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Collective Action Towards Risk Management in Informal Urban Areas in Medellín: COVID-19 Lessons for Reducing Vulnerability and Inequality

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Recent experiences of socio-environmental disasters in Latin America have demonstrated the ineffectiveness of the state as a social actor in the organisation, coordination and implementation of adequate public policies to face these emergencies. This affects the most vulnerable urban areas, leading to unequal levels of impact from crises and disasters within cities. As a response, local collective actions, led by citizens, have emerged to manage risks. In Medellín, Colombia, in the context of the current COVID-19 crisis, our research identified a diverse repertoire of collective actions within informal, vulnerable communities, including collaboration towards improving food security, sanitation, pedagogy for self-care and prevention, and financial aid. Although these actions have had limited scope within the context of the ongoing COVID-19 pandemic, they demonstrate the need to promote a more proactive interaction between society and the state, based on a series of agreed interventions, promoting the exchange of knowledge and articulation of actions in the production and improvement of informal urban areas. This research explores how these collective actions have developed through a set of semi-structured interviews with community leaders and key actors in Medellín, with a view to identifying lessons for state-community dynamics in relation to disaster risk management and achieving a more integrated approach to improving habitat conditions within vulnerable urban areas. This work demonstrates that vulnerable communities in informal urban settlements can actively address their exposure to risk through locally-oriented, bottom-up collective actions. However, key linkages with institutional frameworks are needed to strengthen state-community dynamics and facilitate sustainable, inclusive and equitable development in cities.

Keywords: collective action, disaster risk management, social production of habitat, co-production, vulnerability, inequality, COVID-19

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INTRODUCTION

Increasing urban growth has resulted in the creation of informal, low-income settlements with poor access to basic public services, mainly within the outskirts of large cities in the Global South. The variety of environmental hazards to which these settlements are commonly exposed (e.g., landslides, floods, earthquakes, among others), due to the geophysical conditions of informal urban areas, raise the level of risk for communities and increase the potential for disasters. Promoting resilience and

reducing vulnerability have therefore become critical objectives in risk management, and are the focus of ongoing research that this paper reflects upon. The current health crisis brought on by the COVID-19 pandemic is considered a disaster because it has generated a severe interruption in the routine and daily functioning of society (Lavell et al., 2020). The COVID-19 crisis has contributed to exacerbating and increasing the visibility of social inequalities, revealing that informal settlements are the least prepared to face this pandemic. According to Corburn et al. (2020), an equitable approach to halting the COVID-19 pandemic must change the standard ways of treating populations in poverty, create more participatory governance, improve delivery of essential services, and invest new resources to ensure that informal urban settlements benefit in the long term. Strategies associated with the comprehensive upgrading of informal settlements, aimed at reducing risks, focus on providing environmental and social improvements for these vulnerable communities, including permanence in the *territory*[1], housing, infrastructure, employment, health services, and political and social inclusion (Corburn and Sverdlik, 2017). However, the complexity of the risks to which these communities are exposed, together with the socio-economic challenges linked to social inequality, generate a lack of integration of risk management strategies in comprehensive improvement plans.

This paper focuses on the case of the city of Medellín in Colombia, where, since the first reported case of COVID-19 on March 6, 2020, various measures of social isolation have been adopted, forcing changes in the patterns of social activities, consumption, mobility, among others. The perception of communities in vulnerable areas is that these local measures evidence marked inequalities associated with the socio-economic characteristics of the population (Oviedo et al., 2020), following the approach adopted by developed countries and ignoring the social, economic and cultural conditions, availability of resources and services, and unemployment, which constitutes in itself a pandemic-related risk (Weston, 2020). In this sense, most of the implemented strategies present a top-down approach that tends to ignore local groups and the knowledge that already exists in many informal and vulnerable neighbourhoods.

