroad line to ensure safe access to the waterfront. The Ohio Department of Transportation has been slowly converting a freeway known as the West Shoreway into a boulevard, reducing the speed limit to 35 miles per hour and adding landscaping and lakefront access. Other major projects have included a $2.3 million marina at

Parks and beaches on the Lake Erie waterfront have been cleaned up after years of neglect, becoming a destination for Cleveland residents. Credit: Pgiam/iStock.

North Coast Harbor and the 88-acre Cleveland Lakefront Nature Preserve on Dike 14, a former disposal area for sediment dredged from the Cuyahoga. Open space and affordable housing advocates have also raised the question of reinventing Burke Airport, which occupies 450 acres of prime downtown waterfront and saw air traffic decrease 60 percent from 2000 to 2018.

The city has also cleaned up waterfront parks and beaches after years of neglect. In the 1970s, Cleveland ceded management of its park system to the state because it couldn't keep up with high maintenance costs. (In 1978, Cleveland became the first city since the Great Depression to suffer municipal default.) The state returned 455 acres of city-owned property to local control in 2013, and improvements quickly followed.

Lee Chilcote, a journalist whose family has lived in the Detroit Shoreway neighborhood for 15 years, said the changes have been dramatic. Before the improvements to nearby Edgewood Park, he said, "We literally told our kids, 'OK, look at this beautiful view, but don't play in the sand.' . . . It was disgusting, because the state didn't have the time or resources to put into it." Now the park is a pleasure to visit, Chilcote said. Offshore, rowers and kayakers frequently ply the waters.

Regional improvements that build connectivity across political borders are also in the works, including dam removal and habitat restoration at Cuyahoga Valley National Park, which lies along the river between Cleveland and Akron. In the nearby suburb of Euclid, city and county officials partnered on a $30 million lakefront trail made possible by easements granted by private landowners in exchange for help with erosion control. A regional planning agency has allotted $250,000 to study the feasibility of a similar arrangement for a lakefront trail spanning Cuyahoga, Lake, and Lorain counties. In 2020, local leaders debuted a plan for the Cuyahoga River watershed called "Vision for the Valley."

And eight miles offshore from Cleveland, the city where the electric wind turbine was invented in 1888, the Lake Erie Energy Development Company wants to build North America's first freshwater wind farm.

Statue of former Cleveland Mayor Tom Johnson holding the book *Progress and Poverty*. Credit: russellkord.com/agefotostock.

CLEVELAND AND THE ORIGINS OF THE LINCOLN INSTITUTE

Cleveland is a city of special interest to the Lincoln Institute: it is where the inventor and philanthropist John C. Lincoln founded the Lincoln Electric Company in 1895. The company celebrated its 125th year in 2020, and Cleveland is still home to about 3,000 of its 11,000 employees. "We have 58 factories in 18 countries around the world, and Cleveland is by far the innovation hub," said Amanda Butler, the company's vice president of investor relations and communications. "We've been investing multimillions of dollars annually, and will continue to do so, to maintain Cleveland as the most innovative hub in our industry worldwide."

The city is also where John Lincoln encountered the work of the writer and economist Henry George, whose ideas about land value inspired the creation of the Lincoln Foundation and, ultimately, the Lincoln Institute. George's work also galvanized Tom Johnson, a fellow inventor who became mayor of Cleveland. Johnson championed public ownership of utilities and expanded parks during his tenure, which lasted from 1901 to 1909. The bronze statue of Johnson in Public Square, the city's central plaza, shows him holding George's most famous book, *Progress and Poverty*.

Expanding Housing Options

Cleveland is home to about 379,000 people today. In the 1950s, residents began flocking to the suburbs, including Shaker Heights, a planned community designed by the team that built Terminal Tower. As a result, the urban core saw many properties become vacant and eventually crumble into disrepair.

That downward spiral continued in the last decades of the 20th century and accelerated during the Great Recession. Between 2007 and 2015, banks foreclosed on more than 25 percent of all city parcels. Neighborhoods were hit by a cascade of problems: structural issues, lead contamination, and a plague of speculators buying houses in bulk over the internet. In 2007, the Slavic Village neighborhood, a predominantly Black community, had the highest foreclosure rate in the nation.

The housing stock was hurt not only by vacancy, but also by the Forest City's large base of wood-frame construction. "It's unlike Boston, or Columbus even, where there's a lot of masonry construction," said Coyne. In Cleveland, "homes are historically made of wood," making them especially vulnerable to deterioration. But a number of efforts, some of which are bearing fruit after decades of concerted effort, are interrupting the cycle of vacancy and disrepair.

As Coyne explained it, city leaders in the early 1990s pursued an aggressive agenda that emphasized the development of more diverse housing options, including townhouses and rental units, as well as lease-purchase programs and down payment assistance for modestly priced homes. In some ways this was a callback to Cleveland's post-war boom. To accommodate the surge in population in the 1940s, landlords in neighborhoods like Hough and the Near West Side converted mansions to rooming houses, and single-family homes into two- and four-family apartments (Souther 2017). But this time around, investment in housing alternatives was designed to accommodate population *loss*. By providing scalable options for people with different lifestyle and financial needs, the city hoped to give people more ways to stay.

Then-Mayor Michael White also challenged banks to live up to their mandate to comply with the Community Reinvestment Act, Coyne said. "It sent an important message to reinvest in demographics that were left out of the market," he noted, referring to the systemic racism that had created unequal housing patterns and opportunities in a city where Black residents make up more than half of the population.

The Great Recession hit Cleveland hard, leaving many vacant properties in its wake. Here, a postal carrier passes a vacant home in 2008. Credit: Timothy A. Clary/AFP via Getty Images.

When the Great Recession hit, Cuyahoga County responded by creating one of the first land banks in the nation.

Gus Frangos, president of the Cuyahoga Land Bank, points to a map of Cleveland foreclosures (marked in red) in 2011. Credit: Michael Williamson/The Washington Post via Getty Images.

Land Bank Pioneers

When the Great Recession hit, Cuyahoga County responded by creating one of the first land banks in the nation. The Cuyahoga Land Bank acquires property with the goal of returning it to productive use. This can mean patching together contiguous parcels for green space or development, demolishing vacant structures, or working with homeowners and other partners on property rehabilitation and maintenance. Funding for the land bank comes largely from penalties and interest on real estate tax assessments, as well as from grants and sales of city-owned properties. Cleveland created its own land banking program in 2009 as well, which works in partnership with the county. The Cuyahoga Land Bank might demolish a dilapidated building, for example, and then deliver the title for the lot to the city land bank, which then seeks buyers with plans that will "contribute to the economic, social, and environmental betterment of the city."

In its first 10 years, the county land bank demolished about 7,000 properties, supported in part by $50 million from Cuyahoga County's budget. According to a study commissioned by the land bank, each demolition generated nearly $60,000 in value to neighboring properties, for a total increase of $415.3 million (CLB 2019). The study also reported that the land bank spent about $56.3 million to rehab houses, adding an average of $151,105 to the value of each property. Nearly 11,500 distressed properties were returned to the tax rolls. Now, with fewer houses in need of demolition, the land bank has signaled that it will focus more on rehabilitation and stabilization, including home renovation, commercial development, and home-buying assistance programs.

Meanwhile, some neighborhoods are in the midst of a housing and population boom. Home prices rose more than 16 percent between 2015 and 2020 (Chilcote 2020). Downtown has grown from 5,000 residents to 20,000 over the last decade. Millennials are the largest group, according to the Downtown Cleveland Alliance, while empty nesters are the fastest-growing segment. In the next decade, the downtown population is expected to reach 30,000. Neighborhoods near downtown, including Detroit Shoreway and Ohio City, are also in high demand.

"The heart of any city is its downtown, and Cleveland recognized more than three decades ago that it needed to use every tool in the box to rebuild a vibrant, competitive downtown," said Alison Goebel, executive director of the Greater Ohio Policy Center and coauthor of the Lincoln Institute report *Revitalizing America's Smaller Legacy Cities* (Hollingsworth and Goebel 2017). She noted that the city has been particularly successful at securing state and federal historic preservation tax credits.

The boom has become so strong that one legacy program from the White administration, citywide tax abatements, is now controversial. In neighborhoods where house values have spiked, the homeowners, who are disproportionately white, still get a break on property taxes, meaning that the city is effectively subsidizing upscale housing, according to critics.

Meanwhile, neighborhoods with a majority of people of color aren't seeing meaningful gains in housing or investment. "As in most legacy cities," Goebel said, "redlining resulted in resource constraints that are racialized." According to a 2018 report on property devaluation in U.S. metro areas, the average devaluation of houses in predominantly Black neighborhoods in Cleveland is 20 percent. This means that a house valued at $85,000, the median home value in majority Black neighborhoods in Cleveland, should more accurately be valued at $104,000 (Perry, Rothwell, and Harshbarger 2018).

Hoping to change that, Cleveland Development Advisors (CDA) is launching an initiative that will see nearly $9 million invested over three years in three key neighborhoods: Clark–Fulton, Glenville, and Buckeye–Kinsman, all of which have struggled with disinvestment and concentrated poverty. The program will provide loans to developers at below-market rates to support social-impact projects and attract additional investment. Funding comes from JPMorgan Chase's annual Partnership for Raising Opportunity in Neighborhoods competition ($5 million) and CDA ($3.75 million). The challenge will be to accomplish the goals of the project while not replicating the gentrification and resulting displacement seen in some other neighborhoods.

In the midst of these investment projects, community members have been undertaking land use experiments of their own. Off Kinsman Avenue, residents started a dynamic farm on vacant land bank property, taking advantage of a 2010 zoning change that allowed urban agriculture. The Rid-All Green Partnership has four hoop houses, two greenhouses, and an aquaponics fishery; it provides food, beautifies the community, and offers jobs, educational opportunities, and even a comic book series to teach young people about environmental stewardship. "Community is pretty much the biggest cornerstone of what we do here," said Tim Lewis, a cofounder of the partnership that created and manages the farm, in an interview for *Making Sense of Place* (LILP 2020). "Without the community, you don't have anything to build off of."

"Community is pretty much the biggest cornerstone of what we do here. Without the community, you don't have anything to build off of."

Cleveland Development Advisors is investing in three neighborhoods that have struggled with disinvestment and concentrated poverty. This architectural rendering shows affordable housing planned for the Clark–Fulton neighborhood. Credit: RDL Architects.

Investing in Transit

Cleveland covers about 80 square miles. Its two biggest employment hubs—the downtown core and University Circle, where the city's hospitals are clustered—are some four miles apart. The route between those neighborhoods was long served by the Number 6 bus. Offering a slow ride on an aging fleet, the Number 6 "was not an economic development tool, shall we say," said former mayor Campbell. The city decided to invest in a Bus Rapid Transit (BRT) system, which has made rides quicker and more efficient, and has also stimulated an estimated $9.5 billion of mixed-use development along the corridor.

The project was a long time coming, emerging from a series of community conversations in the 1990s. The city secured its first grant for the project from the federal Department of Transportation while Campbell was in office in the early 2000s, and the program was implemented under Mayor Frank Jackson, now in his fourth term. The resulting HealthLine bus along Euclid Avenue—a main thoroughfare once dubbed "Millionaires' Row" due to residents including the founders of Standard Oil and Western Union—is now a popular feature of Cleveland's transit system.

The $200 million system debuted in 2008, financed in part by selling naming rights to the Cleveland Clinic and University Hospitals for 25 years. The Greater Cleveland Regional Transit Authority (RTA) was the first transit authority in the nation to sell such a sponsorship, and it has since made similar deals for regular bus routes now bearing the names of sponsors MetroHealth and Cleveland State. The HealthLine also received funding from city, state, and federal sources and the Northeast Ohio Areawide Coordinating Agency. When the HealthLine was scarcely five years old, one team of researchers described it as having "by far the highest" return on investment of 21 transit corridors studied (Hook, Lotshaw, and Weinstock 2013). The result, according to RTA's chief operating officer, Floun'say Caver, is that the HealthLine is "a jewel of our city" (Wood 2019).

Students from Cleveland State University at a stop on the HealthLine, a Bus Rapid Transit system that connects their college with other schools, hospitals, and neighborhoods. Credit: Greater Cleveland Regional Transit Authority.

The 7.1-mile route stretches from downtown to East Cleveland, a predominantly Black inner-ring suburb. Along the route are stops at Cleveland State University, Case Western Reserve University, and Playhouse Square. To the relief of riders, the number of stops has shrunk from 108 on the old Number 6 to 36 today. (Some riders say the line could stand to lose a few more stops, but the agency says it should remain a local service.)

The system's hybrid-electric buses run 24 hours a day on dedicated lanes in the middle of the road and are allowed higher speeds than other vehicles. Bike lanes hug the curb, and cars use the lanes between the bikes and buses. "We all just share the road," said Deltrece Daniels, an avid bus rider who works at Bike Cleveland.

Despite its successes, the system has faced criticism and legal challenges related to inequitable fare collection and enforcement. For the first several years of operation, passengers purchased fare cards before boarding. They could board at any door and had to provide proof of purchase when spot-checked by transit police. In 2010, the *Plain Dealer* reported that 85 percent of fare-violation tickets on RTA lines went to Black passengers, who made up 70 percent of ridership at the time; in 2017, a municipal court ruled that the spot-checking was an unconstitutional search. The RTA unsuccessfully appealed the decision.

Riders now pay as they board, which critics say has countered the efficiencies that made the line an improvement in the first place. Like many systems, the RTA doesn't give change. If you pay $3 for the $2.50 fare, you don't get your quarters back; that, according to Daniels, "adds up over time and could be $50 over a year. I don't want to give away money if I don't have to."

The HealthLine initially saw highs of about 4 million riders a year, but the COVID-19 pandemic and frustration over fare collection have led to decreases in ridership throughout the system. During the month of June 2020, the overall RTA system had 1.2 million riders, compared to 2.4 million during June 2019. Funds from the RTA's biggest revenue source, the county sales tax, have dropped too, even as heightened bus sanitation has added to operating expenses. The RTA received more than $111 million in federal aid in the early months of the pandemic, which helped offset the losses, and it has promised no service cuts or fare hikes in 2021. The agency also joined a national effort by transit authorities seeking increased federal relief.

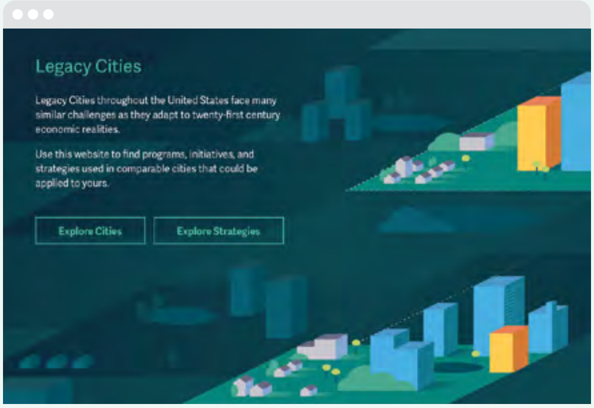
According to Angie Schmitt, a Clevelander who recently wrote a book about transit and equity (Schmitt 2020), Cleveland's transit system suffers from a pattern of underinvestment that could be remedied by a city levy or by financial aid from the state, which focuses most of its transportation spending on roads and highways. "There's still a good amount of road widening, two- to three-lane conversions in the latest sprawl suburb," she said.

The divisions among local, state, and federal interests are nothing new. After the Cuyahoga River burned, Mayor Stokes pointed out that a city's problems don't begin or end at its borders. Just as strong state and federal action was needed to revive the waterways of Cleveland and other cities across the country, cohesive state and federal leadership can strengthen the revival underway in this city and improve urban infrastructure nationwide. "Tragically, in some ways, cities are left on their own to survive," said Coyne, the former planning commission chair. "We just don't have a good urban agenda in Ohio."

