

IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT GOALS AT THE LOCAL-NEIGHBOURHOOD SCALE

Alción Alonso Frank^{a,b}, Luisa Mattioli^{a,b,c}

^a National University of San Juan, San Juan, Argentina

^b National University of Avellaneda, Avellaneda, Argentina

^c National Scientific and Technical Research Council (CONICET), Buenos Aires, Argentina

Keywords:

community participation;
local planning;
urban governance;
Sustainable
Development Goals.

Abstract: The 2030 Agenda for Sustainable Development Goals (SDGs) establishes global goals from an action plan at various scales on the south of Latin-American. To pursue this agenda, however, it is necessary to facilitate cooperation between actors, agendas, and urban policies at the local-neighbourhood level to enable the progressive transformation that the Agenda projects. The objective of this paper is to propose a methodology that translates these SDGs to the local-neighbourhood scale and to apply it to “Barrio Virgen de Lourdes”, located in San Juan province, Argentina. The study was carried out in a participatory manner, in conjunction with community, academic, and governmental actors. As a result, Urban Sustainability Indicators and action strategies according to neighbourhood SDGs were obtained. In addition, a Sustainable Development Index was designed to assess the impact of actions on the realisation of the SDGs at different levels of government. This methodology represents an effective tool to contribute to sustainable development and social inclusion.

Email: mss30291@gmail.com

Initial submission: 15.03.2022; Revised submission: 18.12.2022; Final acceptance: 28.02.2023

Introduction

The United Nations (UN) promotes two important initiatives worldwide based on the development and protection of human rights. One of them is the Millennium Declaration (United Nations 2000), which encourages a new global alliance. In Argentina, nine associated objectives, known as the Millennium Development Goals (MDGs), were established. The other initiative is endorsed by the World Summit on Sustainable Development, materialising the “2030 Agenda for Sustainable Development” (United Nations 2015). This agenda aims to establish an action plan to expand the scope of action. It includes 17 Sustainable Development Goals (SDGs) and 169 targets included in the economic, social, and environmental dimensions (United Nations 2015).

The 2030 Agenda involves a “revitalised Global Alliance” committed to supporting the implementation of relevant strategies and action programs (United Nations 2015). It highlights that governments are responsible for carrying out, at the national, regional, and global levels, the follow-up and examination of the progress achieved in the fulfilment of the goals and targets in the next 15 years at the different levels (United Nations 2015). Likewise, it states that it is necessary to develop indicators that contribute to this work, as well as disaggregated quality data that are accessible, timely and reliable to help measure progress and ensure that no one is left behind, since these data are fundamental to decision-making (United Nations 2015).

The United Nations call for increased support to strengthen data collection and capacity building in the Member States, in order to establish national and global baselines, in particular for the goals that do not include clear numerical targets (United Nations 2015). It also encourages member states to conduct periodic and inclusive reviews of national and sub-national progress. In addition, the Agenda engages the world, regional, and national levels in its implementation and it specifies that the member states must use the existing planning instruments, such as national development and sustainable development strategies (United Nations 2015).

The SDG Report shows that despite progress in some areas, enormous challenges remain that require integrated solutions (United Nations 2019). It is understood that there are valuable opportunities to accelerate progress by analysing the interrelationships that exist between the goals (United Nations 2019). The problems are interrelated, and so are the solutions to poverty, inequality, climate change and other global challenges (United Nations 2019).

The same report highlights that, due to the speed of urbanisation, the world population living in cities is expected to increase by 60% by 2030 (United Nations 2019). This is an issue that needs to be addressed because cities are the engines of economic growth at present, but they represent around 70% of global carbon emissions and more than 60% of the resource consumption (United Nations 2019). Consequently, rapid urbanisation

results in a growing number of issues that prevent cities from growing in a more sustainable and inclusive way (López and González González 2019, United Nations 2019).

In this context, the Latin American Centre of Administration for Development (CLAD for its acronym in Spanish) clarifies that the state and public administration, in order to achieve the SDGs, must take the lead in finding solutions to the great problems that Latin America faces through governance and the role played by cities. Cities, however, do not have the capacity to address by themselves the quantity, intensity and complexity of the problems affecting the citizens of our region today (Velázquez López 2019). In this regard, Carrera and López Moreno (2014) emphasise that a reformed governance paradigm requires articulating efforts, fortifying formal coordination mechanisms, defining concurrent responsibilities, and providing the necessary resources and incentives to each level of government. This shows the enormous responsibility and the challenges involved in strengthening the capacities of local authorities as well as supra-municipal and metropolitan levels of government. It is necessary to link local equity policy with the jurisdiction of the territory, through programs that allow the transfer of resources between and within cities (Carrera and López Moreno 2014).

The process of State reform in Argentina encourages decentralisation. Municipalities show themselves as spaces for political reconstruction and renewed management based on effectiveness-efficiency, articulation with civil society organisations, and the search for dialogue and cooperation at the micro-regional level (García Delgado 1998). However, the municipality also appears as a point of condensation of social fragmentation, the mediation crisis, and the lack of resources (García Delgado 1998). In these conditions, approaching the city implies using vertical relations of supra-subordination, as well as radial or fluid networks. In this regard, governance implies recognising the importance of other actors who participate in the public space and that can contribute to effectively solving complex problems in a context of active collaboration and communication (Velázquez López 2019). In the words of Bourdieu (2011), from the social reproduction that is linked to a locally based social space, the position in this familiar space or sub-space can be experienced as a microcosm of the social space as a whole (Bourdieu 2011).

The aforementioned reasons justify the need to think about the dynamic role played by the local-neighbourhood scale from the micro-relationships. This is a priority in the articulation of territorial scales and levels of government for the implementation and monitoring of the SDGs in a cross-sectoral manner. For this reason, the objective of this work was to translate the SDGs to the local-neighbourhood scale and to propose a methodology for “Virgen de Lourdes neighbourhood” (VLN), San Juan province, Argentina, with a focus on Goal 11 of the SDGs: “Make cities and human settlements inclusive, safe, resilient and sustainable by 2030”. It is conceived from the premises of “global partnership” proposed by the 2030 Agenda and the complementary policies in the measurement of actions, strategies, and programs at different scales. To this end,

Urban Sustainability Indicators and action strategies are proposed according to the neighbourhood SDGs. A Sustainable Development Index was also incorporated to evaluate the level of impact of actions on the implementation of the SDGs at different levels of government. The participatory methodology conceives the community, together with academic and governmental actors, as active agents that contribute to decision-making. The results obtained aim to contribute to the future constitution of an urban action plan by proposing specific action strategies.

