

Rosario, Argentina Uses Urban Farming to Tackle the Pandemic and Climate Crisis

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City Population (Metropolitan Region)	1,276,000
City Area (Metropolitan Region)	178.7 km ²
City GDP	37.9 billion USD
Climate Zone	Cfa (humid subtropical)
ARC3.3 Linkage	COVID-19, Cities, and Climate Change Element

of Municipalities and Communities that Promote Agroecology). Rosario municipality’s urban and peri-urban agriculture program- Sustainable Food Production for a Resilient Rosario (Programa de Agricultura Urbana, or PAU) - is exemplary, as it weaves agroecology in its urban planning, policy, and design frameworks to co-benefit its economy, local environment, and citizens’ quality of life. Rosario, the third-largest city in Argentina, developed its PAU program as a response to the 2001 economic crisis in Argentina to fight severe food insecurity and unemployment. It became a cornerstone of the city’s resilience strategy against extreme weather events and social inequity. Rosario’s PAU program delivers synergies with several United Nations Sustainable Development Goals (SDGs) like Goal 1 (No Poverty), Goal 2 (Zero Hunger), Goal 3 (Good Health and Well-being), Goal 5 (Gender Equity), Goal 8 (Economic Growth and Decent Work), Goal 10 (Reduced Inequality), and Goal 11 (Sustainable Cities and Communities).

Introduction. The COVID-19 pandemic exacerbated food insecurity worldwide by disrupting global supply chains, labor shortages, employment loss, and income depletion. The global food-insecure population doubled to 276 million within the first few months. Cities grappling to cope with food insecurity during the pandemic realized (i) the need for an alternate model of food production and supply, (ii) the need for a more local and coordinated action plan, (iii) the role of local governance, (and local service provision) in ensuring sustainable access to food, and (iv) the need for local job creation, especially for the most vulnerable groups. As a result, a resurgence of urban farming and gardening was witnessed globally, with Latin American cities leading the dialogue through their Agroecology model (the application of ecological concepts and principles in agriculture/farming, derived from the knowledge and natural resources of local and indigenous communities).

Brief History. Rosario is located in the fertile Pampa húmeda, Argentina’s primary agricultural land formed on the alluvial basin of the Parana River. Parana is South America’s second largest river and forms its delta - about 14000 square kilometers - through Santa Fe and Rosario. Historically, Rosario served as Argentina’s principal port for agricultural products. In the 1990s, Argentina’s excessive privatization and deregulation programs transformed the agrarian sector into an intensive industrial model prioritizing commodity crops. Genetically modified soybean production replaced Rosario’s rich horticultural belt that sustained the city’s food supply. This accelerated deforestation, diminished soil quality, exacerbated rural poverty, led to the disappearance of small farms and loss of employment in the agriculture sector, and increased food insecurity, and food-import-related emissions.

Latin America has a long-standing practice of agroecological farming rooted in the agrarian social movements. Indigenous and campesino farmers’ resistance to the intensification of industrial agriculture in the continent paved the way for institutionalizing agroecology in the 1980s and 1990s. Argentina created innovative institutional and legislative frameworks to enable a decentralized and localized agroecological farming network for its widespread use. Thus, 130 municipalities in Argentina form the national agroecological network RENAMA (National Network of

With the soybean (Rosario’s mono-crop) market crash in the early 2000s, the city’s economy broke, leaving over 60% of the population below the poverty line. As Rosario’s unemployment soared past the national average, hundreds of residents protested daily in front of Rosario’s government buildings, demanding work or assistance. As a response, the municipal government, along with two key partners - national program Pro-Huerta (“Pro-Garden”) and a local NGO - Centre for Agroecological Production Studies (CEPAR) - launched a program that strategically repurposed underutilized and degraded land for urban agriculture and leveraged farmers’ expertise in soil care.