Faced with that reality, Cleveland continues to manufacture its own urban agenda. The transformation of Public Square a few years ago offers an example of what is possible. The $50 million redevelopment of this central gathering place was completed in 2016, led by the firm of James Corner—the designer of New York City's High Line and a contributor to the Lincoln Institute book *Design with Nature Now*. The site was enlarged by about 40 acres and transformed into a walkable public mall overlooking Lake Erie, featuring public art, landscaped medians, and 1,500 newly planted trees. Planners eliminated cut-through roads, with the exception of a bus lane through the middle of the square. During the renovations, the city took the opportunity to implement a few infrastructure improvements. The upgrades included the reconstruction of electrical circuits dating to 1948 and the installation of an underground system that collects and reuses stormwater instead of sending it into the lake.

Anna Clark is a journalist in Detroit and the author of *The Poisoned City: Flint's Water and the American Urban Tragedy* (Metropolitan 2018).

Just as strong state and federal action was needed to revive the waterways of Cleveland and other cities across the country, cohesive leadership can strengthen the revival underway in this city.



ABOUT THE LEGACY CITIES INITIATIVE

In 2020, the Lincoln Institute of Land Policy launched the Legacy Cities Initiative to help policy makers, civic leaders, and other stakeholders build on their city's strengths to create a more equitable, sustainable, and prosperous future. Legacy cities are places like Cleveland that were once drivers of industry and prosperity but have since experienced economic and population losses. In the United States, legacy cities are home to nearly 17 million people and a collective economy worth $430 billion. In recent years, many legacy cities have advanced on a path of revitalization. Now they are being tested by unprecedented health and economic crises, which, together with demonstrations against police violence and increasing calls for addressing systemic racism, have shed light on longstanding inequities.

The initiative includes cutting-edge research and online tools, as well as opportunities for participants to connect with peers in other cities through a national network of governmental, civic, and philanthropic leaders. "Research and ideas are important, but the success of legacy cities depends on people," said Jessie Grogan, the Lincoln Institute's associate director of reduced poverty and spatial inequality. "A big part of our mission will be to bring leaders and civic advocates from legacy cities together so they can learn from one another and achieve even greater impact. No city will have to rebuild alone."

To learn more about the Legacy Cities Initiative, visit ***legacycities.org****.*

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MAKING A GOOD TAX BETTER

From Assessment to Collection, Three Places That Built Stronger Property Tax Systems

By Liz Farmer

KAMPALA, UGANDA, is home to 1.7 million people and is one of the fastest-growing cities in Africa. Situated on the north shore of Lake Victoria, this tropical capital city has many of the hallmarks of a booming metropolis: skyscrapers, bustling streets, public transit, and a lively nightlife. Major events like the African Water Association's international conference and the World Cross Country Championship have been held here. But like other large African cities, Kampala is experiencing rapid urbanization that has strained its financial and physical infrastructure.

Over the past decade, Kampala has increased municipal revenue by improving its property tax system. Until the early 2000s, the city was grappling with unreliable manual databases, outdated technologies, unclear procedures, a narrow tax base, and inadequate collection practices. In 2010, the central Ugandan government created the Kampala Capital City Authority (KCCA) and tasked it with delivering services and collecting revenues in the city.

With the new revenue from property taxes, the government has been able to invest more in schools, renovating or building classrooms and science labs and distributing hundreds of computers. Three public libraries have reopened since 2011, and roadwork projects are improving access to the urban core.

When it works well, the property tax is a reliable and productive source of revenue for local governments. In municipalities around the world, property tax revenue supports critical services and infrastructure including public education, public safety, water and sewer services, trash collection, public parks, and road construction and maintenance. Because it is tied to property, rather than to income or sales, the tax is relatively stable—and tough to shirk. Property, unlike income, "has a fixed location and is difficult to conceal," says Joan Youngman, a Lincoln Institute senior fellow.

But the property tax faces a challenge: unlike taxes on income or sales, which are typically baked into paychecks and cash register receipts, the property tax bill arrives separately. This makes it highly visible, politically sensitive, and often difficult to reform. Changing any aspect of the property tax requires persistence, innovation, and the ability to explain the complexities of government funding to the public.

Kampala, Uganda, undertook a municipal revenue overhaul that offers lessons for other rapidly urbanizing cities. Estonia and its capital city, Tallinn, implemented a land tax and the sophisticated technology to track it. Boston, Massachusetts, revived a mature system that had been in decline—and now has one of the most stable and productive tax systems in the United States.

Kampala, Uganda. Credit: Ben Welle/Flickr CC BY 2.0.

Reform is difficult, but it can be done, as illustrated by the experiences of Kampala and the other places in this story: Estonia and its capital city, Tallinn, which implemented a land tax and the sophisticated technology to track it; and Boston, Massachusetts, which revived a mature system that had been in decline—and now has one of the most stable and productive tax systems in the United States.

The property tax changes in Kampala, Tallinn, and Boston have provided predictability, which in turn has increased investment in development and jobs and, in some cases, improved credit ratings. This predictability also allows people who want to buy or develop property to better estimate their future tax liability and adjust their bids accordingly, says Youngman. Along with helping cities prosper financially, a property tax system based on efficiency and transparency can build faith in local government; residents who are regularly taxed are more likely to become engaged with local officials to ensure that their money is well spent.

The World Bank estimates it will cost sub-Saharan cities a collective US$93 billion a year to keep up with the infrastructure needs of their expanding populations.

Kampala, Uganda

According to the Lincoln Institute book *Property Tax in Africa*, a property-based tax is levied in every African country except Burkina Faso and the Seychelles. In countries including Uganda, the tax is a constitutionally guaranteed revenue source for local governments, but "almost everywhere in Africa, it is underused and badly administered" (Franzsen and McCluskey 2017).

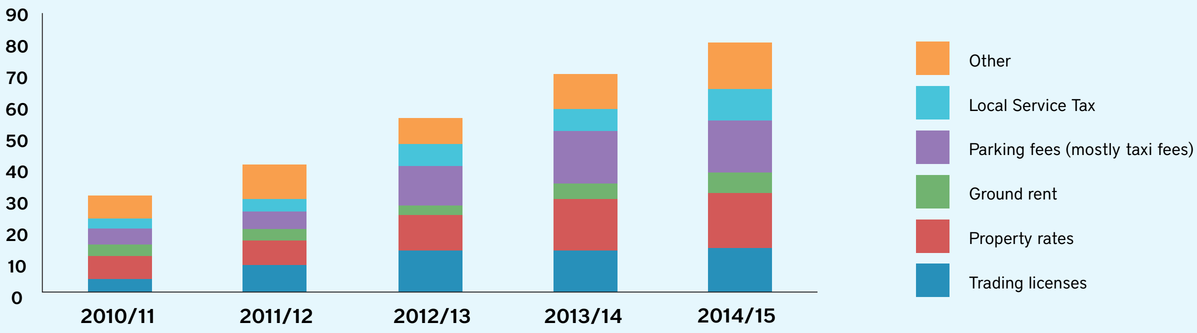
In general, the collection rate for property taxes in Africa has been low, according to the International Centre for Tax and Development (ICTD): just 0.38 percent of GDP on average, compared with 2.2 percent in developed countries. What's more, the administration of the tax has myriad complexities. In many cities, streets are unnamed and houses unnumbered. Large tracts of land in many countries are collectively owned and used for communal grazing and subsistence agriculture. In Uganda and Mozambique, this kind of collective ownership accounts for 62 and 90 percent, respectively, of the land area (Franzsen and McCluskey 2017). A shortage of qualified appraisers contributes to the difficulties of administering the tax effectively.

Many localities rely on transfers from the central government for funding. But given that African cities are expected to triple in size between 2010 and 2050, this model is unsustainable. The World Bank estimates it will cost sub-Saharan cities a collective US$93 billion a year to keep

Home to 1.7 million people, Kampala, Uganda, is one of the fastest-growing cities in Africa. Rapid urbanization has put a strain on the city's financial and physical infrastructure. Credit: Nick Greaves/Shutterstock.

OWN-SOURCE REVENUE IN KAMPALA (BILLIONS OF UGANDAN SHILLINGS)

In the five years after the Ugandan government created the Kampala Capital City Authority and tasked it with delivering services and collecting revenue, own-source revenue more than doubled. Credit: KCCA via International Centre for Tax and Development.



up with the infrastructure needs of their expanding populations (Taylor 2016). Central governments can help to some degree, but these cities will have to reform their tax systems to become more self-sustaining.

Before the establishment of the KCCA, Kampala experienced "extremely low revenue collections and poor tax morale," meaning a general unwillingness on the part of residents to pay taxes, notes a report from the International Growth Centre, or IGC (Andema and Haas 2017).

A critical aspect of the success of early revenue reforms, says Priya Manwaring, an economist with the IGC based in Kampala, was that the KCCA was staffed in part by experts from the national tax authority. "The Uganda Revenue Authority is a well-functioning institution, and many of them come with a high level of understanding and skills," Manwaring says.

The first five years of reform in Kampala were devoted to making it easier for Kampalans to pay their taxes and for the government to keep track of taxes owed and payments made. It was no small effort. Previously, the city had farmed out revenue collection to third parties, using 151 bank accounts, many opened by employees without authorization. This made it impossible to accurately estimate revenues or prevent graft. Records were poorly kept and often wrong.

To address this, the KCCA spent a year developing an open-source tax collection program called eCitie, launched in 2013. The program auto-sends bills and receives and tracks payments for items such as business licenses, property taxes, and room taxes. In relatively short order, Kampalans went from standing in line for hours at downtown offices and dealing with lost bills to paying bills on their smartphones. (Smartphone take-up rates in Africa are less than 50 percent but are rising rapidly, particularly among the well-educated.)

A 2015 report from the IGC noted that Kampala's payment system was on par with those in developed countries (Kopanyi 2015), and the improvements had paid off almost immediately. Revenues soared from 30 billion Ugandan shillings (US$9 million) in 2011 to 81 billion shillings (US$24 million) in 2015. Even after accounting for inflation, that represents a rise of 89 percent. Though the annual cost of collection increased ninefold during that time, the jump resulted mainly from startup costs, which were recovered with higher revenues after one year. Although operating costs have also increased,

The Kampala Capital City Authority has undertaken road improvements throughout the city, including along the busy Queensway, which carries traffic to and from downtown. Credits: KCCA.

"the KCCA has now moved from a low-cost but unsustainable revenue collection to a higher-cost sustainable system" (Andema and Haas 2017).

More important, in just a few short years, Kampala was generating about one-third of its own income through property taxes on commercial properties and income-generating properties such as rental housing. The experience in this city, which first began taxing property in 1948, offers resounding support for the idea that revenues can be increased by simplifying the system. Kampala went from collecting more than 20 different types of taxes to focusing only on top sources of revenue and making it easier to pay those taxes. (Even in places where collection rates are high, instituting more convenient systems makes a difference: after Scotland added a direct debit option, the tax collection rate in Edinburgh rose from 93 percent to 97 percent.)

For Kampala, the revenue jump was encouraging, but officials knew they were still collecting only a fraction of the taxes owed. After increasing over the first two years, revenue from property taxes remained stagnant at around 35 percent of total revenue. The next phase of reform targeted other aspects of the long-neglected system. The last valuation had been conducted in 2005, with an incomplete revision in 2009. The property register was disorganized and did not include many modern buildings that could have generated tax revenue. Considering that rental values in some areas of the city had tripled between 2005 and 2013 (Kopanyi 2015), the city was leaving money on the table.

With financial support from the World Bank, the KCCA used geographic information systems (GIS) to compile a database of all buildings, including residences. The agency assigned each building an address and a new valuation. The database was then linked to eCitie. Of the 350,000 properties in Kampala, 64 percent were now identified as taxable, up from 47 percent at the previous inventory.

Now, says Manwaring, officials can better track increases in revenue from property taxes as well as potential revenue. In the city's Central and Nakawa divisions, for example, revenue rose from 14 billion Ugandan shillings (US$5.6 million) in fiscal 2013–2014 to 38 billion (US$10.2 million) five years later (Manwaring and Regan 2019). Revenue collection took a hit during the pandemic, however, with one report citing an 83 percent drop in payments collected from April to June 2020 compared to the same quarter the previous year (Mwenda 2020). A major factor, officials said, was the inability to conduct in-person outreach.

"Even though there are significant gaps in compliance, there's a better understanding of what the potential revenue could be," says Manwaring. Ultimately, she adds, the new data "laid the groundwork for thinking about potential mass valuation models in the future."

The international finance community has recognized the progress made in Kampala. World Bank funds support ongoing infrastructure projects, and the Arab Bank for Economic Development in Africa is funding a three-story building that will provide 2,000 workspaces to the community (KCCA 2019). Kampala was also awarded its first-ever credit rating in 2015, a respectable A1. And the KCCA has made a number of investments in the local economy. It set up an employment service bureau that has trained more than 4,000 people and connected some 600 of them with jobs.

Despite progress and praise—*Property Tax in Africa* suggests that the enhancements in Kampala "can and should be replicated in other local governments in Uganda" (Franzsen and McCluskey 2017)—Kampala's government has struggled to communicate the link between paying taxes and receiving better services. Some local residents see the creation of the KCCA as an attempt to grab power by Uganda's president, Yoweri Museveni. Manwaring says the KCCA "has invested a lot in communications and awareness," but confirms that it is a long-term effort.

"I wouldn't say people are unwilling to pay taxes, full stop," Manwaring says. "The city, at least from my point of view, is a well-functioning institution, and that does lend itself to building up trust. But there's always more that can be done to raise voluntary compliance."

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Kampala Library and Information Centre, one of the oldest public libraries in the country, was established in the 1950s and is now managed by the Kampala Capital City Authority. Credit: KCCA.

Tallinn, population 437,000, is the capital and largest city of Estonia. Credit: Christophe Pinard/Flickr CC BY 2.0.

Tallinn, Estonia

When the Soviet Union broke up in 1991, more than a dozen former Communist states had to develop a national government and revenue system essentially from scratch. Estonia took full advantage of the opportunity. Over the course of a generation, the Baltic nation of 1.3 million people transitioned from a system that hadn't recognized land ownership at all to one that acknowledges land ownership, collects a land tax, and has created a sophisticated technological ecosystem that made it, according to a *Wired* article in 2017, "the most advanced digital society in the world" (Hammersley 2017). The country's total embrace of digital government means that an Estonian can legally establish a business in a few hours, and real estate transactions can be finalized in a matter of days, instead of the months it used to take.

This success would not have been possible without the groundwork laid when the nation regained its independence. Estonia's turbulent history has been marked by centuries of Danish, Swedish, and Russian rule. After a brief period of independence between 1918 and 1940, the country was a Soviet Republic for the next 50 years. The people's land rights and ownership were taken away during this era, which made the process of establishing who owned what—and how much it was worth—extremely difficult when the country regained its independence.

First, the right of individuals to own land had to be reestablished; that was achieved in 1992 with the drafting of a new constitution. A system for returning land parcels to their former owners was created, and 212,000 land claims were filed by 1993 (Malme and Tiits 2001). Over the next few years, the national government drew up land valuation principles and a land value tax. It took the rest of the decade to process the land claims and update the land registry accordingly.

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By taxing only land, not buildings, the system was designed to encourage development, particularly in the capital, Tallinn. “Unlike a tax on improvements, a tax on land does not discourage maintenance and construction,” says Youngman. “It can also reduce incentives for land speculation and for withholding land from the market in times of rising values.” It was also a pragmatic decision, because data and public records on buildings were incomplete. Aivar Tomson, a former manager at the Estonian National Land Board, notes that many of the new government officials, including then-Prime Minister Mart Laar, were in their late twenties or thirties. Their decisions tended to be progressive, market-driven, and quickly made. “It was at least partly a shock therapy to find out how people can survive in a completely new environment,” Tomson says.

The land tax avoided contentious issues of building valuation, but its implementation was still controversial. “It was rather complicated to explain to the landowners,” says Tomson, “that despite their ownership rights, they are obliged to pay an annual land tax.”