Background, concepts, and definitions

United Nations (2015) propose a progressive transformation towards economic, social, and environmental sustainability. The Argentine Republic is one of the 193 Member States that subscribe to the Agenda, as part of the reference guide for the work between now and 2030. The SDGs are a planning tool for countries at global, national, and local levels. Their long-term vision aims to generate public policies and instruments for budgeting, monitoring and evaluation and to support each country on its path towards sustained, inclusive and environmentally sound development.

This Agenda states that cities are home to the majority of humanity and sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. The SDGs pay special attention to cities by proposing Goal 11 with regards to their sustainability. This goal highlights that cities will determine whether we will continue on the path of constant and increasing exploitation of the world's resources or whether we can take a more sustainable path (United Nations 2015).

The New Urban Agenda III was adopted at the UN Conference on Housing and Sustainable Urban Development in 2016 and it proposes a change in the understanding of sustainable urban development. It points out that it must become an engine of economic, social, and human development that protects the environment and it generates well-being, justice and equity. To achieve this, it sets three fundamental objectives: to promote quality of life, an inclusive and competitive economy, and resilient and sustainable urban development. Based on these objectives, the document establishes challenges that seek to guide institutions to achieve an inclusive and people-centred vision (ONU-Habitat III 2017).

These documents show that it is necessary to radically transform our unsustainable modern cities and our way of living in them. The construction of a sustainable city involves recovering the control of the complete cycle of energies and materials that allow our existence. Reducing traffic at all levels and distances is, therefore, a priority task. The recovery of the city, built, modified, and rehabilitated by its citizens, is also an essential condition for its sustainability (Vázquez Espi 2004).

These ideas are closely related to the concept of governance understood as an

articulation of interests and conflict management. It focuses on the institutional efficiency of the State, the satisfaction of the population's needs, the construction of citizens as subjects of law, and their relationship with the political system (Altmann 2013). Participatory networks and the right to the city must act especially by cross-cutting the relationship between local governments and social actors, in order to expand the exercise of citizenship. The extension of the state sphere to the public sphere allows citizens to have the instruments of participatory democracy (Grin 2019).

The growing and complex challenge that cities face creates the need to rethink and reorganise the fundamentals of the relationship between the State and society at local level (Grin 2019). The concept of governance is defined as the ability of societies to equip themselves with systems of representation, institutions, processes, and social bodies as an instrument of democratic control, participation in decisions and collective responsibility (European Commission 2001). Therefore, local governance strengthens these processes if it is understood as planning and management systems (Orbea Celaya 2009). Reese (2007) highlights that management for development through planning implies deploying a process “interested” in the future effects of decisions made in the present. The situation in which the territory is located (initial situation) and the situation that one hopes to attain (desired situation) must be established through mechanisms and resources that determine intermediate situations.

Urban planning has been critically evaluated in terms of its legitimacy, rationality, and operability. Consequently, its theoretical instruments and legal framework must be reviewed. The most widespread methodology used at the urban scale is the strategic planning approach, which takes as a starting point the SWOT matrix (Nozica et al. 2020). Hope is placed on Territorial Planning as a technique for addressing the multi-scale, systemic and comprehensive nature of the territory. On the other hand, “planning should be adapted to local circumstances and to the different development trajectories of mid-sized urban areas” (Grădinaru et al. 2015: 141). But “it will always be down to communities themselves to frame their own solutions by expanding development-oriented NGO networks to intensify promotion of economic potential and enhance skill and competence levels” (Crețan et al. 2005: 37). Finally, urban planning and urban sustainability should take care of the human-nature relations in the urban neighbourhoods, including ethics on animals’ care (Crețan 2015) and the reduction of urban green spaces (parks, trees) (Wang 2009).

SDGs reference at the local level: Contributions to the field of study

The National Council for the Coordination of Social Policies of the Presidency of the Nation has presented a guide and a manual for the local (provincial) adaptation of the SDGs (Ministry of the Interior, Public Works and Housing 2020). It provides guidelines and methodological suggestions for the incorporation of these SDGs as a management

and planning tool at the municipal level. The manual summarises the lessons learned so far in the implementation of the 2030 Agenda in the country, with results from municipalities throughout the national territory, and it includes new contributions of guidelines (Ministry of the Interior, Public Works and Housing 2020).

Numerous initiatives and programs have been promoted by different agencies. For example, an OECD program supports governments in the localisation of SDGs (OECD 2019). The territories receiving assistance include (OECD 2019):

- Cordoba Province (Argentina), which is developing a participatory process involving private sector and civil society actors to jointly define a 2030 vision and to identify the main drivers of social inclusion.
- The city of Kitakyushu (Japan), which aims to create opportunities in the economic and social sectors using the environmental SDGs by linking green industry, offshore wind energy, ecotourism, and culture to strengthen employment and to foster social cohesion through intergenerational solidarity.
- Southern Denmark (Denmark), which aims to use the SDGs to form a new 2020-2023 Regional Development Strategy.
- Viken County (Norway), which uses the 2030 Agenda as a framework for implementing the territorial reform.

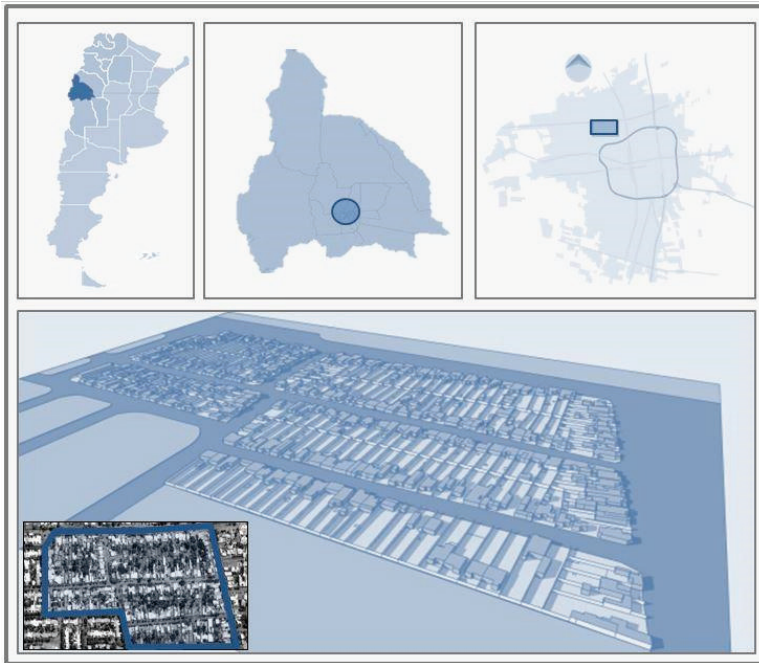
The Basque Country has created a guide to orient the transfer of the 2030 SDG to the local scale (Ihobe Public Company for Environmental Management 2019). In addition, the United Nations Development Program (UNDP) aims to help with the implementation of goals through work in 170 countries and territories, with integrated solutions focused on systems, root causes and connections between challenges. It addresses not only thematic sectors but also people's daily realities (United Nations 2020b). Finally, the closest experience to San Juan province is the case of Mendoza, Argentina (United Nations 2020a), which is discussed below.