However, this research has identified collective actions that have emerged in Medellín from within communities and social organisations at the neighbourhood level, which focus on providing a more efficient and direct response to local needs, while reducing vulnerability and inequality in the area. These actions have strengthened social organisation and collective knowledge. Some of these collective actions emerged in the context of COVID-19 itself, while others represent an evolution of organisational processes and strategies implemented before the pandemic. This research has identified a positive result from the health crisis, in the strengthening of knowledge creation and the increase in negotiation capacity, in particular in relation to strategies focused on the co-production of urban settlements, in collaboration with government organisations and academia. The creation or restructuring of social organisations and their long-term impact can be explored from two perspectives: (1) the level of knowledge required to achieve a more comprehensive co-production of informal urban settlements; and (2) forms of interaction and negotiation in favour of the creation and validation of knowledge. Within this approach, the current crisis highlights and increases the visibility of inequity generated from exposure to an accumulation of risks. At the same time, it may help to accelerate, validate and up-scale bottom-up collective actions that are informed by the evolution of knowledge within social organisations, seeking new strategies for co-producing the city in a concerted way, and potentially contributing to increasing levels of community autonomy.

This article seeks to offer alternatives for the future of community risk management, emphasising the importance of the local scale and the turn that social organisations and collective actions are taking, facing the issues of autonomy and self-management in response to criticisms and loss of trust towards current institutional frameworks. Through the analysis of a series of collective actions of different natures in informal areas in Medellín, which were aimed at finding solidarity solutions, producing food, or disseminating information, this paper explores the idea of collective and community-led action to reduce inequity and contribute to greater social inclusion and integration at the local level. The overall aim of this research is to identify how collective action, supported by social organisations at the local level, has enabled the *territory* to meet the immediate needs of vulnerable communities. The analysis helps to identify new forms of negotiation, agreement and collaboration, in the medium and long term, which could have a greater impact in informal urban settlements in terms of increasing resilience, sustainability and self-management, particularly considering the evolution of risks associated with climate change that will affect these communities with greater intensity. This paper therefore addresses the following question: how is collective action leading the response to the risks related to the current pandemic and promoting co-produced approaches for improving living conditions in informal settlements?

To serve as a conceptual framework for our analysis, the following section explores the concept of risk, emphasising the relevance of recovery and community resilience processes around the narratives surrounding the current COVID-19 pandemic (Harkins, 2020), particularly from the point of view of collective, bottom-up, community action. The article identifies alternative processes of academia-state-society cooperation, especially in the context of Disaster Risk Management (DRM) in response to a range of intersecting and accumulated risks. These strategies can promote the comprehensive improvement of informal settlements, through recognising the significance of collective action and the opportunities for community engagement in the co-production of their habitat.

[1]By *territory*, we refer to the informal urban areas where the work of community organisations is focused. It is important to note that this term in Spanish links urban space with notions of ownership and the right to the city by vulnerable groups in informal settlements. It builds an understanding of the 'home' and surrounding 'landscape' as well as the habitat conditions that are created within the community.

CONCEPTUAL FRAMEWORK

Disaster Risk Management

The extent to which populations are exposed to different types of hazards has increased faster than vulnerability has decreased. This has generated an increase in the scale of material and non-material losses in the short, medium and long term, observed particularly at the local and community level, including economic, social, health, cultural and environmental conditions (UNISDR, 2015a). In response to this, DRM has been an important issue on the institutional agenda in recent years. At the international level, the Sendai Framework (2015–2030) promotes a strategic and systematic approach to reducing vulnerability to multiple hazards, by incorporating DRM into sustainable development policies and planning, and prioritising the reduction of underlying risk factors, which is expected to contribute to the achievement of the UN Sustainable Development Goals, known as SDGs (UNISDR, 2005).