Over the years, however, this approach has helped drive economic development, especially in Tallinn. Construction boomed in the capital in the early 2000s, mainly with infill and higher-density housing. In 2000, fewer than 500 new flats were constructed; in 2007, more than 3,000 new flats were built (Wenner 2015). The Tallinn metro area’s economy now accounts for 64 percent of the country’s GDP and 51 percent of employment. But thanks in part to the country’s embrace of urban density, Tallinn remains one of the more affordable European cities and is among the least polluted. The city has invested heavily in improving local parks, renovating schools, and upgrading infrastructure. Its 2020 budget included raises for teachers and nurses and 5.7 million euros (US$6.7 million) toward renovating the historic Tallinn City Theatre complex.

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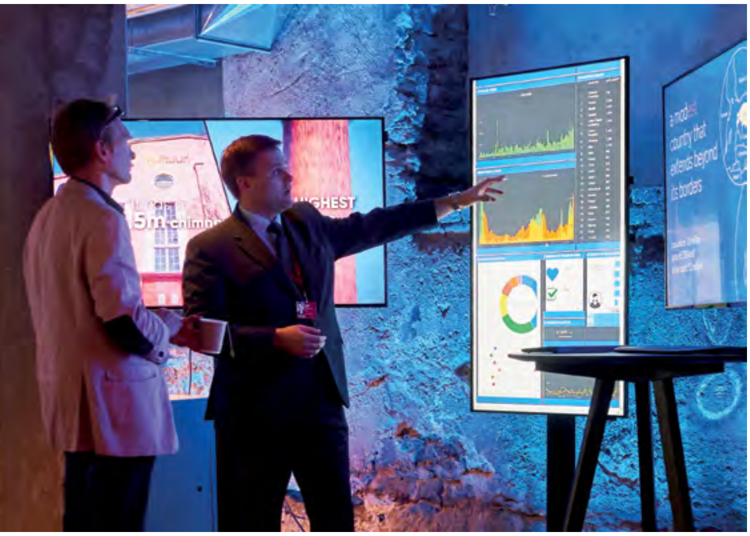
City officials have made many investments, including restoration of the historic Tallinn City Theatre complex. Credit: mikeinlondon/iStock.



Estonia has gained international attention for its pioneering use of digital tools, including the launch of governing platform e-Estonia in 2012. Credit: Annika Haas/Flickr CC BY 2.0.

Estonia's transformation into a digital republic has also bolstered its tax system. While the governments of most countries are slowly digitizing records and transactions, Estonia jumped into e-government in the 2000s. With the launch of governing platform e-Estonia in 2012, the country began using secure technology that allows users to record data and transactions instantaneously. For tasks ranging from voting to getting a mobile ID to paying taxes, all that's required to interact with the government is an internet connection.

The move to a digital system has earned Estonia all sorts of accolades from the business community for startup friendliness, and for landowners it offers an extra layer of security. The system has transformed the way property transactions are carried out, eliminating the need for residents to visit public offices and spend hours waiting for a civil servant to search records. This paper-free system has reduced the processing time for land transactions from up to three months to as little as eight days.

Estonia still has a weak spot familiar to property tax officials across the world: land values have not been reassessed since 2001, even as they have increased by roughly sevenfold over that time period, said Tomson, now the deputy director of a Tallinn-based real estate consulting firm. Tomson hopes there will be a reassessment in 2021, but he fears that the unpopularity of such a move will delay it. "The exact revaluation period is not fixed according to the law," he says. "It is always easy to wait for better times."

The move to a digital system has earned Estonia all sorts of accolades from the business community for startup friendliness, and for landowners it offers an extra layer of security. The system has transformed the way property transactions are carried out, eliminating the need for residents to visit public offices and spend hours waiting for a civil servant to search records.

Boston, Massachusetts

In 1980, Boston was "a city in decline," wrote Harvard economist Edward Glaeser years later. The city's population had shrunk dramatically from its peak, he noted, "and real estate values had sunk so low that three-quarters of its homes were worth less than the bricks-and-mortar cost of constructing them." Like other once-thriving industrial cities, the capital of Massachusetts seemed headed for "the dustbin of industrial history" (Glaeser 2003).

Contributing to the city's economic woes was a property tax system described by the *Boston Globe* in 1976 as "crippled with abuse" and rampant with disparities. The last citywide reassessment had been conducted in the 1920s, and the failure to reassess for a half-century had led to growing tax inequities in neighborhoods where property values had appreciated at different rates. Relying on assessments from the 1920s meant that residential property in the predominantly Black neighborhood of Roxbury, for example, was assessed at approximately 40 percent of the current market value, while properties in Charlestown, a traditionally Irish neighborhood where appreciation had been greater, were assessed (and therefore taxed) lower, at approximately 16 percent of current market value.

Instead of updating assessments, the city tended to simply raise tax rates to secure the revenue it needed. In 1981, Bostonians were paying a nominal property tax rate of 27 percent, one of the highest rates in the nation. That was "completely unsupportable if assessments were at all close to market values," noted the Lincoln Institute book *A Good Tax* (Youngman 2016). The problem was occurring statewide; the nominal property tax rate in Billerica, halfway between Boston and the New Hampshire border, was as high as 31 percent.

In the 1970s and early 1980s, a series of court cases and a statewide ballot measure led to two important changes in the state constitution. The first of those changes allowed for but did not require the classification of properties, meaning that residences could be taxed at a lower rate than businesses. Then a citizen-led ballot measure, Proposition 2½, capped the property tax, limiting total revenue to 2.5 percent

In 1980, Boston was "a city in decline," wrote Harvard economist Edward Glaeser years later. . . . Like other once-thriving industrial cities, the capital of Massachusetts seemed headed for "the dustbin of industrial history."

After decades without a citywide assessment, Boston's tax system had failed to keep up with market appreciation and was rife with inequity. Valuations varied widely among predominantly Black neighborhoods like Roxbury (left) and traditionally Irish neighborhoods like Charlestown (right). Credits (l-r): kmf164/Flickr CC BY 2.0, ericodeg/Flickr CC BY 2.0.

of the total cash value of all properties, and capping annual rate increases at 2.5 percent. Cities fought the measure, but it passed easily in 1980 during a national wave of antitax sentiment. As a result, the main revenue flow for cities and towns across the state fell by roughly 20 percent over a few years. “There was a lot of pain,” says Ron Rakow, a Lincoln Institute fellow and former commissioner of the City of Boston Assessing Department. “We had to cut the levy by 15 percent two years in a row to come into compliance.”

The state helped offset some of the revenue loss during the first two years, but after that, cities and towns had to adjust to the rigid limits imposed by Proposition 2½. Localities all over the state suddenly began conducting long-overdue reassessments. In 1981, fewer than 100 of the state’s 351 cities and towns had implemented market value assessments. Four years later, 339 had done so (Youngman 2016).

In Boston, assessors had traditionally traveled the city to revalue individual properties, a labor-intensive exercise that relied on subjective opinions. To stay on top of current property values and maximize potential revenue, Boston needed a more efficient assessment method. The city turned to Computer Assisted Mass Appraisal (CAMA), whose statistical models made it possible for assessors to estimate the value of properties based on the sale prices of properties similar in location, size, and condition. Because it was based on market sales, the new system was more precise and efficient than the old practice. (Learn more about the Lincoln Institute’s pioneering role in the development of CAMA on page 26.) Rakow says the department shrank from about 272 staff members in the 1980s to about 86 today. “Because of all this automation, we had one third of the people doing the job 100 times better,” he says.

The updated assessments have had other positive effects as well. In 1992, more than 12,000 assessment appeals were taken to state court, and the city had to set aside more than 6 percent of its property tax revenue to pay refunds. By 2015, there were fewer than 500 appeals. The city was setting aside just 1 percent of its levy for refunds, and the account was running a surplus.

Demonstrators took to the streets in 1981 to march against Proposition 2½, which capped the property tax in Massachusetts. Credit: Wendy Maeda/The Boston Globe via Getty Images.

Over the years, the state legislature has allowed the city to collect a few other taxes (such as jet fuel, room occupancy, and meals taxes) to support its budget. But Boston is still highly reliant on property tax revenue; the $2.2 billion it netted in 2019 accounted for 71 percent of its recurring revenue. Its winning strategy was transforming the property tax from an unpredictable source to one that is quite stable. Boston has one of the state’s lowest property tax rates. Compared with the rest of the country, its per capita property taxes have risen more slowly: adjusted for inflation, the city saw a 14 percent increase between 1979 and 2009 versus a 60 percent increase nationwide (Youngman 2016).

The stability of the property tax system has helped encourage investment by businesses, which has strengthened Boston's overall economy. Over the last decade, companies such as General Electric, Reebok, Wayfair, and LEGO Education North America have moved their headquarters here. To help get through lean years, the city began building budgetary reserves as its fiscal health improved in the mid-1990s; during the Great Recession, it was one of the few American cities that didn't see a year-over-year revenue drop, according to the credit rating agency Moody's Investors Service. It did dip into its reserves, but by raising property tax rates and offering tax relief to homeowners who experienced economic hardships, Boston was able to keep its revenue from dropping even as assessed values fell. As those values recovered, the city then lowered its property tax rates. Although it's too early to tell how Boston will fare during the pandemic-driven recession, the stability of its main funding source has made it one of the few large cities able to afford a notable annual increase (4.4 percent) in funding for education, housing, and public health.

Revenue stability and a flourishing economy have transformed Boston from a junk-rated enterprise in the 1970s into a triple A–rated city today. A few decades ago, says Rakow, officials were worried that the city might have to file for bankruptcy. Recently, Moody's said Boston was one of a very few U.S. cities that should be able to get through a downturn with relative stability. Boston has also increased its investment in nearly every major area of spending. Over the next four years, the city expects to leverage federal and state dollars to help fund a $4.7 billion plan called Go Boston 2030, which will allocate $2.8 billion to capital projects such as new housing, revitalized parks, transit, schools, and climate resilience (City of Boston 2019).

The stability of the property tax system has helped encourage investment by businesses, which has strengthened Boston's overall economy. Over the last decade, companies such as General Electric, Reebok, Wayfair, and LEGO Education North America have moved their headquarters here.

Not surprisingly, the city's reforms weren't always welcomed by officials. Court mandates and legislation by ballot are often maligned by those who write the laws. "In 1980, there was a lot of doom and gloom," says Rakow. "But once we got through that initial period, we now have a predictable system where there have been growing revenues to pay for services, but at the same time it limits how much you can spend. That's had a really positive impact."

Liz Farmer is a fiscal policy expert and journalist whose areas of expertise include budgets, fiscal distress, and tax policy. Her work appears regularly in Forbes.com, *Route Fifty*, and other national publications. She is also currently a research fellow at the Rockefeller Institute's Future of Labor Research Center.

Go Boston 2030 outreach team. Credit: City of Boston.

The property tax has helped transform Boston into a thriving economic hub. Credit: Wenjie Qiao/Flickr CC BY-SA 2.0.

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Scenario planning workshop. Credit: Mid-Ohio Regional Planning Commission.

BUILDING VALUE

In Brazil, Land Value Capture Supports the Needs of the Community

By Ignacio Amigo

For most cities, the costs of creating public housing in an increasingly expensive area would have been prohibitive. But São Paulo relied on a land-based financing tool to generate revenue it could reinvest.

STANDING JUST a few meters from São Paulo's iconic Octávio Frias de Oliveira bridge, the Jardim Edite public housing complex is hard to miss. The eye-catching cluster of buildings includes three black-and-white residential towers perched above brightly colored ground-floor facilities that include a public health center, day care facility, and culinary school. The complex has won several prizes for urban design, but the story behind this project is even more remarkable than its architecture.

Thirty years ago, this neighborhood was on the swampy southern outskirts of the city, and Jardim Edite was the name of a favela, or informal settlement, that had taken shape here. It provided a home for hundreds of families, most of whom had arrived from rural northeastern Brazil in a bid to escape poverty. In the 1990s, as São Paulo's population grew and its urban core began to expand southward, this area underwent a radical transformation, and construction and roadbuilding near Jardim Edite surged.

In 2001, city leaders approved an ambitious program to redevelop several neighborhoods, expand the subway network, and build the Octávio Frias bridge across the Tietê River to connect this area with the west side of the city. To make room for the project, local authorities wanted to relocate the more than 800 families living in the favela to other parts of the city. The residents of Jardim Edite, however, made it clear that they wouldn't leave their homes without a fight. They created a neighborhood association and publicly declared their opposition to the relocation. In 2002 they won a major victory: the city's new master plan classified the favela as a Special Zone of Social Interest, a designation under Brazilian law that can be used to ensure affordability in urbanizing areas (Fontes 2011). This meant the residents had the right to remain in the vicinity—and the city had to provide housing for them.

Over the next several years, private and public investments in the area sent the land value soaring to $4,000 per square meter in 2008, compared to an estimated $100 per square meter in 1980 (UN-Habitat 2010). City leaders, eyeing other potential uses for the Jardim Edite site, offered a small amount of compensation to residents who were willing to leave, and many took them up on the offer. But others persevered, and in 2012, 252 families received keys to apartments in the brand-new Jardim Edite housing complex (Lacerda Júnior 2016).

"We have everything here," says community leader José Vilson. "We have public transport at our door, we have four public schools [in the area], we have a health unit right below our house."

For most cities, the costs of creating public housing in an increasingly expensive area would have been prohibitive. But in this neighborhood and others, São Paulo has relied on an innovative financing tool called CEPACs, or Certificates of Additional Construction Potential, to generate revenue it can reinvest in the area.

CEPACs are a form of land value return, also known as land value capture. This policy approach, in use in many countries around the globe, allows communities to recover and reinvest land value increases resulting from government actions and public investment. The implementation of land value capture in Brazil has been "extremely sophisticated," says Martim Smolka, director of the Program on Latin America and the Caribbean at the Lincoln Institute. Smolka says CEPACs in particular "are a brilliant idea . . . in São Paulo they have delivered something like $3 billion since 2004. Not millions, billions. This is unprecedented in the world."

The Jardim Edite favela, top, and the housing complex that took its place. The Octávio Frias de Oliveira Bridge is visible in the background. Credits: Daniela Schneider, Nelson Kon. Project design: H+F Arquitetos, MMBB Arquitetos.

Panoramic view of the Santo Amaro district of São Paolo. The city is one of the 10 largest urban areas in the world. Credit: Viktar Palstsiuk/Flickr CC BY 2.0.

The Building Blocks of Land Value Capture

São Paulo is South America's largest city and Brazil's economic hub. More than 20 million people live in the metropolitan area, which extends over more than 3,000 square miles, making it similar in size and population to the New York metropolitan area.

Across the São Paulo region, affluent areas with luxurious houses adjoin crowded, economically precarious neighborhoods where residents have built their own houses out of brick and metal. Some neighborhoods are characterized by tall buildings and high population density, while other areas are more bucolic, with streams, waterfalls, and scattered houses. Within the city limits are dozens of favelas and two indigenous villages. Like many large cities, São Paulo is home to both profound poverty and vast wealth. That wealth is made possible, at least in part, by municipal zoning decisions and public investments in infrastructure.

When cities make changes to zoning and infrastructure, such as allowing greater density, improving roads, or building new rail lines, the value of nearby properties tends to rise. The improvements themselves are typically paid for by the public, in the form of taxes and other revenues, but the rise in property value tends to benefit private landowners. In other words, the community pays for improvements that benefit only a few.

But as many communities have discovered, it is possible to recover these increases in value and reinvest them for the public good (see sidebar page 59). In São Paulo, as development has surged over the last few decades, land value return has played a critical role in ensuring that the public sees some benefit from private development, in the form of affordable housing, parks, public transit, and other amenities (Smolka 2013).

The city accomplishes that by charging developers for the new development potential created by rezoning and public investments in well-defined areas, such as for taller buildings

Like many large cities, São Paulo is home to both profound poverty and vast wealth. That wealth is made possible, at least in part, by municipal zoning decisions and public investments in infrastructure.

or more dense developments. Those fees can then be earmarked for public goods and services. Charging developers for the right to build taller structures or denser developments makes sense, say proponents of this approach, because high-rise buildings require wider roads, higher water pressure, more powerful electricity grids, and other infrastructure upgrades.