Methodology

Study area

San Juan city has a centralised institutional model. Municipalities have transferred their land management rights to the Provincial Directorate of Urban Development (DPDU for its acronym in Spanish). The absence of land regulation instruments and the lack of inter-institutional coordination is a limitation in urban management and planning. The city is characterised by low-density and urban expansion by leaps and bounds. The population has decreased in the Capital Department and it has grown in the other departments. This historical trend makes it difficult to improve accessibility to urban services and facilities (Nozica et al. 2020).

The Virgen de Lourdes Neighbourhood (VLN) is located in Rivadavia Department, a suburban area of the Greater San Juan (Figure 1). Land use is predominantly residential with a medium population density according to the urban code of the province. It has 196 housing units and 216 homes with a total population of 800 residents.



*Figure 1. Location of Virgen de Lourdes neighbourhood, San Juan city, Argentina
Source: based on data estimated by the authors and Google Earth image (2019)*

The VLN combines an excellent location in the urban structure of the Greater San Juan in a depressed sector of the peri-urban area with a high percentage (83%) of households below the poverty line. Its inhabitants are willing to participate actively for the collective benefit.

The peri-urban area appears today as the place where the processes installed by global capitalism crystallise: social fragmentation, spatial segmentation, absence of public policies and advance of the real estate market (Puebla 2009/10). These inter-phase areas have generally been postponed from the planning and actions of the State at different historical moments (López-Goyburu 2019).

SDG analysis

According to the UN, the localisation process of the SDGs at the municipal level implies integrating these goals into the strategic axes of local government policy in three aspects of sustainable development: the social, economic, and environmental

dimensions. Priority goals and indicators must be determined to allow the monitoring and reorientation of government actions. This implies the creation of a framework for the formulation and implementation of development policies at the local level that makes visible the contribution of the municipality to the achievement of the SDGs through its actions (United Nations 2020c).

Mendoza province (Argentina) has experience in the adaptation of SDGs (United Nations 2020a), which is taken as a reference. The Municipality of Godoy Cruz, through the Municipal Plan of Territorial Organisation (PMOT) Law 8051/09 OTyUS (Government of Mendoza 2009), establishes goals and actions based on the strategic axes of the municipal government, articulated with the 2030 Agenda (SDG). It also complies with the guidelines defined in the Provincial Land Management Plan (PPOT) Law 8999/17 (Government of Mendoza 2017). It should be noted that Mendoza has the only Land Use Law in Argentina, which can be taken as a relevant normative precedent. It is part of Law No. 8051 of 2009.

Mendoza, along with San Juan, San Luis, and La Rioja provinces, forms the Cuyo Region. They share the characteristic (like other settlements in the Andean range) of being productive oases surrounded by desert where the water resource plays a structuring role (Nozica et al. 2011). Although the regions served as intermediate frameworks for planning and territorial ordering, at present they are not used as such (Mattioli 2019). However, the SDGs offer an opportunity to reinforce interprovincial implementation and cooperation mechanisms and to articulate guidelines for land use planning as an intermediate scale between the region and nation. In this sense, the experience generated in the province of Mendoza at the normative and localisation levels of the SDGs provides a model in tune with the local and provincial reality of San Juan.

The goals at the local-provincial scale were based on the strategic axes of the provincial government. These are outlined in the “San Juan 2030 Strategic Plan”, related to the 2030 SDGs. Subsequently, the translation of the SDGs to the local-neighbourhood scale (Figure 2) was based on the consensus of strategic axes attained in participatory workshops conducted for the VLN community. These workshops allowed the residents to be recognised as active agents that contribute to decision-making, in cooperation with academic and governmental actors.

It is worth noting that the municipal level was not addressed in the translation of the SDGs as municipalities have transferred their land management rights to the DPDU. This centralised entity manages urban planning and ordering for the whole of the provincial territory. The DPDU is an institution inherited from the centralised administration that generated the reconstruction process of the city of San Juan, after the earthquake of 1944. Despite the constitutional reform, neither its functions nor its scopes were altered. For this reason, there are no municipal instruments that summarise goals or management axes that allow a reference to the SDGs.

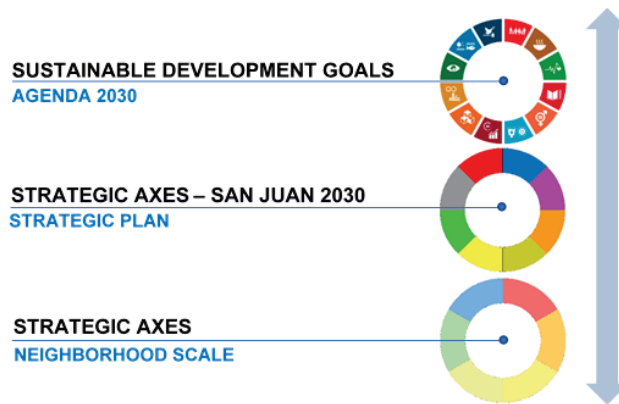


Figure 2. Methodological scheme for defining the SDG indicators
Source: based on SDGs Images (United Nations 2020b)

Máttar and Cuervo (2017) highlight the challenge that multi-scalar and multi-temporal articulation implies because long-term planning is a requirement for development. Matus (1980) argues that the multi-scalarity of planning seeks to develop a process where the micro level (the neighbourhood) is integrated with the macro level (the city, the region, the country, the world) meeting different demands and dynamics, according to criteria from the different territorial scales.

It should be considered that although the SDGs show some compliance at the national level, their operationalisation at the subnational and departmental levels is a real challenge. At the local level, the task of territorialising these global goals generally poses difficulties related to the approach and measurement of variables and indicators, as well as to the technical and financial capacity of those responsible for carrying out this activity.

In addition to the above, there are limitations associated with the community's capacity for participation, perspectives and interests, continuity of participants, as well as resources that allow for continuity over time. All this allows us to understand the complexity of these experiences.