To this aim, the Sendai Framework expresses the need to better understand risk factors and their drivers, to establish integrated and inclusive measures that avoid the construction of new risks, reduce existing risks, and strengthen resilience (UNISDR, 2015b). The Sendai Framework prioritises actions and measures to reduce disaster risk, given the consequences of poverty and inequity, climate change, and rapid unplanned urbanisation, as well as other prejudicial factors such as the lack of governance, the implementation of inadequate policies, and the spread of pandemics and epidemics globally (UNISDR, 2015a). Although the risk of a health emergency such as COVID-19 has been addressed in DRM frameworks in an interdisciplinary and systemic way, the pandemic is not comparable with any other event of such magnitude and proportion in recent times. This is especially relevant in the framework of the research presented here, since disadvantaged populations will be disproportionately affected by the socio-economic and health effects of a pandemic, exacerbating existing inequalities (Charania and Tsuji, 2012; Corburn et al., 2020; Harkins, 2020), while adding to the adverse effects of environmental and climate change-related risks (Singer and Winkel, 2018).

In terms of drivers of risk, the climate change emergency is of particular relevance, as it has resulted in an increase in disasters concentrated in low- and middle-income countries, where urbanisation rates are close to 80% (UN-Hábitat, 2012) and where 21%[2] of the total urban population lives in densely inhabited, precarious, and informal settlements, as is the case in Latin America (Brassiolo and Fajardo, 2017). Although there has been considerable evolution in DRM regarding the development of public policies and risk mitigation measures (Marulanda and Cardona, 2006; Lampis and Rubiano, 2012), disasters continue to affect large segments of the population, gravely impacting the social and economic fabric of society (UNISDR, 2009; Agrawal, 2018). In less developed countries, climate change-related dynamics account for 96% of deaths caused by disasters (Agudelo, 2010). This increase in damages and losses extensively affects low-income populations in unplanned or not yet consolidated areas. These impacts are aggravated by the fact that urban planning mechanisms tend to be oriented towards an overly broad classification of risk exposure in urban areas, often leading to eviction in 'high risk' areas and a lack of regularisation of land tenure and public services, which in turn increases inequality for vulnerable communities in peri-urban informal settlements. For example, the Medellín Land Use Plan (Plan de Ordenamiento Territorial–POT) defines areas that are 'at risk' and at 'non-mitigatable high risk', and puts forward as part of its 'model of land occupation' the creation of an urban edge composed of high-quality consolidated neighbourhoods where the threats and risks are gradually reduced (Alcaldía de Medellín, 2014). However, this classification may obviate the opportunity of addressing high risk areas in "non-mitigatable" zones with strategies rooted in increasing resilience, comprehensive neighbourhood improvement and sustainable development, leading instead to a lack of action from government institutions, and eventually eviction. Moreover, considering the increasing impact of climate change-related risks, the areas classified as 'high risk' within informal settlements are likely to increase, aggravating evictions and exacerbating the lack of government action.

Given the multiplicity and accumulation of types of risk and their differential impacts in informal settlements, considering DRM in the context of emerging climate change adaptation strategies helps to define a comprehensive and multidimensional approach to risk (Sperling and Szekely, 2005). Within this approach, the COVID-19 crisis can offer unprecedented insights on how the global climate crisis can be managed, as there are many parallels between the current pandemic and what is projected with respect to the global climate emergency (Manzanedo and Manning, 2020). In particular, similarly to climate change, the COVID-19 crisis has a differential impact on social and spatial equity in low-income countries. The scarcity of economic resources, dearth of infrastructure, and social instability have put these societies at greater risk both in the short term, during the worst phase of the health crisis, and in the future, as their economic impacts will be greater and recovery slower (Manzanedo and Manning, 2020). This goes in hand with the effects of climate change in less developed nations, which will suffer the worst impacts of the climate emergency (Althor et al., 2016). In both cases, the impact on vulnerable groups located in densely populated areas in countries with little economic and institutional capacity will assuredly be greater.