In Brazil, such charges are broadly known as Outorga Onerosa do Direito de Construir (OODC, literally "onerous grant of the right to build"). The Brazilian Constitution of 1988 puts public interest above private gain, stating that the goal of urban development is to "guarantee the well-being" of citizens and to ensure the "full development of the social function of the property." These ideas were codified in 2001 through a federal law known as the City Statute, which stipulates that each city must include OODC guidelines in its master plan and must pass municipal laws to define the details (Furtado et al. 2012).

Smolka notes that the system has withstood legal challenges claiming the charges are essentially a tax. In 2008, the nation's Supreme Court ruled that the OODC is not a tax, because developers do not have to pay for the rights if they do not choose to use them.

In São Paulo, city leaders have taken the OODC framework one step further with CEPACs, the tool that paid for both the Jardim Edite housing complex and the nearby Octávio Frias de Oliveira bridge (Sandroni 2010). Unlike traditional charges for building rights, for which a city sets the price, CEPACs are sold via electronic auction, with developers paying what they think the market will bear.

CEPACs have become an essential source of revenue for São Paulo and for other Brazilian cities, including Rio de Janeiro and Curitiba. "This is essentially money that, if you didn't have this instrument, would be going into the pockets of landowners in areas that have benefited from public investment," Smolka says.

LAND VALUE CAPTURE AROUND THE GLOBE

In an era of tight budgets and exploding need, cities around the world are funding infrastructure and other public improvements through land value return, also known as land value capture. This policy approach involves an array of public finance tools that enable communities to recover and reinvest land value increases resulting from public investment and government actions. Examples of reinvestment include the following:

- The city of **San Francisco, California**, collected $423 million in impact fees—one-time charges designed to cover the costs associated with a development's impact on certain public services and infrastructure—from fiscal year 2013 through 2016. It used the funds to invest in transit needs, bicycle infrastructure, pedestrian capital improvements, and more.

- In **Manizales, Colombia**, betterment fees—which are paid by property owners to defray the cost of a public improvement or service that the owner specifically benefits from—have contributed to the city's revenue base for urban infrastructure financing and funded road improvements, urban renewal, and notable projects such as the renovation of Alfonso Lopez Plaza.

- In one of the most successful examples of large-scale redevelopment in the 20th century, Japan's **Greater Tokyo Railway Network** used land readjustment—a model in which landowners pool their properties to accomplish a redevelopment project, then receive smaller parcels of land that have greater value due to the improvements made—as a strategic component of its financing.

- **Cambridge, Massachusetts**, has used its 1998 Inclusionary Zoning Ordinance, which requires developers to provide a certain amount of low- or moderate-income housing in exchange for the right to construct market-rate residential or commercial properties, to create 1,000 units of affordable rental and ownership housing.

Successfully implementing land value return demands the management of many complex factors and diverse stakeholders; proper understanding of land market conditions; comprehensive property-monitoring systems; fluid communication among fiscal, planning, and judicial entities; and the political resolve to realize the full potential of this suite of tools.

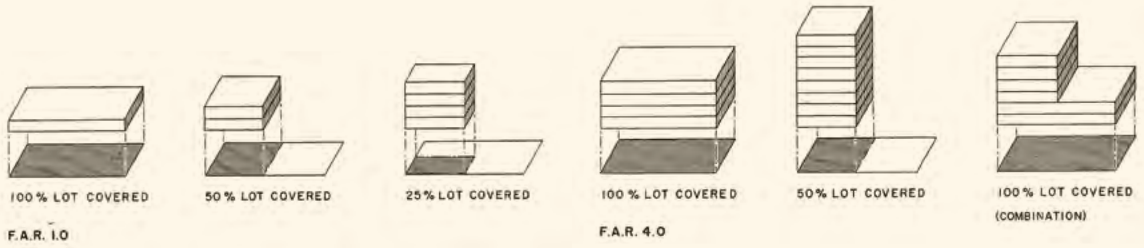
Adapted from Land Value Return: Tools to Finance Our Urban Future, *a policy brief by Lourdes Germán and Allison Ehrich Bernstein published in 2020 by the Lincoln Institute of Land Policy (Cambridge, MA).*

Managing Growth in São Paulo

Compared to other cities in Brazil, São Paulo had a head start in charging for building rights. In the late 1980s, the city was negotiating a loan with the World Bank for a river-rechanneling project. The World Bank conditioned the loan on the city's providing housing for low-income people who lived along the river's banks, many of them in favelas. To fulfill this condition, São Paulo passed a law that required developers who wanted to build taller buildings or more dense developments to construct public housing or provide money for the government to do so. The law lasted only a decade, but it provided an invaluable learning experience for the city.

"Many businesspeople who wanted to get rid of favelas on land they owned or who needed additional building rights accepted this deal," says Paulo Sandroni, an economist and Lincoln Institute associate. Initially, developers chose where to build the affordable housing. Not surprisingly, they often chose sites at the urban periphery, where land was cheaper. Also, the law did not specify a minimum size for these units, which tended to be very small. As a result, people were displaced from favelas in desirable locations and forced to relocate to cramped, inadequate housing far from jobs, schools, and other sources of opportunity. The city fixed these loopholes, setting a minimum size for affordable units and taking over the responsibility of siting them. Though the law was invalidated in 1998 because of a conflict with the São Paulo State Constitution, the city was ready when the federal government codified the OODC in 2001. São Paulo swiftly approved a master plan and passed laws to implement the OODC.

The Old Downtown area of São Paulo. Credit: Diego Torres Silvestre/Flickr CC BY-SA 2.0.



Floor Area Ratio (FAR) is the total constructed floor area of a building relative to the size of the parcel it occupies. This illustration shows possible building variations with a FAR of 1.0, which requires the floor area and lot size to be the same, and a FAR of 4.0, which permits the total floor area to be four times the size of the lot. The higher FAR makes it possible to construct taller buildings, which encourages density. Credit: Courtesy of American Planning Association.

São Paulo's master plan regulates the density of development in different neighborhoods through floor area ratio (FAR). A common unit of measure worldwide, FAR is the total constructed floor area of a building relative to the size of the parcel it occupies. For example, a FAR of 1.0 would allow a building with a total of 200 square meters of floor space on a parcel of 200 square meters. If the FAR is set higher, more floor area can be constructed. With a FAR of 4.0, for example, that same 200-square-meter parcel could hold a building four times the size, with a total floor area up to 800 square meters.

Cities can designate both a basic FAR—the density at which a developer can build without paying fees—and a maximum FAR, the most dense development permitted under any circumstances. Developers purchase building rights to construct buildings up to the maximum FAR allowed, which is often higher in commercial corridors, near transit stations, or in other areas where policy makers want to see growth.

Under the master plan, OODCs became a promising source of income for São Paulo. But city leaders soon recognized a problem common to such transactions everywhere: charge too little, and you leave unearned windfalls in the pockets of landowners; charge too much, and developers are reluctant to pay. To address this, the city introduced the certificates known as CEPACs. Sold through electronic auction, CEPACs are a market-based tool whose price is determined by bids from developers.

Each CEPAC enables the construction of a specific number of additional square meters in one of several "urban operations," which are areas identified as priorities for redevelopment. There are 13 urban operations in São Paulo, two of which have been especially lucrative: Água Espraiada, which includes the Jardim Edite housing complex, and Faria Lima, which has become the city's financial center (SP-Urbanismo 2017). The two areas are now among the most expensive in the city, and CEPACs allowed the city to capture a good part of this land value increase.

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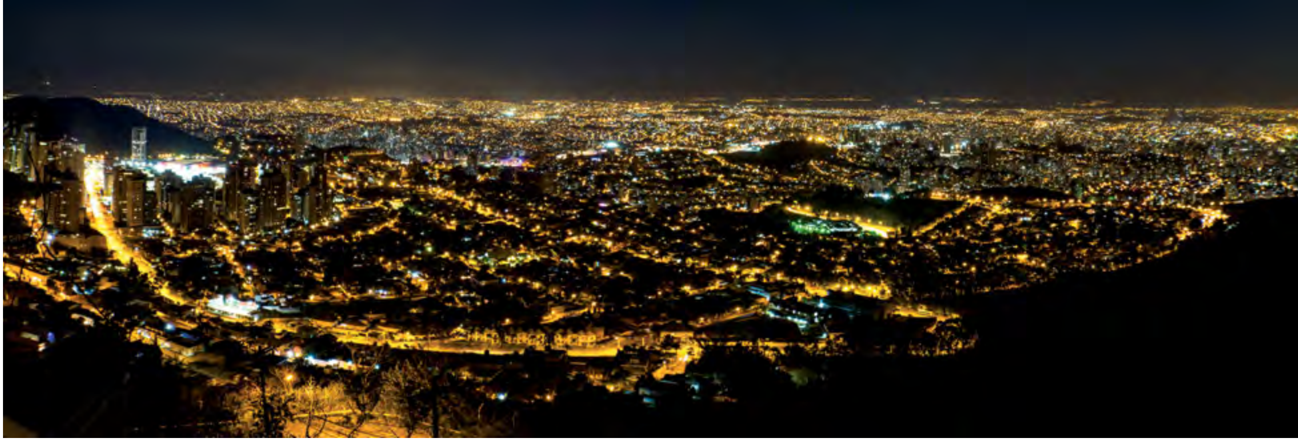
Sandroni says Faria Lima offers a dramatic illustration of the economic potential of CEPACs. “The first bids [in 2004] were not very successful because nobody knew how the system would work . . . only in 2006 and 2007 did bids begin to be substantial.” He believes the bids increased not only because people better understood the tool, but also because the real estate market was strong—and from there, the market for CEPACs boomed. In 2010, developers bought the Faria Lima CEPACs for 4,000 reais each (equivalent to US$750 today). This represented a 363 percent increase from the 2004 starting price of 1,100 reais. In the 2019 auction, each of the 93,000 CEPACs sold for a staggering 17,601 reais. That one sale garnered 1.6 billion reais in revenue for the city (more than US$400 million). Together, Faria Lima and Água Espraiada CEPACs have raised more than US$3 billion.

With those funds, the city has been able to expand public housing, improve public transit, build and maintain roads and parks, and more. The experience in São Paulo highlights the great potential of a well-implemented program of land value capture. The city’s willingness to experiment with different methods and to correct mistakes along the way offers lessons for other cities—including Belo Horizonte, a city about 300 miles to the northeast that is implementing new OODC guidelines.

The experience in São Paulo highlights the great potential of a well-implemented program of land value capture. The city’s willingness to experiment with different methods and to correct mistakes along the way offers lessons for other cities—including Belo Horizonte, a city about 300 miles to the northeast that is implementing new OODC guidelines.

The Faria Lima district of São Paulo (left) has been a focus of urban redevelopment. By charging developers for certain building rights, the city has been able to invest in public transit (right). Credits (l-r): diegograndi/iStock, Alfribeiro/iStock.



Belo Horizonte, population 2.7 million, is the sixth-largest city in Brazil. Credit: Elton Menchick/Flickr CC BY 2.0.

Challenges in Belo Horizonte

Maria Caldas, the secretary of urban policy for Belo Horizonte—home to 2.7 million people and the capital of Minas Gerais state in southeastern Brazil—has seen firsthand how strong the opposition to the OODC can be. During 2018 and 2019, Caldas and other officials were targeted by an intense smear campaign for trying to create the right conditions to use the OODC. “I have never seen anything wilder in my life,” says Caldas. “There was an incredible amount of fake news, bots, they invaded my [social networks] . . . they tried to hit the mayor through me.”

At the center of this controversy was a vote on Belo Horizonte’s new master plan. Under the old plan, landowners in many parts of the city could build up to the maximum floor area ratio (FAR) without having to pay anything to do so. This rendered the nationally endorsed concept of the OODC useless, as the city did not have any rights to sell to developers. To solve this, the city’s new master plan set the basic FAR at 1.0 for the entire city. Developers who wanted to build more densely would have to pay the city for that right. According to Smolka, about 80 percent of the city already had a maximum FAR of 1.0, so the new rule would affect only a small percentage of properties. Nevertheless, the proposal met with fierce opposition.

“Before the recession [of 2015], the real estate market experienced a boom, and the big developer companies created a stock of land,” says Caldas. “They became both developers and landowners” and they didn’t want to pay for a right they had previously gotten for free.

The development companies united around the Federation of Industries of Minas Gerais (FIEMG), which lobbies for industrial companies in the state. With the federation’s support, the developers launched an aggressive publicity campaign decrying the new master plan. Their slogan was “no more taxes,” ignoring the fact that, as the national Supreme Court had established years earlier, the OODC is not a tax.

The campaign claimed that setting the basic FAR at 1.0 for the whole city would negatively affect low-income people. An animated video described how the new master plan would destroy the dreams of a fictional character called “Seu Pedro,” a resident of an informal settlement who would no longer be able to build a three-story house for his family. However, Smolka says the cartoon showed a distorted reality. “With a floor area ratio of one, you can easily build a four-story house,” he says, noting that although the computable area of a building can’t exceed the area of the plot of land, a house can have more than one story. Elements such as corridors, garages, balconies, and terraces are also not included in the allowed area calculation.

The campaign against the OODC in Belo Horizonte did not succeed. The new master plan was approved in June 2019 and went into force in February 2020. Mayor Alexandre Kalil, a target of the anti-OODC campaign, was also handily

Maria Caldas, secretary of urban policy for Belo Horizonte, has helped implement value capture in that city. Credit: Ramon Bitencourt/O Tempo.

reelected in late 2020. However, the developers did score one victory: the municipal government agreed to a three-year transition period during which the old basic floor area ratios would prevail. Smolka says the interim period could see developers speed up projects to take advantage of the opportunity to build up to the maximum FAR at no extra cost, but notes that the pandemic could affect those plans.

Ultimately, the government of Belo Horizonte prevailed against opponents of the OODC, making it clear that the new rule would be good for the city and wouldn't harm ordinary citizens. In fact, it will allow the city to expand its stock of affordable housing, with proceeds earmarked for a specific public housing fund.

Smolka says land-based financing tools will likely gain momentum globally as cash-strapped cities struggle to find new ways to finance urban infrastructure. "There is a big discussion among the United Nations, the World Bank, and other multilateral agencies about the global infrastructure backlog—they talk about trillions of U.S. dollars to renew and build needed infrastructure," he explains. "Governments are looking at many different ways to pay these costs, and land value capture is a classic tool for this purpose."

Ignacio Amigo is a former scientist who writes about science, cities, and the environment.

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SPOTLIGHT ON OUR INITIATIVES

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Torres del Paine National Park, Chile. Credit: NASA Goddard Space Flight Center/Flickr CC BY 2.0.

CULTIVATING CHANGE

China Amends Land Regulations, Giving Farmers a Fairer Deal

By Matt Jenkins

SEVERAL YEARS AGO, villagers in Wukan, China, rose up in protest. Residents of the small port town in the southern province of Guangdong were furious with the leaders of their village, who had condemned a swath of land and sold it to developers in a backroom deal. The villagers received no compensation.

The protests began modestly enough, but ultimately drew as many as 13,000 participants and became increasingly violent as residents and police repeatedly clashed. The showdown left one protester dead while in police custody, saw villagers drive officials out and barricade the town, and drew international media attention. The situation calmed down only after the provincial head of the Communist Party intervened, allowing the villagers to choose new representatives for the village committee in what outside observers heralded as the first transparent, free election in China.

The standoff in Wukan was but one example of the tensions surrounding land use in rapidly urbanizing China, where 500 million people have moved into cities over the past few decades. Social stability has long been a central goal of the Chinese government, and conflicts related to land use and development were proving to be an increasing source of social unrest. In 2013, China's national leadership decided to push for more equitable urbanization policies as part of a broad endeavor to address the social inequalities that have dogged the country during the period of rapid development.