On the other hand, there is an opportunity for the academic sector of the region to conceive common methodological approaches that consider planning from the point of view of "complex global systems". Both the Faculty of Architecture, Urbanism and Design of the National University of San Juan (Mattioli 2016, Nozica et al. 2020) and the National University of Cuyo in the province of Mendoza (Gudiño et al. 2016) are working on this approach. For this reason, the regional scale is relevant within the framework of the intervening scales for inter-institutional articulation. In turn, the local-neighbourhood scale would act as the endogenous push in solving problems from the neighbourhood towards the higher scales.

Participation of the Virgen de Lourdes community

The VLN participated in the activities of a project called “Participation, integration, organisation and collective management in the recovery and rehabilitation of neighbourhoods, Virgen de Lourdes, Rivadavia Department”. Two workshops were held for the purpose of getting to know the neighbours, fostering community organisation, and stimulating citizen participation. The aim of this undertaking was to engage the community in the formulation, implementation and control of the different activities related to their needs and interests. Thus, the neighbours expressed their needs, interests, and proposals within the framework of sustainability (Figure 3), enabling social integration with their environment.



Figure 3. Workshop experience

Source: Mattioli (June, 2019)⁵

Results

Construction of SDGs at the local-neighbourhood scale

A proposal of SDGs at the local-neighbourhood scale was developed by the authors according to the conceptual background presented above and input from the neighbours' participation in the workshops. Table 1 shows the global SDGs and their translation to the proposed neighbourhood scale. The proposal of these goals reflects the particularities of the real needs of the VLN residents. For example, the high percentage of working-age women who are unemployed promoted a concept of housing that goes beyond the requirements of residence and habitability. This makes it possible to think of housing as real opportunities at the family and community levels. It is also possible to envisage new forms of relationships and a multiplicity of functions for housing. Complementarity and association would enable a solidarity economy based on social benefit, possibility of providing care or attention, and agroecological production, among others. Housing thus becomes the basic unit of social reproduction.

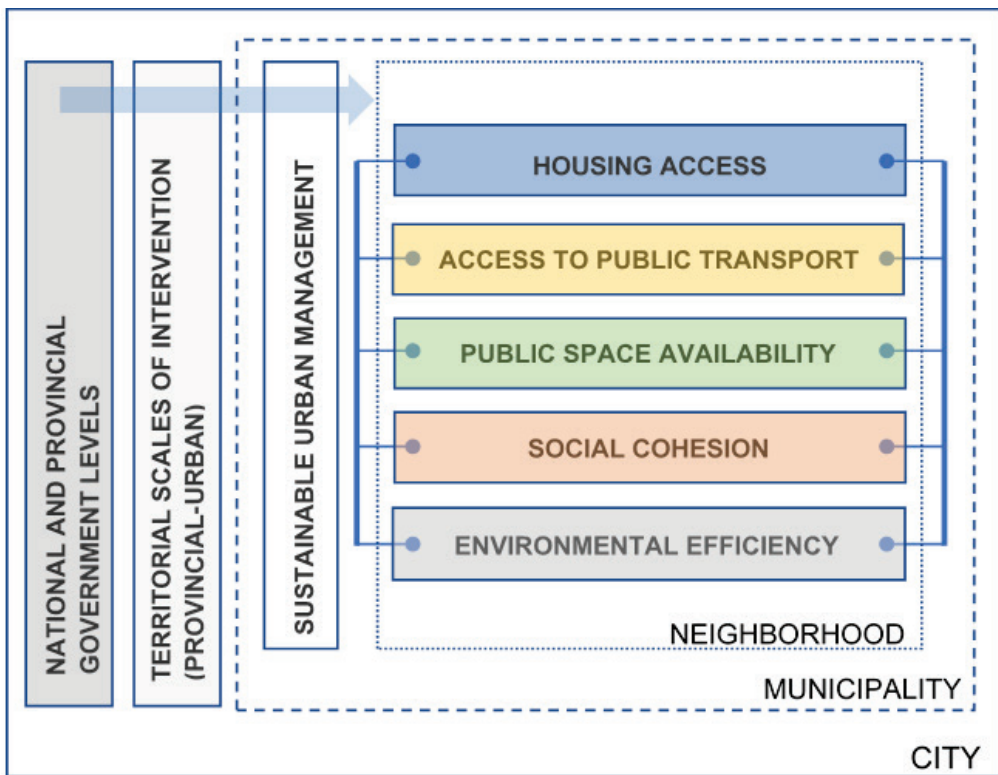
*Table 1. Proposal of Global SDGs at the local-neighbourhood scale.
Source: Adapted from Arroyo O'Grady (2015)*

Global SDGs	SDGs proposed at the local-neighbourhood scale
1. Ensure access for all to adequate, safe, and affordable housing and basic services and upgrade slums.	1. Access to quality housing, conceived as a space of real and concrete opportunity for family and community progress.
2. Provide access to safe, affordable, accessible, and sustainable transportation systems for all and improve road safety, in particular by expanding public transport, with an emphasis on the needs of people in vulnerable situations, women, children, people with disabilities and the elderly.	2. Promote spatial accessibility to public transport, guaranteeing its proximity to the commuter service.
3. Increase inclusive and sustainable urbanisation and capacity for participatory, integrated, and sustainable planning and management of human settlements in all countries.	3. Formulate participatory neighbourhood improvement plans. Urban development must become an engine of economic, social, and human development that protects the environment and generates well-being, justice, and equity.
4. Redouble efforts to protect and safeguard the world's cultural and natural heritage.	4. Protect buildings or spaces of value that can constitute the basis for strengthening the neighbourhood identity, such as the opportunity to have valuable infrastructure capable of accommodating complex uses.