In 2002, intending to expand the program slowly, the city provided equipment, seeds, and training on agroecological production to 20 groups from the city's poorest neighborhood. However, high unemployment, hunger, and poverty pulled more people towards the program every week, forming around 800 gardening groups in a few weeks. Till early 2003, the city identified a significant amount of vacant and underutilized land for cultivation and expanded the irrigation network through well-distributed wells. To increase agroecological production and farmers' income (to 785 pesos a month - the poverty line), in 2003, the PAU created seven weekly markets across the city where farmers could directly sell their products. As the demand for their produce increased, the gardening groups demanded continued access to the allocated land for urban farming. Hence, in 2004, the city introduced a new regulation to formalize the temporary cession of property for urban agriculture and created an information bank that regulated the use of vacant land.

In 2005, when a community expressed the need for cultivating land in their vicinity - a natural reserve named Bosque de los Constituyentes - the city arranged permissions for cultivating within the reserve's limits, innovating the concept of agriculture garden parks. Rampant wildfires and flooding in Rosario throughout 2007-2008 urged the city to incorporate climate action into PAU, giving rise to the Green Belt Project.



Figure 1: Rosario suffers from floods and the urban heat island effect, which exacerbated climate change. Photo by the Municipality of Rosario.

Since then, the city has reserved increasing land for agroecology. In 2019, Rosario had an average of 12 square miles of green space per capita, making it the greenest Argentinian city. By 2021, 75 hectares of urban land and another 800 hectares of peri-urban land were dedicated to urban agriculture. 300 farmers produced about 2500 tons of fresh agroecological produce, drastically reducing food import dependency and food insecurity. Over 500 community gardens and green spaces generate employment and income for thousands of citizens and improve access to fresh and high-nutritional food, benefiting 300,000 residents. Over 2,400 families and 40 schools have adopted agroecological production in home/

school gardens. Pablo Nasi Murua - Rosario's sub-secretary of Social Development - describes PUA's organic transformation over the two decades: "It (PUA) has lasted through prosperous and lean years, but every time there has been a crisis, it expands."

Analysis, Evaluation, and Implementation. Over the past two decades, consolidating the PAU involves securing land and infrastructure for permanent cultivation, brownfield rehabilitation through horticulture, contained urban sprawl, and distribution of greenspaces across the city. Cultivating solely through agroecological methods regenerated the soil, decreased soil and water pollution (by eliminating the use of chemicals/pesticides, etc.), increased the biological value of the produce, and increased the soil's capacity to absorb water. Increased water absorption decreases surface run-off (and hence urban flooding), increases groundwater recharge, and eliminates threats of water scarcity.

Additionally, the greenbelt provides various other ecological services like relief from the urban heat island effect, enhanced resilience from wildfire, and improved air quality. The PAU also contributes to a 95% decline in greenhouse gas emissions associated with the delivery of vegetables. The city used agricultural garden parks to foster social cohesion by hosting a variety of community and civic activities, including agroecology training. Furthermore, the PAU program fosters social equity in the city through "productive barrios," where agriculture is integrated into public housing and slum upgradation programs. While the intended purpose of PAU was local food security and employment generation, climate change adaptation and mitigation emerged as co-benefits of this program.



Figure 2: Mayor Pablo Javkin with Marta Queñas in a Vegetable Garden Park. Photo by WRI Ross Center for Sustainable Cities.

The success of the PAU can be attributed to several salient features of the program, which serve as a blueprint for other cities to embed urban agriculture and other nature-based solutions into their planning and policy frameworks.

Institutionalizing PAU. The University of Rosario, with the Municipality, created an inventory of vacant and underutilized land along railroads and highways, low-

-lying, flood-prone lands, and designated greenbelts. Hence, roughly 35% of the municipal area was made available for urban agriculture. The 2004 ordinance allowing the city to grant temporary tenure of vacant land for urban agriculture significantly expanded PAU. The city also formed a food network including government agencies, research bodies, charities, wholesalers, and retailers to regulate supply and eliminate food waste. The city's commercial gardeners are enrolled in the National Registry of Family Farmers, which entitles them to development assistance, social benefits, and old-age pensions.