Turning those reforms into reality has taken some time. The Peking University–Lincoln Institute Center for Urban Development and Land Policy (PLC), jointly established by the two institutions, has played an important role in helping lawmakers understand the options for reform. In 2019, after six years of deliberation, the central government approved major amendments to the national land administration law.

"It's a landmark change," says PLC Director Zhi Liu. "It's a major paradigm shift from chasing value to meeting the needs of the people."

In 2019, the central government approved major amendments to the national land administration law. "It's a landmark change," says Zhi Liu, director of the Peking University–Lincoln Institute Center for Urban Development and Land Policy. "It's a major paradigm shift from chasing value to meeting the needs of the people."

Rapid urbanization in China has seen villages like this one in Nanning, Guangxi Autonomous Region (top), give way to encroaching high-rises. At bottom, migrant workers from a rural township plant trees and sow grass at an urban park built on farmland in Chengdu, Sichuan Province. Credits: Kacper Kowalski/Panos Pictures, Justin Jin/Panos Pictures.

A Growth Machine

Over the past four decades, China's phenomenal growth and transformation have been driven by its cities, particularly along the coast. In 1978, just 18 percent of the population lived in urban areas. Today, 60 percent do, and it is projected that by 2030, 70 percent will. China's cities, which exist at a scale seen in few other places on earth, include the sprawling megalopolises of the Yangtze River Delta, centered on Shanghai and Hangzhou; the area around Beijing; and the Pearl River Delta, centered on Shenzhen, Guangzhou, and Hong Kong.

The trajectory of China's rise can be roughly divided into two phases. The first began in 1978 under the leadership of Deng Xiaoping. Casting off nearly 30 years of international isolation and a centrally controlled socialist economy, Deng opened China to the outside world and encouraged a more market-based economy. Two decades later, in 1999, China joined the World Trade Organization (WTO); the resulting boom in manufacturing drove unprecedented levels of growth and opened a pathway to prosperity.

After joining the WTO, China assiduously courted foreign manufacturers to set up shop. Labor was plentiful, but developable land was a precious commodity. As a result, cities used land as a major factor to attract business.

According to the land administration law, urban land is owned by the government, while rural land is owned by village collectives. But government authorities can use eminent domain to seize land for urban expansion (Liu and Sun 2014). Villagers have little say in the matter and typically receive limited compensation.

Until the recent reforms, the central government allotted an annual quota of developable rural land to every municipality—an administrative unit that includes a central city surrounded by townships and rural areas—for the purpose of urban expansion. That set off an annual scramble by municipal and county authorities to attract development so they could secure their share of the quota (Liu and Liu 2019). For some sub-provincial governments, proceeds from land sales have accounted for 30 to 50 percent

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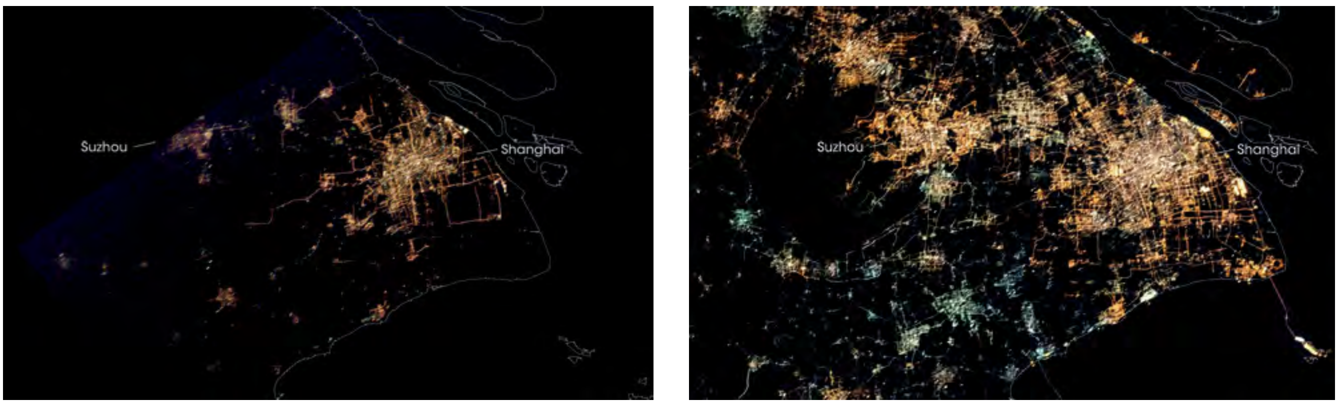

Images from the International Space Station show the expansion of Shanghai between 2003 (left) and 2018 (right). Credits: NASA.

A resident of Wukan, Guangdong Province, holds the deed to family land that was taken for development. Credit: Peter Park/AFP via Getty Images.

of annual fiscal revenue (Ran 2013), most of it spent far from the villages where the land in question is located.

During the post–WTO period, government authorities “exhibited an insatiable appetite for growth and investment,” said Professor Tao Ran, who leads the Center for Economics and Public Governance at Renmin University. Speaking at the University of Southern California’s US–China Institute in 2016, he noted that “in their drive to secure revenues, local governments competed fiercely with each other” for manufacturing capital, business taxes, and land revenue.

From 2004 to 2014, a period now referred to as the golden decade of China’s real estate market, China’s GDP growth averaged 10 percent per year. During the same time, the amount of land earmarked for urban growth across China increased by 19,366 square kilometers (7,477 square miles), a whopping 64 percent. Ninety percent of that was formerly rural land that had been expropriated by the government through eminent domain, bringing in huge amounts of money to local governments (Liu and Sun 2014). During that same decade, revenue from land concessions—contracts between governments and business entities for the right to use or develop land—was more than half of local tax revenues.

Although some rural land is permanently protected as farmland in the name of national food security, urbanization appeared to be an unstoppable force. In some cases, rural villages were literally swallowed up by larger cities, with high-rise buildings taking shape around the existing homes of villagers and migrant workers. In one much-publicized scandal, the vice mayor of Guangzhou, China’s fifth-largest city, was imprisoned for life for accepting bribes from developers and pressuring villagers on the outskirts of the city to give up their land (Lau 2014).

“It was a growth machine,” says Liu, but not everyone profited. “The losers were the farmers.”

Keeping Pace with Growth

Rapid urbanization in the first decade of the 21st century "led to tens of millions of dispossessed farmers left undercompensated," wrote Ran of Renmin University in a Lincoln Institute working paper (Ran 2013). As the development boom continued, he noted, "developing and managing land [became] a major business for local governments in many localities."

When government officials took land, farmers typically received compensation. (The land deal that led to the Wukan protests occurred outside this system, with corrupt village officials profiting instead.) That compensation was usually based on the agricultural value of the land rather than on the market price, which would have been much higher. Even the agricultural value was tied to low-value commodity crops like rice and wheat rather than the higher-value fruits and vegetables that farmers might have been growing.

Farmers whose land had been expropriated had few ways to make a new start, leading to thousands of incidents such as the showdown in Wukan. Land disputes "have emerged as the principal source of state–society conflict in China," wrote Meg Rithmire of the Harvard Business School. "Land conflict accounts for the majority of the hundreds of thousands of 'mass incidents' of protest that engulf rural and periurban China each year as well as the majority of petitions and letters filed by citizens to appeal to higher authorities" (Rithmire 2017).

Outside of protest, farmers have had almost no way to fight back against unfair land deals. With the central government setting the price for land, "farmers could bargain, but only indirectly," says a Beijing economics professor who requested anonymity. "They could petition higher levels of government to intervene on their behalf, or they could hold out as *dingzihu*."

Residents who resorted to the practice of dingzihu—which alludes to a single nail sticking up in the air—combined protest with bargaining. As they held out in the face of development, their houses were left perched, Dr. Seuss-like, atop towers of dirt as construction crews excavated everything around them. There they would remain, sometimes for years, until they were

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A "nail house"—so called because of the way it sticks up after structures around it have been demolished—on a construction lot in Gongqin Village, Yichang, Hubei Province. Credit: Imaginechina/AP Images.

Founded in 2007, **the Peking University–Lincoln Institute Center for Urban Development and Land Policy (PLC)** in Beijing is one of China's leading authorities on the property tax, municipal finance, urban development, housing policy, infrastructure, and land conservation. Its work includes research, training, policy analysis, academic exchanges, advisory services, and demonstration projects throughout China. The center also extends its work to other Asian countries, with activities across many of the Lincoln Institute's six goals. To learn more about the PLC, visit **www.lincolninst.edu/china-asia**.

Participants in a PLC course in Hangzhou, China. Credit: Yihao Li.

forcibly removed or managed to strike a more favorable buyout deal with the developer. "But this process has a very high transaction cost," says the Beijing professor. "The costs of bargaining this way are high for everyone involved."

The development policies led to other problems, too. According to some estimates, housing prices tripled between 2005 and 2009. That led to rampant speculation and a proliferation of sprawling and unoccupied "ghost cities."

"All these things have their roots in land policy," Liu says, and China's land policy simply hadn't kept pace with its breakneck growth. After China joined the WTO, the country was changing rapidly, and the law became a barrier.

Fundamental Shifts

By 2013, the central government recognized the need for change. Part of the impetus was the rise of small property rights (SPR) housing—illegal housing built on village land that was being snapped up by migrant workers and others who needed to be close to urban areas. (For a closer look at SPR housing, see *Land Lines*, July 2015.) As the practice spread, eventually accounting for as much as 20 percent of the country's housing, officials saw that SPR served a social and economic function, and calls increased for amending the land administration law (Liu 2019).

In November 2013, the Communist Party's Central Committee announced a policy reform aimed at both increasing land use efficiency, by allowing market-based land sales, and improving equity, particularly for farmers. "The broad principles were a shift from focusing on value to focusing on people," Liu says, "and from a government-dominated approach to enabling the market to do much of the work."

While the central government knew the general direction it wanted to take, working out the details was no simple task. Much of that work fell to the Development Research Center (DRC), which makes policy recommendations to the State Council and the Central Committee. More than a decade earlier, the DRC and the Lincoln Institute had conducted a joint study related to the property tax. Not long after the intent to reform the land administration law was announced in 2013, the DRC approached the PLC, this time for help figuring out how the law could be improved.

As a research institution, the PLC is well positioned to help connect Chinese government officials with relevant outside expertise (see sidebar). During the summer of 2014, the PLC brought several prominent Chinese and foreign scholars to a two-day workshop at Peking

University to speak on real estate markets and property rights, land use planning and regulation, housing policies, farmland preservation, and the property tax. Several officials at the vice minister level attended the workshop, including the deputy head of the DRC, a member of the National People's Congress legal committee, and officials from the Ministry of Land and Resources.

As one of many institutions studying land use in China, the PLC had looked closely at the existing land administration law. Now the Ministry of Land and Resources invited specific policy advice for reform. For the PLC, that meant shifting from a purely research-focused agenda toward a more advisory role, one that would help the government navigate the fraught terrain of ground-level reform.

"The general direction for land policy reform was quite clear in 2013," Liu says. "But when you look into the details, it's still tricky. The government became very cautious about putting it into implementation."

Outside observers often see China as a bastion of top-down, command-and-control rigidity. Yet within the central government, the spirit of experimentation is alive and well. Deng Xiaoping, the leader who cautiously set the country on the path of reform and opening in 1978, was fond of describing that process as "crossing the river by feeling for stones."

Reforming the land administration law was no different. In February 2015, the central government announced that it had selected 33 pilot sites throughout the country to test out reforms. This lets local governments figure out what works best for them.

At the same time, the Party leadership was taking a firm stand in favor of equity in the housing market. There, too, the PLC helped provide quantitative analysis: the China International Center for Economic Exchange, a quasi-governmental think tank, had commissioned the PLC to lead a team of researchers from several institutions to examine government control of the market.

The central government had traditionally taken a one-size-fits-all approach across the entire country, which didn't allow for much flexibility to respond to the idiosyncrasies of regional and local housing markets. (This approach was frequently described with the aphorism, "When Beijing gets sick, all the other cities have to take the medicine.") The report, completed in December 2015, advocated a shift toward local regulation of housing markets in individual cities, in part to combat speculation. That point was driven home in October 2017, at the 19th Party Congress, when President Xi Jinping declared that "houses are for habitation, not for speculation."

Changes to the Law

In August 2019, the National People's Congress formally approved the amendments to the land administration law that had begun taking shape some six years earlier. The amendments went into effect at the beginning of 2020, but the implementation is still being worked out. One major change is that the process of converting rural land to urban space has been dramatically streamlined. If a project conforms to local planning regulations, villagers can now deal directly with developers. This gives villagers more bargaining power and higher compensation in the form of land leasing revenues. In contrast to the previous model, most of this revenue will now stay within the village.

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The urban–rural boundary in Guilin, Guangxi Zhuang Autonomous Region, one of the first Chinese cities that opened to tourism. The population of the city has tripled since 1978. Credit: luxiangjian4711/iStock.

The amendments to the law are also much fairer for the farmers whose land will be developed. For one thing, farmers will receive a larger share of the increased value of land converted to urban use. Compensation is no longer based on the value of the original use. Instead, it will be based on a comprehensive price matrix that includes the quality, location, original use, and production potential of the land, as well as market conditions. Compensation will also include payments to cover farmers' loss of livelihood and the costs of social security.

Perhaps just as important, the amendments limit the conditions under which a higher-level local government can take village-owned land through eminent domain. When the government needs to take land, it must have a clear public purpose, such as public infrastructure, affordable housing, poverty reduction, or military or foreign affairs. "That's actually a lesson we learned from the United States," Liu notes.

In terms of social fairness, Liu says, that concession is one of the key breakthroughs of the new law. "All around the world, landowners dislike compulsory purchase of their land by the government, or eminent domain," Liu says. "After seeing so much tension over expropriation, the Chinese government decided to limit its scope."

The new amendments also contain provisions making it easier for rural people to migrate to cities, part of an effort to boost the flagging national economy by encouraging continued, albeit more careful, urban growth.

New Revenue Needed

The land administration changes underway are a significant step forward for villagers. But by allowing villages to make deals directly with developers, the amendments have created a new challenge for the local governments above them, which will lose the revenue previously gained from such land transactions. Some efforts are already being made to test ways to mitigate this problem. In several pilot projects, 20 percent of the land concession fee paid by the developer to the village is earmarked for higher levels of government.

That shift in revenue is significant in light of another reform coming from the central government, which will make more city dwellers eligible for social benefits. A major focus of this broader effort is reform of the long-controversial *hukou* system, which was introduced in the 1950s and gave Chinese citizens access to social services such as health care and public education for their children, based on a residence permit. Traditionally, hukou was tied to place of birth. In many cases, skilled workers who moved to a different city could change their hukou and gain access to social services. But the vast majority of Chinese migrants, particularly construction laborers and factory workers, were legally barred from transferring their hukou and were thus excluded from publicly funded social benefits. "We don't want migrant workers to be left behind," Liu says. "They should be integrated into urban citizenship, but the hukou is a barrier for them."

Over the past several years, the central government has been abolishing hukou requirements in successively larger cities. In April 2020, partly in a bid to boost the economy, the government announced that it was allowing residents without hukou in cities that have populations under three million to receive social benefits. Roughly three dozen cities in China have more than three million people, and therefore are not yet subject to hukou reform, but ostensibly will be as the requirements continue to expand to larger cities. Finally treating migrant workers as actual residents of the cities in which they work is a significant step toward real social equity.

Now, though, local governments must find a way to fund services for legions of urban residents granted the right to social benefits. "If you are the mayor of a city, certainly you worry, 'Where do I get the money to take care of these people?'" Liu says. At the end of an era in which land sales provided a reliable source of money, municipal governments are left in an especially tight bind.