Global SDGs	SDGs proposed at the local-neighbourhood scale
<p>5. Significantly reduce the number of deaths and people affected by disasters, including those related to water, and substantially reduce direct economic losses related to the global gross domestic product caused by disasters, with special emphasis on the protection of the poor and people in vulnerable situations.</p>	<p>5. Formulate neighbourhood contingency plans, considering the losses of life, infrastructure and services caused by disasters</p>
<p>6. Reduce the negative per capita environmental impact of cities, with special attention to air quality and the management of municipal and other waste.</p>	<p>6. Manage household waste in a sustainable manner.</p>
<p>7. Provide universal access to safe, inclusive, and accessible green areas and public spaces, particularly for women, children, the elderly and people with disabilities.</p>	<p>7.a. Conceive public space as a space for coexistence, leisure, exercise, exchange, and other multiple uses.</p> <p>7.b. Propose strategies that provide solutions to quality urban spaces in terms of thermal, light and acoustic comfort. This quality will depend on the integration of the microclimate, the urban configuration, and the materials that characterise it.</p> <p>7.c. Protection of shadows in the road from a certain number of trees. Create bio-climatically comfortable public spaces, characteristic of an oasis city.</p>
<p>8. Support positive economic, social, and environmental links between urban, peri-urban, and rural areas by strengthening national and regional development planning.</p>	<p>8. Guarantee the spatial and functional continuity of the city, articulating the processes of expansion and social cohesion in such a way that dispersed urban developments are not created.</p>
<p>9. Substantially increase the number of cities and human settlements that adopt and implement integrated policies and plans to promote inclusion, efficient use of resources, mitigation of and adaptation to climate change, and resilience to disasters, and develop and implement comprehensive disaster risk management at all levels, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.</p>	<p>9.a. Optimisation of the demand for domestic and public water from the application of saving measures in homes and substitution of part of the demand for non-potable water, which implies the use of rainwater and wastewater.</p> <p>9.b. Guarantee that basic services are accessible (in time, distance, and quality) to all citizens, including the vulnerable population in any circumstance.</p> <p>9.c. Propose energy self-sufficiency strategies for homes and public spaces based on solar thermal or photoelectric capture capacity.</p>
<p>10. Provide support to less developed countries, including financial and technical assistance, so that they can build sustainable and resilient buildings using local materials.</p>	<p>10. Encourage houses built with passive systems (without thermal bridges, cross ventilation, good insulation, and light colours for the facades), using bio-climatically appropriate technologies.</p>

To summarise the SDGs proposed at the local-neighbourhood scale, it is convenient to organise the goals into six groups as follows: accessibility to quality housing, public transport, public space, social cohesion, environmental efficiency, and sustainable urban management.

Figure 4 shows the interrelationships between the territorial and government scales and the groups of neighbourhood goals. It can be seen that the objectives related to sustainable urban management are conditioned by the policies of the different levels of government: national, provincial, and municipal. In turn, the groups that refer to the neighbourhood scale collaborate with the Sustainable Urban Management of municipal competence.



LOCAL SDGs AND THEIR ARTICULATION OF LEVELS AND SCALES

Figure 4. Multi-level and multi-scalar relationships between the SDGs

Table 2 articulates the neighbourhood goals with the objectives of the provincial government (government axes according to the San Juan 2030 Strategic Plan) and the 2030 SDGs, considering the need for articulation between the levels of government and territorial scales.

Implementation of Sustainable Development Goals at the Local-Neighbourhood Scale

Table 2. List of Global SDGs, strategic axes of the provincial government and neighbourhood goals based on the SDGs (2015)

		Neighbourhood Goals					
		1. Accessibility to quality housing	2. Accessibility to public transport	3. Accessibility and provision of public space	4. Social cohesion	5. Efficiency	6. Sustainable neighbourhood management
Axes of government	1. State and institutions						■
	2. Government and public policies				■		
	3. Social development, integration, and diversity	■					
	4. Economy, production, and labour						■
	5. Innovation and modernisation					■	
	6. Occupation and use of the territory	■	■	■	■	■	■
	7. Local development						■
	8. Integration						■
Sustainable Development Goals	1. End of poverty	■					■
	2. Zero Hunger						■
	3. Health and Welfare						■
	4. Quality Education						■
	5. Gender Equality						■
	6. Clean water and sanitation					■	
	7. Affordable and clean energy					■	
	8. Decent work and economic growth						■
	9. Industry, innovation, and infrastructure					■	
	10. Reduction of inequalities						■
	11. Sustainable cities and communities	■	■	■	■	■	■
	12. Responsible production and consumption					■	■
	13. Climate action					■	
	14. Underwater life						
	15. Life of terrestrial ecosystems						
	16. Peace, justice, and strong institutions						■
	17. Partnerships to achieve the objectives						■

Neighbourhood indicators based on the SDGs

According to the previous six categories of goals, indicators and action strategies for the VLN are proposed taking into account the SDGs (table 3). These goals resulted from the needs expressed and evaluated in the participatory activities.

Table 3. Proposal of indicators and action strategies based on the SDGs at the local-neighbourhood scale

Category	Goal	Action strategy	Proposed indicators
1. Accessibility to quality homes	Guarantee access to quality housing, conceived as a space of real and concrete opportunity for family and community progress.	Propose new urban-architectural typologies of housing that guarantee a socially diverse fabric in terms of family groups and social levels.	<i>Quality of construction materials:</i> % Percentage of CALMAT (level of construction based on materials) category IV and V dwellings.
			<i>Residential status:</i> % of residents with title deeds. <i>Accessibility to public services:</i> % homes connected to services. m ² per home.
2. Accessibility to public transport	Encourage spatial accessibility to public transport, guaranteeing its proximity to the commuter service.	Allow access on foot to the public transport network that guarantees the connection between the main points of attraction in the city, as well as the maximum number of multimodal commute options.	<i>Location of public transport stops:</i> Availability of public transport stops separated by no more than 300 metres. Urban connection, time/distance to central nodes.
			<i>Provision of green spaces:</i> Available green space area (GS) per inhabitant (Inh) (minimum 10m ² /Inh). It should have 8000 m ² . <i>Access to green spaces:</i> 2000 m ² at a distance of less than 200 m. 5000 m ² at a distance of less than 750 m. <i>Tree provision:</i> 400 trees/km neighbourhood street. 1 tree/20 m ² of built area. <i>Provision of public roads:</i> % of public space for pedestrians and common uses.
3. Accessibility and provision of public space	Conceiving public space as a space for coexistence, leisure, exercise, exchange, and other multiple uses.	Propose strategies that provide solutions to quality urban spaces in terms of thermal and light comfort, typical of an oasis city. This quality will depend on the integration of the microclimate, the urban configuration, and the appropriate materials of the region.	
4. Social cohesion	Guarantee basic services that are accessible (in time, distance, and quality) to all citizens, including the	Build a city accessible to all, with short distances, where services are spatially accessible.	<i>Maximum distances:</i> Local shops 1000 m. Primary school 500 m. Day-care centre for infants 300 m.