Given the heterogeneous and unequal impact of disasters in different geographic and demographic contexts, it is critical to understand risk accumulation patterns that are linked to varying degrees of threat, exposure, vulnerability and resilience (Maskrey, 2011). In the context of adaptation strategies to climate change, for example, the conceptualisation of vulnerability not only refers to the extent to which a community is exposed to severe climatic events or trends and their effects on life and the environment, but also how these events affect the ability to adapt to shocks (CARE, 2014). Likewise, the definition of resilience in this context

[2]This figure has dropped over the past two decades, from 34% in 1990, and 29% in 2000 (Brassiolo and Fajardo, 2017).

emphasises "the capacity of countries, communities and households to manage change, maintaining or transforming living standards in the face of shocks or stresses without compromising its long-term prospects" (CARE, 2014 p.10). Key for disaster and climate change-risk management is the inclusion of social factors in monitoring, mitigation and adaptation, since an increase in social, economic and physical vulnerability will result in a stronger and more disastrous impact (Anderson & Holcombe, 2013). Understanding the nature and impact of collective actions in the context of complex risk factors, such as those that have emerged as a result of the pandemic, will therefore contribute to developing appropriate adaptation strategies that emphasise the role of affected communities.

Risk Management Conceptualised From the Management of the Territory

Maskrey's contribution in 1984 to the International Conference on the Implementation of the Disaster Mitigation Program (known as the Ocho Ríos paper) laid the groundwork for systematically discussing the involvement of local communities in DRM (Maskrey, 2011). Likewise, the Network of Social Studies on Disaster Prevention in Latin America (LA RED), formed in 1992, contributed to a paradigm shift in the way disasters are perceived and addressed, by understanding the risk that predisposes to disaster as a process of social construction inherent to development (Wijkman and Timberlake, 1985; Lavell, 2004; Narváez et al., 2009; Gellert-de Pinto, 2012; UNISDR, 2015a). The circumstances of precariousness and adversity to which informal settlements are exposed configure what Maskrey labels as 'social territories of risk' (2011).

In this regard, the need for a comprehensive vision of risk is evident (Cardona et al., 2003). This reconfiguration of the notion of risk needs to be linked with the 'social construction of the habitat' and the co-production of the territory, particularly emphasising the role of communities within risk mitigation and management processes, which in turn is associated with increasing resilience and social mobilisation, and reducing vulnerability. The concept of the social construction of habitat emphasises the importance of community participation and organisation in neighbourhood development, with processes of housing and habitat improvement taking on a more comprehensive perspective while addressing underlying complexities, as an opportunity for communities to decide and control how to improve their living conditions (Romero, 1995).

Social organisation, that is, institutional and non-institutional organisational processes, constitute an essential component in the construction and improvement of urban settlements (Franco Gómez and Hincapié Ballesteros, 2013). In turn, the co-production of the territory, seen as the collective construction of knowledge for transformative change, focuses on the dialectical structures between different forms of knowledge (formal/informal, technical/social) in the planning and construction of the city (Velasquez, 2015). Integrating local communities into these processes leads to the co-production of urban settlements in identifying approaches to the mitigation of environmental risk and adaptation to climate change.

The multidimensional, dialectical and participatory forms of co-production enhance the knowledge, capacities and needs of communities, and focus the discussion on the role of collective action, particularly in response to the accumulation of risks in a territory. According to Torres Carrillo, "collective action is always the result of a tension that disturbs the balance of the social system" (2009, p.55). This tension, given the varying degrees of uncertainty and anxiety it generates, leads to collective actions aimed at responding to a crisis (Torres Carrillo, 2009). In the framework of this research, collective action assumes a central role in the response of vulnerable groups to the accumulation of risks derived from the current health and economic emergency. In this regard, this research contributes to understanding the relevance of the emerging forms of organisation and self-management related with collective actions, not only for disaster risk management, but also in strengthening processes of social construction of habitat and co-production of urban settlements, towards the reduction of inequity. In other words, how can vulnerable communities in informal urban settlements become key players in addressing their exposure to risk through collective actions powered by new state-community dynamics?