One solution would be the introduction of a property tax. "The property market is a big deal here," Liu says, "but China is one of the few countries that does not have a property tax." Such a tax was part of the reform package announced in 2013, and the government is drafting a national property tax law. But its presentation to the National People's Congress has been delayed, and the entire effort may now be on hold because of COVID-19 and the associated economic downturn, along with concerns about public opposition to a new tax.

When it comes to the current amendments, Liu predicts that it will take at least three years to get any sense of how effective the changes will be. And, he concedes, there may be plenty of tweaking yet to come. "In China, sometimes we joke that all regulations are temporary," he says. "But that leaves space for you to come back and amend the regulation; it's not something that's carved on the wall. And that's very practical, because China is changing rapidly."

Matt Jenkins is a freelance writer who has contributed to the *New York Times*, *Smithsonian*, *Men's Journal*, and numerous other publications.

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MODIS satellite data, Spain. Credit: NASA Global Imagery Browse Services (GIBS), part of NASA's Earth Observing System Data and Information System (EOSDIS).

IN SEARCH OF SO

Water & Tribes Initiative Encourages Collaborative Approach to Colorado River Management

LUTIONS

By Matt Jenkins

IN THE FALL OF 2018, water managers in Arizona were in heated discussions about how to limit the damage from a decades-long megadrought on the Colorado River. The drought has forced painful reckonings and realignments related to water use throughout the Colorado River Basin. Because of the way the water has been allocated over time, it had become clear that Arizona would bear the brunt of the looming shortages—and that farmers in the state, many of whom have low-priority water rights, would face severe cuts.

At a meeting that October, Stefanie Smallhouse, president of the Arizona Farm Bureau, denounced the proposed cuts. She suggested that the proposals showed disrespect for farmers, in particular for a white settler named Jack Swilling who, in her telling, had heroically made the desert bloom. "I find it's ironic that we are exactly 150 years from the first farmer starting the settlement [of] the Phoenix area," Smallhouse said. "There wasn't anybody else here. There [were] relics of past tribal farming, but [Swilling] was pretty much the starter."

Later in the meeting, Stephen Roe Lewis spoke. Lewis is the governor of the Gila River Indian Community, a reservation south of Phoenix that is home to members of the Akimel O'otham and Pee Posh tribes. The Akimel O'otham trace their heritage to the Huhugam civilization, which constructed a massive system of irrigation canals to support the cultivation of cotton, corn, and other crops in the area beginning about 1,400 years ago. But in the 1870s and 1880s, new canal systems built primarily by white farmers drained the Gila River, devastating the Akimel O'otham and Pee Posh farms and leading to famine and starvation. "History is important," Governor Lewis stated, correcting Smallhouse's account of Swilling finding only "relics" of tribal farming. "We've been farming for over 1,000 years, and the only time that was disrupted was when that water was taken away from us."

The Gila River Indian Community has, in fact, spent much of the past 150 years trying to win back water its members had long depended on. In 2004, a congressionally approved settlement awarded the community a substantial quantity of water from the Colorado. Since then, the community has actively worked to protect those rights. "We will be here as long as it takes to find solutions," Lewis told the assembled stakeholders in 2018. "But we will fight to the end to make sure that our water is not taken again."

"We will be here as long as it takes to find solutions. But we will fight to the end to make sure that our water is not taken again."

A member of the Cocopah Tribe surveys the tribe's former fishing grounds along the Colorado River. Climate change and severe drought are leading to critical water shortages throughout the Colorado River Basin. Credit: Pete McBride.

As that exchange illustrates, the long history of Native Americans in the Colorado River Basin is often ignored in discussions about the management of the resource, as are their social, cultural, and environmental attachments to the river. The comments from Lewis indicate how committed today's tribal leaders are to changing that. Since the late 1970s, tribes in the region have won a series of settlements confirming their rights to Colorado River water. Today, tribes control an estimated 20 percent of the water in the river. As the entire basin faces the reality of serious shortages, it has become clear that tribes—which have sovereignty under the U.S. Constitution, giving them the right to govern themselves—must be key players in any conversation about the future.

The stakes are considerable, not just for tribes but for everyone who depends on the Colorado. Some 41 million people in seven American and two Mexican states use water from the river, which irrigates more than four million acres of farmland. If the Colorado watershed were a separate country, it would be among the 10 largest economies in the world. But drought and other effects of climate change are pushing the river beyond its ability to meet the enormous demands on it, bringing tribes more squarely into the river's politics.

To improve the ability of tribes to manage their water, and to give them a stronger voice in management discussions and decisions in the basin, several organizations launched the Water & Tribes Initiative (WTI) in 2017, with funding from the Babbitt Center for Land and Water Policy, a program of the Lincoln Institute. Leaders of the project, which is now also funded by the Walton Family Foundation, Catena Foundation, and several other partners, include a cross-section of tribal representatives, current and former state and federal officials, researchers, conservation groups, and others.

"If we work together, we can find solutions to these issues," says Daryl Vigil, a member of the Jicarilla Apache Nation and co-facilitator of WTI. He says this is a delicate time for the tribes: "If we're not ahead of this game, in terms of just a basic recognition of tribal sovereignty in this process, there are huge risks."

"We are excited to be part of this evolving and growing partnership," says Jim Holway, director of the Babbitt Center. "The work WTI is doing is critical to the long-term sustainability of the basin and is central to our goal of improving the links between land and water management."

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The **Babbitt Center for Land and Water Policy** seeks to advance the integration of land and water management to meet the current and future water needs of Colorado River Basin communities, economies, and the environment. The Babbitt Center recognizes that water is the lifeblood of the American West, and land use decisions are made every day that shape our collective water future. The coordination of land and water use decisions is critical for the creation of a sustainable and resilient region. Tribal communities have a long history in the Colorado Basin and a deep connection to the river, and the Babbitt Center is proud to be part of the Water & Tribes Initiative.

To learn more about the Babbitt Center and WTI, including opportunities to provide technical assistance or support a Native American Graduate Student Fellowship and Mentorship program, contact Babbitt Center Associate Director Paula Randolph (prandolph@lincolninst.edu).

Divided Waters

The 29 federally recognized tribes in the Colorado River Basin have long lived within a paradox. In 1908, the U.S. Supreme Court ruled that tribes have a right to water for their reservations. In the first come, first served hierarchy of western water law, the Court dealt them a powerful trump card, ruling that a tribe's water rights were based on the date its reservation was created. Since most reservations were established by the U.S. government in the second half of the 1800s, tribes are theoretically in a stronger position than any of the other users on the river. Like the Akimel O'otham and Pee Posh, all of the tribes were here long before non-native settlers.

But when representatives from the seven basin states gathered in 1922 to draw up the Colorado River Compact, they pushed tribes into the background. The compact specifies the division of water among California, Arizona, Nevada, Colorado, Wyoming, Utah, and New Mexico and laid the foundation of a complex web of agreements, laws, and court rulings collectively known as the "Law of the River"—which essentially ignored Indians. (See the special issue of *Land Lines*, January 2019, for an in-depth exploration of the river and its history.) Although the compact briefly acknowledges "the obligations of the United States to American Indian tribes," it does not go into detail about tribal water rights. As the scholar Daniel McCool has noted, "the omission of any consideration of Indian rights left unresolved one of the most important problems in the basin" (McCool 2003).

The author and historian Philip Fradkin put a finer point on it, declaring that "the Colorado is essentially a white man's river." But Anglo settlers had ignored Indians at their peril, he noted: the unresolved issue of Indians' true rights to water from the Colorado was a "sword of Damocles" hanging over the river's future (Fradkin 1996).

MAP OF FEDERALLY RECOGNIZED TRIBES IN THE COLORADO RIVER BASIN

1 Ute Indian Tribe of the Uintah and Ouray Reservation
2 Southern Ute Indian Tribe
3 Ute Mountain Ute Tribe
4 Jicarilla Apache Nation
5 Navajo Nation
6 Zuni Tribe
7 Hopi Tribe
8 Kaibab Band of Paiute Indians
9 Havasupai Tribe
10 Hualapai Indian Tribe
11 Shivwits Band of Paiute Indian Tribe
12 Moapa Band of Paiute Indians
13 Las Vegas Tribe of Paiute Indians
14 Fort Mojave Indian Tribe
15 Chemehuevi Indian Tribe
16 Colorado River Indian Tribes
17 Yavapai-Apache Nation
18 Yavapai-Prescott Indian Tribe
19 Tonto Apache Tribe
20 White Mountain Apache Tribe
21 San Carlos Apache Tribe
22 Fort McDowell Yavapai Nation
23 Salt River Pima-Maricopa Indian Community
24 Gila River Indian Community
25 Ak-Chin Indian Community
26 Quechan Indian Tribe
27 Cocopah Indian Tribe
28 Tohono O'odham Nation
29 Pascua Yaqui Tribe

Credit: Center for Natural Resources & Environmental Policy, University of Montana.

The full extent of Indian water rights is still not quantified. In the early 1970s, federal policy took a radically new course, adopting the principle of tribal self-determination. That led to tribes negotiating directly with the federal government to settle their water rights. In 1978, Arizona's Ak-Chin Indian Community was the first to do so; since then, 36 water-rights settlements have been negotiated between tribes, other water-rights holders in the basin, and state and federal agencies (see sidebar page 82). "The onset of negotiated settlements was an important part of the evolution" of tribal water rights, says Jason Robison, a law professor at the University of Wyoming. "But the features they've come to incorporate have also broken new ground."

While tribal water rights were originally seen primarily as a necessity for farming on reservations, the settlements of the 20th century allowed some tribes to lease their water rights to users outside their reservations. This came to be seen as an economic development tool and a way to fund basic services for tribal members. For the Navajo Nation in Arizona, New Mexico, and Utah, tying water to economic development is "all about creating a permanent homeland, where people go off, get educated, and come home," says Bidtah Becker, a tribal member and attorney who has long been involved in water issues as a Navajo Nation government official. "We're trying to develop a thriving homeland that people come home to, that works."

In many cases, tribes don't have the physical infrastructure to put their allocated water to use. Throughout the United States, Native American households are 19 times more likely than white households to lack indoor plumbing. On the Navajo Nation, the widespread lack of water services has likely contributed to the tribe's horrendous losses to COVID-19; at one point in 2020, the nation had a higher per capita infection rate than any U.S. state (Dyer 2020). "Between 70,000 and 80,000 Navajos still haul water [to their homes] on a daily basis," Vigil says. "In our country, in 2020, there's still 70,000 to 80,000 people who aren't connected to water infrastructure in a pandemic. It's crazy."

Tribal leaders Dennis Patch of the Colorado River Indian Tribes, left, and Stephen Roe Lewis of the Gila River Indian Community, second from left, join state and federal officials to sign the Arizona Drought Contingency Plan agreement at Hoover Dam in 2019. Lake Mead is visible in the background. Credit: Roberto A. Jackson/*Gila River Indian News*.

Vigil is the Water Administrator for the Jicarilla Apache Nation in New Mexico. In a 1992 settlement with the U.S. Department of the Interior (DOI), the tribe was allotted 40,000 acre-feet (roughly 13 billion gallons) of water per year, which it leased to the operator of a coal-fired power plant. The lease helped fund annual payments to tribal members for many years. But as the economy shifted toward green energy, the leases were not renewed. “So all of a sudden we’re left with settlement water stored [in a reservoir] 40 to 45 miles away, with no ability to use that water,” Vigil says.

Given the current drought, he says, the tribe could easily lease its water to others, but the terms of its federal settlement prohibit leasing water outside of New Mexico. Instead, the water flows out of the tribe’s hands and into the hands of other users. “No mechanisms are available to take our water outside of state boundaries,” Vigil says. “For the last two years, we’ve had over 30,000 acre-feet of unleased water going down the river.”

The ability to lease water can give tribes leverage—and an economic boost. In a hard-fought 2004 settlement, the Gila River Indian Community (GRIC) secured rights to more than twice as much water as the city of Las Vegas. It has used those rights to become a major, though often overlooked, force in Arizona water policies and politics. The tribe participated in negotiations around the Drought Contingency Plan (DCP), a multiyear, basinwide agreement signed in 2019 to address the impacts of the decades-long drought (Jenkins 2019).

States negotiated their own agreements as part of the DCP process; in Arizona, GRIC agreed to leave some of its water in Lake Mead, the reservoir that provides water to the Lower Basin, and to lease another portion to the Central Arizona Groundwater Replenishment District to address concerns about long-term water supplies for new development. Together, the two deals could be worth as much as $200 million to the tribe.

Daryl Vigil, co-facilitator of the Water & Tribes Initiative and Water Administrator of the Jicarilla Apache Nation in New Mexico. Credit: Courtesy of Bob Conrad.

The Colorado River Indian Tribes (CRIT)—a community that includes the Mohave, Chemehuevi, Hopi, and Navajo tribes on a reservation spanning the river in Arizona and California—was also an important participant in the DCP. The community’s participation was not without internal controversy: some tribal members were opposed to the DCP and attempted to recall the members of their tribal council. Ultimately CRIT agreed to leave up to 8 percent of its annual allocation in Lake Mead for three years in exchange for compensation of $30 million from the state of Arizona and an additional $8 million pledge from a group of foundations and corporations organized by the Walton Family Foundation and Water Funder Initiative.

The DCP negotiations were complex and contentious. In the end, coming to a resolution required getting tribes, cities, farmers, and other major stakeholders to the table.

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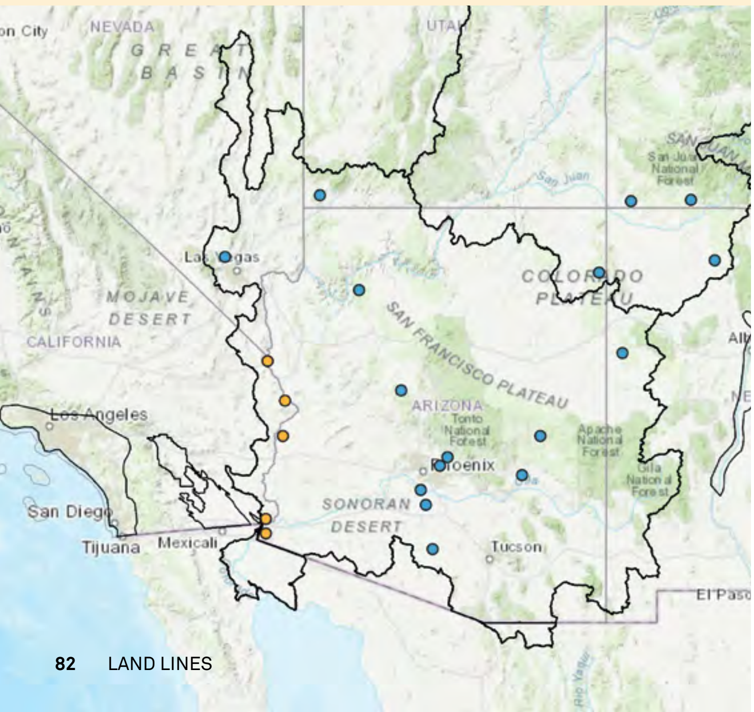
THE RELATIONSHIP BETWEEN TRIBAL AND STATE ALLOCATIONS

When a tribe wins the right to use or lease a certain amount of Colorado River water, that water is considered part of the allocation of the state where the tribe is based. Because the states have individual allocations of water under the laws and agreements governing the river, newly negotiated tribal water settlements reduce the amount of water available for other users in that state. In the past, when tribal water allocations were not used, this water was left in the system for use by others. This issue is particularly acute in Arizona, where 22 of the 29 basin tribes have reservations. With the water rights of many tribes still unrecognized and unquantified, tribes and other stakeholders are understandably on edge about the future availability of water in the drought-stricken basin and intent on finding ways to work together to ensure a sustainable future.

To access policy briefs, reports, and other materials produced by the Water & Tribes Initiative, visit *www.naturalresourcespolicy.org/projects/water-tribes-colorado-river-basin.*

Map of resolved surface water rights for tribes in the Colorado River Basin, reached through litigation (indicated in orange) and negotiated settlements (indicated in blue). Credit: "The Hardest Working River in the West," Babbitt Center StoryMap, www.lincolninst.edu/research-data/data/co-river-storymap.