Category	Goal	Action strategy	Proposed indicators
5. Efficiency	vulnerable population in any circumstance.		Secondary school 800 m. Sports centres 500 m. Municipal office 800-1000 m. Primary health care centre 800 m. <i>Community centres.</i>
	Incorporate the principles of efficiency in the use of resources to urban development in order to produce the minimum disturbance of ecosystems.	Provide residential buildings according to the typology (multi-family or single-family) with energy capturing sources (thermal and photovoltaic) and passive solutions to reduce dependence on non-renewable energy sources. Establish strategies for optimising domestic and public water demand.	<i>Energy consumption per home.</i> <i>Water consumption per home.</i>
6. Sustainable neighbourhood management	Promote the comprehensive collective management of the neighbourhood that allows the recovery of public spaces, family homes, and their urban environments, contributing to the construction of the public dimension of community life.	Coordinate the actions for the rehabilitation of the neighbourhood with public and private organisations from different areas and sectors together with the neighbours.	<i>Existence of:</i> Land use planning plans at the municipal level. Participatory neighbourhood improvement plans. Neighbourhood contingency plans. Participatory housing recovery plans. Participatory housing production programs.

Case study evaluation

The following is the evaluation made for the VLN case study according to the proposed indicators and presented categories:

1. Accessibility to quality homes: It can be noted that the greatest demands were focused on the quality of public space and accessibility to housing. The quality of the construction materials was found to be poor, with 70% made of adobe or mixed brick-adobe, which does not meet the needs of the seismic zone of San Juan, and 26 homes were in critical condition. Only 21% of the households are legally owned by the inhabitants. A low percentage of homes have connections to public services (mainly sewer and gas), due to connection costs, the quality of the home construction materials and the lack of property titles. In addition, 83% of the inhabitants are below the poverty line, with high levels of informality.

2. Accessibility to public transport: There is a good supply of public transport and road connectivity in the sector. Buses circulate on the main roads, and bus stops are located within a range of 300 metres but they offer no shelter, information, or ramps for people with reduced mobility. Public transport runs with acceptable frequency.
3. Accessibility and provision of public space: Deficiency is evident in the availability and quality of public space, given the scarce provision of green spaces, the poor condition of sidewalks and the lack of signage, lighting, and ramps. The tree irrigation and rainwater drainage systems are in critical conditions. The streets lack curbs, although the pavement is complete and in good condition.
4. Social cohesion: Access to health and education services do not show critical situations in relation to availability and access, except for a percentage of people with disabilities. On the main roads, there are premises for daily and occasional shopping. The area is supplied with school infrastructure, offering access to primary and secondary schools, as well as kindergarten establishments. The Neighbourhood Community Centre does not meet the minimum conditions for proper operation.
5. Efficiency: Energy consumption and water consumption per dwelling are parameters within normal to low limits.
6. Sustainable neighbourhood management: With regard to sustainable neighbourhood management, VLN only has a participatory housing recovery plan. The neighbourhood is experiencing a continuous process of impoverishment of the urban fabric, which contrasts with its privileged location close to the province's centrality. This translates into low competitiveness in the land market, due to a problem related to property ownership and a lack of interest from urban investors.

Proposed Neighbourhood Sustainable Development Index (NSDI) and level of incidence

A Neighbourhood Sustainable Development Index (NSDI) is proposed in order to determine the level of sustainability of a neighbourhood, with six categories (Table 3), which are related to the goals described in Table 1. This index makes it possible to assess the level of incidence of such goals grouped by the Government Axes of San Juan province and the 2030 SDG. Each goal is considered to have the same weight in the NSDI, with only the weight of each action varying proportionally. Correspondingly, each goal affects 16.7% of the index (Table 4). Equation 1 expresses the proposed index.

$$NSDI = WG_1 + WG_2 + WG_3 + WG_4 + WG_5 + WG_6 \quad (1)$$

where,

Implementation of Sustainable Development Goals at the Local-Neighbourhood Scale

WG_1 = Weight of neighbourhood goal 1, WG_2 = Weight of neighbourhood goal 2,
 WG_3 = Weight of neighbourhood goal 3, WG_4 = Weight of neighbourhood goal 4,
 WG_5 = Weight of neighbourhood goal 5, WG_6 = Weight of neighbourhood goal 6

The result of the NSDI is a number between 0 and 100. The higher the number, the greater the level of sustainable development of the neighbourhood.

Table 4. Sustainable Development Index and goals according to government scales

		Neighbourhood goals					
		1. Accessibility to quality housing	2. Accessibility to public transport	3. Accessibility and provision of public space	4. Social cohesion	5. Efficiency	6. Sustainable neighbourhood management
Axes of government	1. State and institutions						6.67
	2. Government and public policies				33.3	11.1	
	3. Social development, integration, and diversity	25					
	4. Economy, production, and labour						6.67
	5. Innovation and modernisation					11.1	
	6. Occupation and use of the territory	25	50	50	33.3	11.1	6.67
	7. Local development						6.67
	8. Integration						6.67
Sustainable Development Goals	1. End of poverty	25					6.67
	2. Zero Hunger						6.67
	3. Health and Welfare						6.67
	4. Quality Education						6.67
	5. Gender Equality						6.67
	6. Clean water and sanitation					11.1	
	7. Affordable and clean energy					11.1	
	8. Decent work and economic growth						6.67
	9. Industry, innovation, and infrastructure					11.1	
	10. Reduction of inequalities						6.67
	11. Sustainable cities and communities	25	50	50	33.3	11.1	

12. Responsible production and consumption					11.1	6.67
13. Climate action					11.1	
14. Underwater life						
15. Life of terrestrial ecosystems						
16. Peace, justice, and strong institutions						6.67
17. Partnerships to achieve the objectives						6.67
Total by goal		100	100	100	100	100
Incidence of the goal on the total SD of the neighbourhood		16.7	16.7	16.7	16.7	16.7
Total SD of the neighbourhood		16.7	16.7	16.7	16.7	16.7
		100				

Discussion

The 2030 SDG Agenda sets a strong global precedent for a progressive transformation towards a sustainable city model. However, it should be noted that the development and monitoring of many of the goals set entail the responsibility of local governments within their legal competences. This represents a great challenge in the current situation facing Latin America and Argentina.

Therefore, it is essential to provide normative instruments for territorial planning that regulate land use as well as planning and management with a comprehensive, systemic, inter-jurisdictional and interactive vision between the market, the State and society (Gudiño et al. 2016, Mattioli 2019). Mendoza is advancing in this sense, which represents an opportunity for inter-provincial or regional cooperation, as an intermediate scale of assessment as long as other provinces follow the same path.

Sustainability must unfailingly be achieved based on cooperation and association between different levels, organisations, and the general public interest, through coordinated action to solve problems in accordance with the principle of shared responsibility (González González 2002). This is of vital importance, and it entails an increasing complexity due to the scope of the negotiations in diverse contexts of governance and governability at different territorial scales. Moreover, the practical implications of this work reinforce the idea that localising the SDGs at local and neighbourhood scales merits additional efforts related to neighbourhood participation and self-management, as well as multilevel engagement and collaboration.