The Municipality implemented a significant step in 2007, when a record-breaking rainfall forced the city to evacuate over 3,000 people, recognizing that converting underutilized land to green spaces could help absorb excess water generated by atmospheric events and prevent floods. In 2008, the Parana Delta wildfire covered the entire Rosario and Sante Fe in smoke for weeks, becoming the worst in recent Argentinian history. Rosario's increased exposure to wildfire was traced to sporadic rain, rampant urbanization, and increased deforestation in the delta for cattle grazing since the 1990s. Hence, recognizing that the city's resilience depends not just on converting land in inner neighborhoods but also on protecting its rapidly urbanizing surroundings, the Department of Water Management created a flood risk map to identify problematic zones and to design the development priorities in the Urban Plan of Rosario 2007-2017.

In 2015, Rosario expanded the urban agriculture program beyond the city's borders and into neighboring jurisdictions. Together, they created a first-of-its-kind land ordinance known as the Green Belt Project that permanently designated 800 hectares (1,980 acres) of agroecological fruit and vegetable production. The strategic plan, formally launched in 2015, helps contain urban sprawl while restoring land ecologically sensitively, thus increasing Rosario's resilience to floods. The Greenbelt also helps increase resilience from wildfires in Parana's Delta.

Political Commitment. Underpinning the entire program is a solid political and institutional commitment from the national to the local level. Successive mayors have maintained policy coherence in all domains. It helps that since 1989, Rosario's mayors have come from the same political party, prioritizing transparency and longevity of initiatives. Moreover, the socialist government's city planning model has evolved from physical planning to a more holistic and socially sensitive model. Every development and city planning document in Rosario includes a variety of strategies focused on public health and social well-being.

The city's long-standing participatory planning approach is another salient feature of PAU's success, where the community has a greater agency over planning and policy decisions than in most cities of the Global South. For example, the PAU was expanded over the past 20 years to respond to citizen demands. The sense of belonging and ownership the community fosters for the PAU is reflected in the maintenance and cleanliness of each common PAU plot. Along with citizen engagement, the PAU's success can be attributed to the city's consistent stakeholder engagement efforts, ranging from its

different departments (department of water, special purpose vehicle for housing, etc.) to academic institutions, state and national level authorities, non-profits, retailers, and developers.

Concluding Thoughts. During the COVID-19 lockdown, while global food chains were disrupted and cities suffered employment and income loss, Rosario's PAU created sustained employment and food security. The presence of such innovative programs assists in building long-term resilience against disasters and pandemics. Rosario won first place in the Ross Center Prize for Cities, World Resources Institute in 2021 for PAU's longevity over two decades, especially during the COVID-19 pandemic.

"The many benefits to the people, land, and wildlife have firmly embedded the program into the long-term urban planning process, policies, budgeting, and environmental plans. The program's stability has shown how government can foster public-private partnerships that are a win-win for everyone." - Anne Maassen, Global Lead, World Resources Institute's (WRI) Ross Center Prize for Cities.

Rosario illustrates that when there is political will and a clear social inclusion policy, it is possible to use a single strategy to mitigate multiple threats. PAU has transformed and made productive use of the city's resources by rehabilitating wastelands, recovering and revitalizing public spaces, and creating an alternative, sustainable supply of nutritious, chemical-free food. It has also brought significant benefits to the city's low-income residents, allowing many of them to become engaged in local development. The garden has provided an occupation and a space for learning and sharing experiences; for many women, it has brought economic independence and enhanced social relations. It also paves the way for generating ample Green Jobs while sustaining local and indigenous knowledge. Most importantly, while land is considered the city's most valuable commodity, Rosario's approach of reserving and revitalizing substantial land areas in and around the town shows how win-win situations can be created. It also paves the way to embedding nature-based solutions into urban planning frameworks without compromising urban density.



Figure 3: Local residents walk and cycle to a produce market in downtown Rosario. Photo by WRI Ross Center for Sustainable Cities.

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Additional Data

- **Gross National Income (GNI):** 12,520 (Higher-Middle Income)
 - **Population Density:** 7,140 people/km²
 - **Gini Coefficient:** 40.7
 - **Human Development Index (HDI):** 0.849 (Very High)
 - **Type of Climate Intervention:** Adaptation and Mitigation
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