Bridging the Gap

Since its inception, WTI has aimed to improve the tribes' abilities to advance their interests and to promote sustainable water management in the basin through collaborative problem-solving. "We walk a tightrope," says Matt McKinney, who co-facilitates the initiative with Vigil. McKinney is a longtime mediator who directs the Center for Natural Resources & Environmental Policy at the University of Montana. "On the one hand, it's pretty easy to see us being advocates for tribes, which we are. But the larger frame is that we're advocates for a fair, equitable, effective process of solving problems and making decisions."

"The success of tribal water settlements has been based on the relationships of the people in the room," says Margaret Vick, an attorney for the Colorado River Indian Tribes. "And the Water & Tribes Initiative has expanded the [number of] people in the room." WTI is now working to shift away from narrow negotiations on individual water settlements to a much broader conversation spanning the basin: the current guidelines for managing the river will expire at the end of 2026, and new guidelines for the next several decades will soon be hammered out.

The U.S. Bureau of Reclamation (USBR)—the division of DOI that manages the Colorado and other western waterways—is reviewing the past decade and a half of negotiations and operations to prepare for the next round. "We need a more inclusive renegotiation process," says Morgan Snyder, senior program officer at the Walton Family Foundation's environment program. "This is the opportunity to influence the next 25 years of water management in the basin."

Anticipating the renegotiation process, McKinney and Vigil conducted interviews in 2019 with more than 100 people, including tribal leaders, water managers, and others involved in water issues in the region, to identify major issues facing the basin as well as ways to enhance collaborative problem-solving, particularly tribal participation in decisions about the river. WTI held workshops with tribal members

An aerial view of a portion of the 32,000-acre Mohave Indian Reservation, approximately half of which is used for the cultivation of cotton, alfalfa, and other crops. Credit: Earth Observatory/NASA.

and other interested parties from across the basin to identify strategies to enhance tribal and stakeholder engagement.

"Many interviewees believe it is time to move beyond managing the river as a plumbing and engineering system that supplies water to cities and farms and toward a more holistic, integrated system that better accommodates multiple needs and interests, including but not limited to tribal sacred and cultural values, ecological and recreational values, and the integration of land and water management decisions," McKinney and Vigil wrote. "The intent here is to articulate a holistic, integrated vision and then make progress toward that vision incrementally over some period of time . . . and to move from a system focused on water use to watershed management" (WTI 2020).

To raise awareness, increase understanding, and catalyze conversations, WTI is issuing a series of policy briefs on topics ranging from the enduring role of tribes in the basin to a system-wide vision for sustainability. It is also helping the Ten Tribes Partnership, a coalition created in 1992 to increase the influence of tribes in Colorado River water management, develop a strategic plan.

But changing the nature of water management negotiations—to say nothing of the nature of water management itself—will not be easy. "Just like any other really complicated process, you have to figure out a way to break it down," says Colby Pellegrino, deputy general manager for the Southern Nevada Water Authority, which supplies water to Las Vegas and its suburbs. "You have to eat the elephant that is Colorado River law and all of the interrelated problems one bite at a time. This presents issues if different stakeholder groups have differing opinions on the scope of negotiations."

Some tribes have been frustrated by the difficulty of making their voices heard, even though they are sovereign nations. "We're not 'stakeholders,'" Vigil says. "We always get thrown into the same pool as NGOs, conservation groups. But it's like, 'No, we're sovereigns.'"

"We're not 'stakeholders,' Vigil says. "We always get thrown into the same pool as NGOs, conservation groups. But it's like, 'No, we're sovereigns.'"

The federal and state governments have also made some significant missteps. In 2009, the USBR launched a major study to assess current and future supply and demand along the river (USBR 2012), yet tribes weren't meaningfully included in that process. Only after pressure from several tribes did the bureau commission a study of tribal water allotments, conducted with the Ten Tribes Partnership and released years later (USBR 2018). That study outlines the barriers to the full development of tribal water rights and analyzes the potential impacts of tribes developing those rights—especially for other users who have come to rely on the water that long went unused by the tribes. And in 2013, the basin states and the federal government began discussions about the Drought Contingency Plan without notifying tribes.

"States have ignored tribal water rights and tribal water use since the compact in the 1920s," Vick says. "The [supply and demand study] was a state-driven process, and the states did not understand tribal water rights and were rarely involved in even considering what goes on on the reservation, as far as water use. They can't [do this] anymore, because there has to be a full understanding to be able to manage the 20-year drought that we're in."

One basic but critical remaining challenge is finding a common way to understand and discuss issues related to the river. Anne Castle, a former assistant secretary for water and science at the DOI who held responsibility for the USBR from 2009 to 2014, is now a member of WTI's leadership team. "The challenge is that we're not talking about just having additional people—tribal representatives—at the table," she says. "Those tribal representatives bring different values to the table as well. We haven't really dealt with those cultural and spiritual and ecological values in these sorts of discussions previously."

Bridging that gap is a slow process, Castle adds. "When you have spoken one language for as many years as state water managers have . . . to be exposed to a different way of talking about water is difficult," she says. "But the converse is also true: it takes [tribal representatives] a long time of sitting in meetings and listening to understand how what state water managers are talking about will impact them."

Exactly how tribes might get a more substantial voice in decisions about the river's future isn't clear. One proposal is for the creation of a sovereign review team that would include state, federal, and tribal representatives.

"Tribes call the canyon home," a monument at Grand Canyon National Park reminds visitors. There are 29 federally recognized tribes in the Colorado River Basin. Credit: Dmitry Petrakov/Alamy.

What Comes Next

The coming renegotiations “are a very important inflection point in how the basin states and the federal government treat tribal sovereignty in the Colorado River Basin going forward,” says Robison of the University of Wyoming. “When that process gets mapped out, you’ll be able to see, okay, to what extent are the tribes again being pushed to the margins? To what extent are the basin-state principals and the feds willing to actually not kick the can down the road?”

In a hopeful sign of potential collaboration, several large water agencies are contributing funding to the Water & Tribes Initiative, including the Southern Nevada Water Authority, Denver Water, the Imperial (CA) Irrigation District, the Metropolitan Water District of Southern California, and the Central Arizona Project. The Nature Conservancy and other environmental groups have provided support for WTI convenings as well.

Exactly how tribes might get a more substantial voice in decisions about the river’s future isn’t clear. One proposal that emerged from WTI’s basinwide interviews in 2019 is for the creation of a sovereign review team that would include state, federal, and tribal representatives, perhaps supplemented by an advisory council of representatives from each of the basin’s 29 tribes.

No matter how the negotiations are structured, much is at stake for all involved. While there seems to be a general commitment to consensus and collaboration, there is a fundamental tension at the heart of the endeavor. As McKinney notes, “One of the tribes’ fundamental interests is to develop and use their water rights. That interest seems to be diametrically opposed to the current interests of the basin states and the objectives of the DCP, which are all about using less water.” Historically, unused tribal water has been used by nontribal entities, in some cases allowing those entities to exceed their allocations. Now, in an era of long-term drought and climate change, there’s less and less water to go around. “You can see,” says McKinney, “that the basin is faced with some difficult conversations and tough choices.”

Ivy Ledezma of the Colorado River Indian Tribes at the Ahakhav Tribal Preserve, a 1,253-acre conservation area established along the river in 1995 in Parker, Colorado. Credit: Alexis Kubhander/Cronkite News.

For most tribes, the choice is clear. “We need to develop our water rights,” says Crystal Tulley-Cordova, principal hydrologist for the Navajo Nation’s Department of Water Resources. “We shouldn’t be expected to forfeit our development.”

One of the most contentious issues centers on the ability of tribes to lease their water to users outside the boundaries of their reservations. Allowing tribes to lease their water—or not—is one of the principal sources of leverage that individual states have over the tribes within their boundaries. “Given that tribal water rights are administered by the state in which the reservation is located, tribes need to work with state officials and other water users to find mutual gain solutions that balance everyone’s needs and interests,” says McKinney.

Vigil agrees and emphasizes that a tribe’s right to do what it wants with its water, whether using it for farming or economic development on tribal lands or leasing it to other users, is a key tenet of the self-determination principle codified in federal policy since the 1970s. “The heart of it goes to those foundational concepts of an ability to determine your own future,” Vigil says. “And that’s what sovereignty is to me.”

Finding Common Ground

WTI is already helping tribes work toward the kind of solidarity that will make it difficult for any entity to ignore their collective voice. Recently, 17 tribal leaders joined together to send a letter to the DOI about the next stage of negotiations. "When Tribes are included in major discussions and actions concerning the Colorado River, we can contribute—as we already have—to the creative solutions needed in an era of increasing water scarcity," the letter read. "We believe frequent communication, preferably face-to-face, is appropriate and constructive."

"The 'Law of the River' is always evolving," says Holway of the Babbitt Center. "I am optimistic that we will better incorporate the perspectives and interests of the broader community in future Colorado River management discussions; in the face of increasing water scarcity, a broader base of engagement will be essential. I am also hopeful we will be seeing a stronger tribal voice within the U.S. Department of the Interior." (At press time, President-elect Joe Biden had nominated Rep. Deb Haaland of New Mexico to serve as secretary of the Interior; Haaland would be the first Native American to head the agency and the first Native American Cabinet secretary.)

The guiding principle for WTI, McKinney says, is "to build on the collaborative culture in the basin and to focus on common ground, to build a sense of momentum by working on the 80 percent of the issues where tribal and other water leaders can agree—and then circle back around to address the differences."

That focus on common ground is helping to create stronger ties not just among tribes, but also between tribes and the established water management community. "One of the great things about the Water & Tribes Initiative is that it's trying to create this network of people who can all rely on each other," says Colby Pellegrino. "It's building a web for people to walk across instead of a tightrope."

Matt Jenkins is a freelance writer who has contributed to the *New York Times*, *Smithsonian*, *Men's Journal*, and numerous other publications.

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SPOTLIGHT ON OUR CENTERS

Center for Community Investment

The Center for Community Investment (CCI) works to overcome disinvestment and improve opportunity so everyone has a fair chance to lead a healthy and productive life. Founded in 2017, CCI helps communities set the stage for investments that advance their goals by helping leaders use its capital absorption framework to clarify local priorities, enlist institutions that could contribute to success, develop a pipeline of investments to achieve the vision, and change policies and practices to create a more supportive financing environment.

To learn more, visit
www.centerforcommunityinvestment.org

Daniel Hoan Memorial Bridge, Milwaukee, Wisconsin.
Credit: Pete/Flickr CC BY-NC-ND-2.0.

Envisioning Climate Resilience

Experts from the Lincoln Institute Network Weigh in on Promising Land and Water Policy Solutions

Land and water policy can shape the built and natural environment to reduce the extent of climate change and help communities and natural systems withstand the impacts of a changing climate. The Lincoln Institute is advancing good planning practices to address these challenges and aspires to foster climate justice as a key element of this work. We reached out to people across our global network to ask them this question:

If you could implement one land-based solution during 2021 that would have a meaningful impact on climate change, what would it be?

Kongjian Yu

Founder and President, Turenscape; Contributor, *Nature and Cities*

The most effective and holistic solution to climate change is "sponge lands." Expanding on the concept of "sponge cities," which uses green infrastructure to absorb stormwater and combat pollution in urban areas, this land-based solution can retain rainwater at the source, slow the water in the course of its flow, and be used adaptively at its outlets (rivers, lakes, and oceans). This is completely opposite to the conventional engineering solutions widely used across the globe, particularly in developing countries in the monsoon climate: damming rivers to create big reservoirs, channelizing water using concrete flood walls, building concrete drainage in the city, and pumping water out. Gray infrastructure consumes huge amounts of cement, creating a significant amount of carbon emissions, suffocating the most productive ecosystems with the highest biodiversity, and making land less resilient.

Sponge lands means the creation of porosity in vast, hilly landscapes that are suffering from erosion; the creation of "sponge fields" in the form of small ponds in farmland where runoff pollutes nearby rivers and lakes; and the creation of sponge cities. Sponge lands means the prudent use of cement in hydrological engineering and pavement in urban areas. It also means the removal of concrete flood walls and dams along waterways to restore habitat, replenish groundwater, nurture lush vegetation, and create other benefits. Sponge lands are an efficient, inexpensive solution that will empower the resiliency of the land against climate change.

Courtesy of American Society of Landscape Architects.

Linda Shi

Assistant Professor of City and Regional Planning, Cornell University; C. Lowell Harriss Dissertation Fellow 2015–2016

The United States needs a national climate adaptation plan that includes a land use and development strategy. Efforts related to carbon dioxide removal and renewable energy, such as biofuels and solar arrays, will significantly impact rural land use. Failure to decarbonize means escalating climate impacts, climate-induced migration, and new landscapes of injustices in the form of climate oases and climate slums. Growing urban–rural political conflict already reflects spatial and socioeconomic inequality, rooted in rural resource and human extraction for processes of urbanization, dynamics that the climate crisis can exacerbate. Market responses will not be sufficient in scale, target geographies that can sustainably accommodate growth, or enable a just climate transition. The magnitude of needed actions to tackle the climate crisis therefore requires a new national architecture of land policy. This includes (1) science- and equity-informed identification of geographies where future growth and investment should go; (2) fiscal, investment, and grant policies that enable local governments to respond to climate impacts rather than burden them with unfunded mandates or punitive measures; and (3) legal reforms to banking and organizational regulations that would expand cooperative ownership models that help build community control of housing and land for local wealth retention and creation.

Courtesy of Cornell University.

Alan Mallach

Senior Fellow, Center for Community Progress; Author, *Regenerating America's Legacy Cities*

The zoning of America's suburbs, resulting in a suburban landscape dominated by large single-family houses on large lots and by vast areas—often largely vacant—zoned for industrial and office use, has fostered an auto-dependent pattern of widely dispersed population and employment centers which in turn has led to increased emissions from vehicular travel, as well as from energy use for lighting, heating, and cooling. It has also curtailed housing production, exacerbated housing affordability problems, and led to millions of lower-income workers making long daily treks from urban centers to suburban jobs. Solutions are straightforward, and do not require undoing single-family zoning. State zoning statutes should require municipalities to allow accessory apartments and structures in single-family zones wherever feasible from a health and safety standpoint, permit multifamily housing along commercial corridors and in industrial or office zones, and rezone bypassed vacant parcels, of which dozens exist in nearly every American suburb, for multifamily housing. Higher residential densities along corridors and in mixed-use clusters will, in turn, vastly increase the opportunities for cost-effective, efficient transit solutions. Increased and diversified housing options in already largely developed suburbs will address unmet housing needs and reduce the pressure for further outward expansion of metros, making the suburbs themselves more sustainable in the face of demographic shifts, changing housing demands, and future climate shocks.

Courtesy of *Next City*.

Sivan Kartha

Senior Scientist, Stockholm Environment Institute; Advisor, Lincoln Institute Climate Program

A survey across 64 countries estimated that forests held collectively by indigenous peoples and forest communities contain approximately one trillion tons worth of carbon dioxide, equal to more than three decades' worth of global emissions from fossil fuel use. These lands are also among the world's richest in biodiversity and home to vital freshwater resources. However, those living in these forests often lack formally recognized land rights. Forest-rich countries generally have colonial legacies, in which land and resources were seized at the expense of local communities. Centuries-old property rights and land tenure regimes originally set up for taxation and extraction persist, contributing to the continued degradation of forest resources. A growing body of research shows that when land rights are formally recognized and legally safeguarded, indigenous peoples and local communities can protect common resources through informal practices and collective action that prevent deforestation, preserve biodiversity, and protect ecosystem services such as soil enrichment and watershed health. Imposing conventional private property regimes, on the other hand, can cause new problems, triggering land speculation and clashing with local cultural norms. Establishing secure land tenure rights for indigenous peoples and rural communities can help preserve the world's declining forest resources, while safeguarding the livelihoods on which their hundreds of millions of residents depend.