Finally, it is highlighted that works such as, Grădinaru et al. (2015), Nagy et al. (2018), Méreiné-Berki et al. (2021), among others, could contribute to the future development of research in areas of urban expansion, as well as to the debate on indicators and ways

of implementation for the SDG agenda. They also collaborate with the study and planning of intermediate cities in the framework of sustainability, participation, and social relations at the local level.

Conclusions

The SDGs offer an opportunity to strengthen inter-jurisdictional implementation and cooperation mechanisms aimed at articulating the guidelines of the different territorial scales and levels of government. To this end, it is necessary to articulate efforts, to propose coordination mechanisms, to define responsibilities, and to allocate resources or incentives to each level of government.

Currently, efforts to “localise” the SDGs have been focused on national, provincial, and municipal levels, with incipient cases in Argentina at the last level. The neighbourhood scale is not considered in this translation. For this reason, this work aimed to generate a proposal for the “localisation” of the SDGs at the neighbourhood scale, evidencing the need to define and quantify the goals according to local realities. The translation for the VLN made visible the centralised structure of the DPDU of the province of San Juan, which hindered the proper management of the municipalities.

It was observed that the municipalities play a predominant role in the chain of collaboration with the monitoring of the SDGs, since they are the ones that materialise the concrete actions in the territories. The neighbourhood scale makes it possible to achieve the objectives in a collaborative way among the different actors involved by considering the social and spatial reproduction logic of the inhabitants and, therefore, the different territorial scales. The experience in the VLN equips the inhabitants with tools to develop as citizens and subjects, contributing to the resolution of their problems. This implies that the proposed process is reversed from the micro-relationships in the articulation of territorial scales, generating bottom-up development with a top-down policy framework (ODS), and the different axes of government that support it. The localisation of the SDGs at the local-neighbourhood level allows us to state that it represents an effective tool to measure the contribution generated by local actions at the various scales involved.

Acknowledgments

This work was carried out with the support of institutions such as the National Council for Scientific and Technical Research of Argentina (CONICET, for its acronym in Spanish), the Interinstitutional Centre for Urban Mobility, Logistics and Transport in South and West AMBA of the National University of Avellaneda (CILOT/UNDAV, for its acronym in Spanish) and the Regional Institute of Planning and Habitat of the Faculty of Architecture, Urbanism and Design of the National University of San Juan (IRPHa/FAUD/UNSJ, for its acronym in Spanish).

References

- ALTMANN J. (2013) Integración y desarrollo, componentes esenciales para la gobernanza (Integration and development, essential components of governance), in: Silva P., Rojas Aravena F. (eds.), *Gobernabilidad y convivencia democrática en América Latina: Las dimensiones regionales nacionales y locales* (Governance and democratic coexistence in Latin America: Regional, National and Local dimensions), FLACSO, San José de Costa Rica, pp. 47-60.
- ARROYO O'GRADY G. (2015) *Agenda 2030 para el Desarrollo Sostenible: un enfoque desde la sustentabilidad urbana* (Agenda 2030 for Sustainable Development: an approach from the perspective of urban sustainability), UNDP México, Retrieved from: fes-transformacion.fes.de.
- BOURDIEU P. (2011) *Las estrategias de la reproducción social* (Strategies of social reproduction), Siglo Veintiuno Editores S. A., Buenos Aires.
- CARRERA J., LÓPEZ MORENO E. (2014) *Construcción de ciudades más equitativas. Políticas públicas para la inclusión en América Latina* (Building more equitable cities. Public policies for inclusion in Latin America), CAF, Bogotá.
- CREȚAN R. (2015) Mapping protests against dog culling in post-communist Romania, *Area* 47 (2), 155-165, <https://doi.org/10.1111/area.12155>.
- CREȚAN R., GURAN-NICA L., PLATON D., TURNOCK D. (2005) Foreign Direct Investment and Social Risk in Romania: Progress in Less-favoured Areas, in: Turnock D. (ed.), *Foreign Direct Investment and Regional Development in East Central Europe and the Former Soviet Union: A Collection of Essays in Memory of Professor Francis 'Frank' Carter*, Routledge, London, pp. 305-348, <https://doi.org/10.4324/9781351158121-15>.
- EUROPEAN COMMISSION (2001) *La gobernanza europea – Un Libro Blanco* (European Governance: White Book), Publications Office of the European Union, Luxembourg.
- GARCÍA DELGADO D. (1998) *Estado-nación y globalización. Fortalezas y debilidades en el umbral del tercer milenio* (Nation-state and globalization. Strengths and weaknesses on the threshold of the third millennium), Espasa Calpe S. A., Buenos Aires, Argentina.
- GONZÁLEZ GONZÁLEZ M. J. (2002) *La ciudad sostenible: planificación y teoría de sistemas* (The sustainable city: planning and systems theory), *Boletín de la asociación de Geógrafos Españoles* 33, 93-102.
- GOVERNMENT OF MENDOZA (2009) *Ley No 8051/2009* (Law N° 8051/2009), of 22 de may 2009, of *Ordenamiento territorial de la Provincia de Mendoza* (Land management in the Province of Mendoza), Retrieved from: www.mendoza.gov.ar.
- GOVERNMENT OF MENDOZA (2017) *Ley N° 8999* (Law N° 8999), of 31 de august, of *Plan Provincial de Ordenamiento Territorial* (Provincial Land Management Plan), Retrieved from: www.mendoza.gov.ar.