Courtesy of Sivan Kartha.

Tamika Butler

Built Environment and Equity Consultant, TLB Consulting; Guest Speaker, Big City Planning Directors Institute

My hope for 2021 is that the increased attention, conversation, and resource allocation directed toward fighting racism, white supremacy, and anti-Blackness will not disappear with the flip of a calendar page as people push toward "getting back to normal." Just being better than it is now shouldn't be enough. As a Black person, I could look at the statistics and know that the old normal meant my life was expendable. As a Black person, I also know that in this new normal, I can look at any statistic about COVID-19, hate crimes, or environmental racism and see that my life is still expendable. Beyond not being good enough, "getting back to normal" will not meaningfully impact climate change. Instead, I hope that those in power examine who they are listening to and funding when it comes to land-based solutions.

The ideas, solutions, and pursuits of fighting climate change with land-based solutions should focus on ensuring that we listen to Black people, Indigenous people, and other racialized people and members of historically oppressed groups who have long been leaders in climate change, sustainability, and serving as protectors of humanity. All climate change solutions should center the idea that in 2021 we must stop the killing of Black people, Indigenous people, and other people of color.

Courtesy of Tamika Butler.

Melinda Lis Maldonado

Lawyer, Matanza-Riachuelo River Basin Authority, Argentina; Instructor, Lincoln Institute/Latin America and the Caribbean

The implementation of development charges with environmental components would have a meaningful impact on climate change. These are building or urban permits that consider water and vegetation aspects as requirements to exercise basic or additional building rights. To illustrate the last case, in exchange for increasing density, adding land for green urban spaces could be an additional charge. These urban planning tools could finance climate change adaptation and mitigation, because they could generate, at the local level, resources to finance conservation or the implementation of green and blue infrastructure in private or public spaces. Nature-based solutions would be prioritized. Nature can provide more affordable long-term solutions and more benefits to humans and cities than solutions that only use gray infrastructure. At the same time, such solutions can function as mitigation and adaptation measures.

These requirements would typically be fulfilled in the same place where the building occurs, in the form of sustainable drainage, reforestation, or green space. In some exceptions, they would involve financing green infrastructure in another place. Attaching environmental conditions to building rights would take different forms according to local climate change effects and the magnitude of the urban development project. Urban planning, law, and private property regulation have an important role to play in facing climate change.

Courtesy of Melinda Lis Maldonado.

Frederick Steiner

Dean, University of Pennsylvania Stuart Weitzman School of Design; Coeditor, *Design with Nature Now*

While we work on enacting effective policy, we need to change our hearts and minds about climate change and adjust how we live accordingly. Everyone reading this would make a list of 365 personal activities that contribute to climate change and make a commitment to replace them, one each day, with an action to mitigate or adapt to climate change. By sharing their pledge on social media, they could encourage their family, friends, and followers to do the same. Each of these actions ties back to land, water, and energy. For example:

~~using a copier~~ *planting a tree*
~~building a patio~~ *digging a garden*
~~driving a car~~ *taking a walk*
~~complaining about politicians~~
calling and emailing representatives
~~ordering a book online~~ *visiting a local bookstore*
~~buying imported produce~~ *growing a tomato*
~~dropping off dry cleaning~~ *learning to iron*
~~grilling beef~~ *eating a cricket*
~~flying to a conference~~ *organizing a Zoom*
~~turning on the air conditioner~~ *opening a window*
~~cutting the grass~~ *planting native flowers*
~~upgrading your cable~~ *watching birds*

and so on for another 353 days.

Courtesy of University of Pennsylvania.

Astrid R. N. Haas

Policy Director, International Growth Centre

Larry Clark

Director of Strategic Initiatives, International Association of Assessing Officers

From a governmental perspective, implementing land-based solutions in my own country, Uganda, is inherently challenging. In part this is because our Constitution, and all subsequent legislative instruments pertaining to land, unequivocally vest land in the people. In addition, Uganda has multiple coexisting tenure systems, yet limited administrative capacity to delineate each of them or document ownership. This situation means the government's ability to implement land-based solutions, which unlock public value, is extremely limited. It is within this context that in 2021 I would therefore pursue land readjustment as an entirely practical approach and the most viable land-based solution. Particularly within urban areas, this tool [a model in which landowners pool their properties to accomplish a redevelopment project] has enormous potential. For example, working at a local level, it would be possible to determine land tenure and ownership and elicit community buy-in to pool parcels for more densified development. There is growing evidence that denser cities are greener and more climate efficient. Therefore, this solution would not only have a significant impact on the efficiency of how Ugandan cities could be managed, particularly with regards to public service provision, it would have a meaningful impact on climate change as well.

I am an appraiser with 40 years of experience working in three local jurisdictions, writing articles, lecturing, and teaching mass appraisal in many parts of the United States and the world. My association with people from many parts of the world has given me an appreciation for the issues surrounding climate change. One of the realities of climate change is that water resources are poorly distributed among our 50 states. Climate change exacerbates that situation by causing droughts in one part of the country while the warmer atmosphere brings soaking rains and floods to another. Therefore, my wish would be for the development of a nationwide network of reservoirs and distribution systems to collect and redistribute precipitation nationally. It would require an effort similar in scope to the federal highway system begun under President Eisenhower, and should be governed by a regulatory body that prioritizes humanitarian needs above those of agriculture and commerce. Collection systems should be sited in areas of current and anticipated future flooding, as well as natural runoff, to feed into reservoirs for later distribution into municipal water systems where it is needed.

Courtesy of IGC.

Courtesy of IAAO.

Forster Ndubisi

Professor of Landscape Architecture and Urban Planning, Texas A&M University; Author, *Ecology in Urban Design and Planning*

Climate solutions require us to fundamentally rethink our ethical relations to the land.

I propose that we initiate the process of critical reflection on our ethical obligations to the land and adopt a place-based ecocentric ethic (PBEE) as one climate solution in 2021. The adoption of PBEE via lifelong immersive education stipulates the ethical behavior and moral obligations that designers and planners should adhere to in addressing climate challenges. PBEE is based on the interdependency between people and biophysical [nature] processes, in which each depends on the other for continued existence. Human interactions with natural processes will necessarily result in the degradation of natural resources and processes [natural capital] to a certain degree, including landscapes that provide vital ecosystem services. By implication, PBEE confers the moral imperative for preserving natural capital when feasible; conserving natural capital when a justifiable degree of use is demonstrated; replenishing natural capital through active restoration of degraded ecosystems; minimizing the extent of human footprint; reducing carbon usage; and actively embracing environmental stewardship. To combat climate change effectively, PBEE employs ecological knowing as a process for understanding the interdependency between human and natural ecosystems. In turn, ecological knowing works best by using a coupled system-design thinking process and participatory collaboration in creating climate mitigation and adaptation solutions.

Courtesy of Texas A&M University.

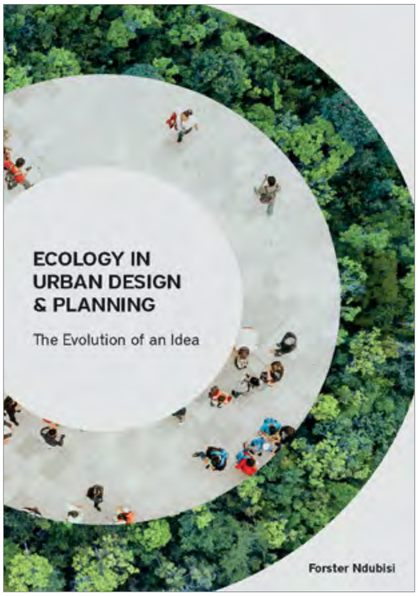
Robin Bronen

Executive Director, Alaska Institute for Justice; Steering Committee, Climigration Network

Return stolen lands to Indigenous Peoples and erase the borders and boundaries that divide and separate the ecosystems upon which we depend. Indigenous Peoples have conserved the biodiversity of this planet for millennia. The one-fourth of the Earth's land occupied by Indigenous Peoples coincides with 40 percent of the natural areas protected and territories that remain undamaged. According to studies undertaken by the World Bank, these territories hold 80 percent of the planet's biodiversity. In the United States, settler colonialism created the legal and institutional structures that forcibly removed and relocated Indigenous populations from their traditional lands and recast Indigenous Peoples' land as property and as a resource. Repatriating land to Indigenous Peoples, as the original stewards of these lands now known as the United States, helps to rectify this injustice. Removing the social construction of boundaries and borders that artificially divides land and erasing these invisible lines ensures that the ecosystems and biodiversity upon which humanity depends can thrive as the climate crisis transforms the web of life.

Courtesy of Robin Bronen.

NEW PUBLICATIONS



Ecology in Urban Design and Planning

By Forster Ndubisi

This lavishly illustrated book surveys connections between ecology and urban planning and design from theoretical, literary, and historic perspectives and demonstrates the increasingly urgent need to balance human use with ecological concerns in our built environments. As places that support life systems for people and other organisms, rural and urban landscapes are degrading in the face of extreme climate change, rising sea levels, resource depletion, species extinction, accelerated consumption, and increased urbanization. The author maintains that we can learn from history, reinterpreted within the context of changing societal concerns, as guidance for the future. The book concludes with a framework for increasing sustainability and resilience despite unprecedented challenges, proposing place-based ecological urbanism as a way to synthesize ecological thinking into design and planning practice in the Anthropocene era.

www.lincolninst.edu/ndubisi

"This unusually comprehensive overview is very relevant as we grapple with climate change, resource depletion, sprawling cities, and loss of nature and biodiversity. The vision and model of place-based ecological urbanism is a well-suited antidote or response to these global circumstances."

—Tim Beatley, Teresa Heinz Professor of Sustainable Communities, University of Virginia School of Architecture

LINCOLN INSTITUTE PODCASTS

Land Matters

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Don't miss ***Estación Ciudad***, a Spanish-language podcast about the forces shaping cities in Latin America.

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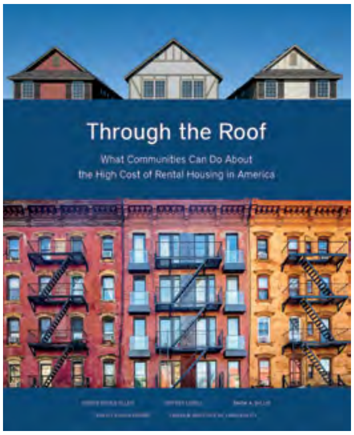


www.lincolninst.edu/through-the-roof

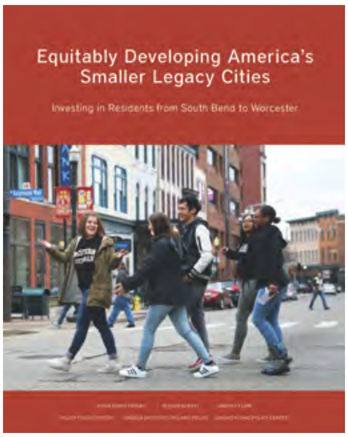
Through the Roof: What Communities Can Do About the High Cost of Rental Housing in America

By Ingrid Gould Ellen, Jeffrey Lubell, and Mark A. Willis

This report shows what local governments can do to mitigate the rising cost of rental housing in the United States. It considers the root causes of high rent burdens, reviews evidence about the consequences, and lays out a framework that cities, towns, and counties can use to help provide all their citizens with safe, decent, affordable housing options.

"Through the Roof *is a ray of light in dark times. Housing has always been at the center of economic and racial inequality in our nation, and it must be at the center of creating real opportunity in every community. The authors explain masterfully how a quiet crisis became a national epidemic of housing insecurity over the past half-century. Even more important, at a time of division and paralysis in our federal government, they show convincingly how cities, towns, and counties can come together to solve our housing challenges and build more just and inclusive communities."*

—Shaun Donovan, former Secretary of the U.S. Department of Housing and Urban Development (HUD)



www.lincolninst.edu/equitably-developing-legacy-cities

Equitably Developing America's Smaller Legacy Cities: Investing in Residents from South Bend to Worcester

By Erica Spaid Patras, Alison Goebel, and Lindsey Elam

Once drivers of industry and wealth, many smaller industrial cities in the Rust Belt declined in the 20th and 21st centuries due to changing industries and government policies that steered investments away from communities of color. This report presents strategies for reinventing these places—tapping their full potential while preparing workers for jobs, helping local businesses expand, empowering residents to become civic leaders, and preventing displacement.

"This report demonstrates a keen understanding of legacy cities, and the policy recommendations are robust and easily understandable."

—Jason Segedy, Director of Planning and Urban Development, Akron, Ohio

Estimated global population, 1946: **2.4 billion**
Global population, 2021: **7.7 billion**
Percent of global population currently living in urban areas: **56.2**
People living in informal settlements worldwide in 2020: **1 billion**
Percent of urban residents in 78 countries who had convenient access to public transit in 2018: **53**
Percent who lived within a quarter-mile of a park or open space: **31**
Approximate percent of U.S. urban land occupied by parks and open space: **15**
U.S. urban residents who lacked access to a park within a 10-minute walk from home in 2020: **100 million**
Total area, in acres, of vacant lots 0.5 acres or larger in the 25 largest U.S. urban cores: **580**
Gallons of stormwater absorbed during rain events by Milwaukee's 0.6-acre Fondy Park, a former vacant lot: **83,000**
Percent of surface area in Shenzhen, China, covered by green infrastructure: **24**
Estimated amount spent per year on green infrastructure around the world: **$25 billion**
Land value lost by flood-prone properties in Miami since 2005: **$125 million**
U.S. coastal properties at risk of a 100-year flood, according to current FEMA maps: **8.6 million**
Properties that actually face that risk when sea level rise is factored in: **14.6 million**
Impervious surfaces added to the Houston metro area from 1997 to 2016, in football fields: **186,873**
Total parking spaces in Seattle/parking spaces per household: **1.6 million/5.2**
Total parking spaces in Des Moines/parking spaces per household: **1.6 million/19.4**
Acres of land owned by Bay Area Rapid Transit (BART) in San Francisco: **250**
Target number of housing units BART will produce on that land by 2040: **20,000**
Percent of those units that will be affordable: **35**
Housing units created if land near Greater Boston's transit stations averaged 10 units per acre instead of 6.4: **253,000**
Combined population of U.S. legacy cities: **17 million**
Collective economy of U.S. legacy cities: **$430 billion**
Property tax as a percent of U.S. local government general revenue in 2017: **30**
Property tax as a percent of total U.S. tax revenue in 2017: **10.6**
Total proceeds from the sale of building rights certificates (CEPACs) in São Paulo since 2004, in USD: **$3 billion**
Estimated percent of U.S. jurisdictions that charge impact fees to developers: **25**
Millions of acres conserved by land trusts in the United States: **56**
Percent decrease in water treatment costs per 10 percent increase in forest cover in a watershed: **20**
Percent of Colorado River flow at risk in the next 30 years due to climate change: **20**
Percent of planners who say they are not involved enough in water planning and decisions: **75**
Vacant homes and apartments in 1950 as a percent of U.S. housing stock: **1**
As a percent of U.S. housing stock in the third quarter of 2020: **10.1**
People experiencing homelessness in the United States during the most recent annual one-night count: **567,715**
Percent of U.S. renters who spent more than half their income on rent in 2018: **25**
Units of affordable housing created in Cambridge, Massachusetts, through inclusionary zoning: **1,000**
Inclusionary housing programs in the United States: **1,379**
Land banks in the United States: **200+**
Distressed properties returned to the tax rolls by Ohio's Cuyahoga Land Bank, 2009–2019: **11,436**
Estimated economic impact for every dollar spent by the land bank during that period: **$8**
Total estimated economic impact of the land bank during that period: **$1.43 billion**

Contributors: Anthony Flint, Katharine Wroth, Emma Zehner, and Sarah Zobel. For a full list of sources, visit www.lincolninst.edu/by-the-numbers.

Playground in Lawrence, Massachusetts. Credit: Alex MacLean.

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