- GRIN E. (2019) Gestión pública y democracia participativa en los gobiernos locales: posibilidades, límites y desafíos (Public management and participatory democracy in local governments: possibilities, limits and challenges), in: Velázquez López F. J. (ed.), *Gobernanza de las Ciudades como guía para la acción* (City Governance as a guide for action), CLAD, Buenos Aires, pp. 55-92.
- GRĂDINARU S. R., IOJĂ C. I., PĂTRU-STUPARIU I. (2015) Do post-socialist urban areas maintain their sustainable compact form? Romanian urban areas as case study, *Journal of Urban and Regional Analysis* 7 (2), 129-144, <https://doi.org/10.37043/JURA.2015.7.2.2>.
- GUDIÑO M., RUBIO M. C., ABRAHAM E., INCA V., PADILLA C., BERÓN N. (2016) Modelos territoriales. La Mendoza actual: Ordenar el territorio. Un desafío para Mendoza (Territorial models. The current Mendoza: Ordering the territory. A challenge for Mendoza), Universidad Nacional de Cuyo, Mendoza.
- IHOBE PUBLIC COMPANY FOR ENVIRONMENTAL MANAGEMENT (2019) *Agenda 2030 Local. Cómo abordar los Objetivos de Desarrollo Sostenible desde el ámbito local. Guía práctica* (Local Agenda 2030. How to address the Sustainable Development Goals from the local level. Practical guide), Ihobe S. A., País Vasco.
- LÓPEZ G. A., GONZÁLEZ GONZÁLEZ M. J. (2019) Diffuse urbanisation and irregular urban growth: Processes and trends in medium-sized cities in the Castilla y León Region (Spain), *Finisterra* 54 (112), 3-26, <https://doi.org/10.18055/Finis17100>.
- LÓPEZ-GOYBURU P. (2019) El borde metropolitano: términos y características. Una revisión (The metropolitan edge: terms and characteristics. A review), *Anales de Geografía de la Universidad Complutense* 39 (1), 109-124, <https://doi.org/10.5209/aguc.64679>.
- MÁTTAR J., CUERVO L. M. (2017) *Planificación para el desarrollo en América Latina y el Caribe. Enfoques, experiencias y perspectivas* (Planning for development in Latin America and the Caribbean. Approaches, experiences and perspectives), Comisión Económica para América Latina y el Caribe (CEPAL), Santiago de Chile.
- MATTIOLI L. (2016) El ordenamiento territorial del buen vivir: territorios rurales de oasis andinos (Land use planning for good living: rural territories of Andean oases), Universidad Nacional de San Juan, San Juan.
- MATTIOLI L. (2019) El buen vivir y el ordenamiento territorial. Una transición socioecológica en construcción (Good living and land use planning. A socioecological transition under construction), *ACE: Architecture, City and Environment* 13 (39), 37-62, <http://dx.doi.org/10.5821/ace.13.39.5357>.
- MATUS C. (1980) *Planificación de situaciones* (Situation planning), Fondo de Cultura Económica, Ciudad de México.
- MÉREINÉ-BERKI B., MÁLOVICS G., CREȚAN R. (2021) "You become one with the place": Social mixing, social capital, and the lived experience of urban

- desegregation in the Roma community, *Cities* 117, 103302, <https://doi.org/10.1016/j.cities.2021.103302>.
- MINISTRY OF THE INTERIOR, PUBLIC WORKS AND HOUSING (2020) Manual para la adaptación local de los Objetivos de Desarrollo Sostenible (Handbook for local adaptation of the Sustainable Development Goals), Presidencia de la Nación Argentina, Retrieved from: www.local2030.org.
- NAGY J. A., BENEDEK J., IVAN K. (2018) Measuring Sustainable Development Goals at a Local Level: A Case of a Metropolitan Area in Romania, *Sustainability* 10 (11), 3962, <https://doi.org/10.3390/su10113962>.
- NOZICA G., TABER E., ROMERO M. (2011) Crecimiento urbano y mercado de suelo en la Ciudad de San Juan. Argentina (Urban growth and land market in the City of San Juan. Argentina), Universidade Federal de Pernambuco, ALAS, Recife.
- NOZICA G., HENRÍQUEZ G., SORIA V., LIRUSI G., MATTIOLI L., BLANCO AVILA A. (2020) Informe Técnico Final: Repensar la Ciudad. Estudio Prospectivo para la Gestión del Crecimiento Urbano del Gran San Juan al 2030 (Final Technical Report: Rethinking the City. Prospective Study for the Management of Urban Growth in Greater San Juan to 2030), Programa IDEA 1400-0030-14, Ministerio de Ciencia, Tecnología e Innovación, Buenos Aires.
- ONU-HÁBITAT III (2017) Nueva Agenda Urbana (New Urban Agenda), Secretaría de Habitat III, Quito.
- ORBEA CELAYA T. (2009) Gobernanza y sistemas de gestión para el desarrollo urbano sostenible (Governance and management systems for sustainable urban development), Centro Latinoamericano de Administración para el Desarrollo CLAD, Caracas.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (2019) Fomentando el desarrollo Local y Regional. Alcanzar los ODS en las ciudades y las regiones (Fostering Local and Regional Development. Achieving the SDGs in cities and regions), OECD, Retrieved from: www.oecd.org.
- PUEBLA G. (2009/10) Caracterización del periurbano en países centrales y periféricos a través de cuatro autores. Breve recopilación y análisis bibliográfico (Characterization of the periurban in central and peripheral countries through four authors. Brief bibliographic compilation and analysis), *Breves Contribuciones del I.E.G.* 21, 135-155.
- REESE E. (2007) Planificación participativa y estratégica. Aportes para su aplicación a procesos de desarrollo local (Participatory and strategic planning. Contributions for its application to local development processes), Instituto del Conurbano de la Universidad Nacional de General Sarmiento, Buenos Aires.
- UNITED NATIONS (2000) ODM Argentina. Los Objetivos del Desarrollo del Milenio. 9 Objetivos de Argentina para el 2015 (The Millennium Development Goals. 9 Goals of Argentina for 2015), Retrieved from: www.onu.org.ar.

- UNITED NATIONS (2015) Naciones Unidas Argentina. Transformar nuestro mundo: la Agenda 2030 para el Desarrollo (Transforming our world: the 2030 Agenda for Development), Retrieved from: www.undocs.org.
- UNITED NATIONS (2019) Informe de los Objetivos de Desarrollo Sostenible 2019 (Sustainable Development Goals Report 2019), United Nations, New York.
- UNITED NATIONS (2020a) Adaptación de ODS al Plan Municipal de Ordenamiento Territorial Godoy Cruz. Mendoza. Argentina (Adaptation of the SDGs to the Godoy Cruz Municipal Land Use Plan. Mendoza. Argentina), United Nations, Retrieved from: sdgs.un.org.
- UNITED NATIONS (2020b) Objetivos de Desarrollo Sostenible (Sustainable Development Goals), UNDP América Latina y el Caribe, Retrieved from: www.undp.org.
- UNITED NATIONS (2020c) ¿Qué significa la localización de los ODS? (What does the localization of the SDGs mean?), United Nations, Retrieved from: www.undp.org.
- VÁZQUEZ ESPI M. (2004) Ciudades sostenibles (Sustainable cities), Cuadernos de investigación urbanística 41, 59-72.
- VELÁZQUEZ LÓPEZ F. J. (2019) Gobernanza de las ciudades: los ODS como guía para la acción (City governance: the SDGs as a guide for action), Centro Latinoamericano de Administración para el Desarrollo (CLAD), Caracas.
- WANG X.-J. (2009) Analysis of problems in urban green space system planning in China, *Journal of Forestry Research* 20, 79-82, <https://doi.org/10.1007/s11676-009-0014-2>.