Co-Production of the Territory: Scale, Knowledge and Power

Exploring DRM in conjunction with climate change mitigation and adaptation strategies through the actions and approaches developed to address the COVID-19 crisis exemplifies the need for synergies and multiple scales of interaction in the construction and improvement of informal, vulnerable urban settlements. It is therefore important to note that addressing local resilience within the approach of co-production and from a perspective that understands multidimensional risk requires three essential elements that can hinder the role of a range of institutions and organisations in the design of risk management solutions. These issues are: the geographical *scale*, such as international, national, municipal or neighbourhood; *knowledge*, that is, the integration of diverse forms of knowledge; and *power*, the ability to influence decision-making (Brugnach et al., 2017), taking into account complex power dynamics, negotiation and agreement (Meerow et al., 2016).

Addressing risk from the local and community level is especially important, since "it is essential to consider that local risk management (. . .) represents the best—and often the only—option for direct action on the most specific conditions of vulnerability, acting on the capacities and resilience built through the history and social context of a community" (Durán Vargas, 2011, np). Communities affected by risks tend to know their territory and are better prepared to monitor threats and respond with resilience and adaptation strategies. Consequently, risk analysis for different hazards must be evaluated together with socio-economic processes at the local level, in order to better understand vulnerability as well as the related collective actions (Maskrey, 1989).

On the other hand, the effectiveness of DRM depends on an integration of multifaceted knowledge, built collaboratively between actors (Hallegatte et al., 2018). Previous research led by

the authors, directed towards the co-production of landslide risk monitoring and mitigation strategies in informal settlements in Medellín, focused on the interaction between the community and external actors (state, academia, NGOs) within DRM[3]. This work has led to the emergence and validation of a 'dialogue of knowledges', where community knowledge takes a significant role in the negotiation of mitigation strategies, and different types of experience are strengthened and complemented (Smith et al., 2020). Within these knowledge co-production processes, the participation of diverse actors with a wide range of points of view is important (Borquez et al., 2017). Inclusive DRM approaches equate local knowledge with scientific and institutional knowledge and position the community as the driver and guardian of local and emergent knowledge. Indeed, the co-production of knowledge to find relevant solutions at the local level has been identified as key for sustainable community development processes and must be implemented through a grassroots approach (Ekanayake, 1990).

Finally, vulnerable groups must also be empowered to influence decision-making at the local level, using community knowledge to respond to threats, assuming an active and participatory role in risk assessment, mitigation planning, capacity building and implementation of DRM monitoring (Pandey and Okasaki 2005). This is a fundamental component within approaches to the social construction of the habitat and co-produced actions in the construction or improvement of informal settlements, discussed above. The Ocho Ríos paper argued that DRM should not seek to implement actions at the community level; rather, the focus should be on "empowered communities changing roles from objects to subjects in a very dynamic process of vulnerability reduction, enabling them to negotiate resources and support from local and central governments to undertake risk management measures at all scales." (Maskrey 2011, p.44). Thus, co-production in the context of risk management should prioritise community agency and empowerment.

METHODOLOGY

This research was funded by GCRF[4] and aimed at understanding the COVID-19 crisis, from the perspective of the range of collective actions that have emerged in vulnerable and informal urban areas in response to the risks derived from the pandemic. The overall aim was to understand the evolution of risk mitigation and adaptation through these emerging actions and networks, and explore how these practices may be preserved, up-scaled and replicated in the long term, for the mitigation of and adaptation to other unprecedented risks, such as climate change.

The research addresses these challenges from the point of view of analysing COVID-19-related risk mitigation collective strategies developed from the bottom up. The study is based on the case of the north-eastern slopes of Medellín, Colombia (*Comunas* 1, 3 and 8), where new networks and social organisation practices have taken a leading role in tackling risks related with the current pandemic. A qualitative and exploratory research methodology was established (see details below), that sought to identify emerging citizen initiatives in the health crisis that can provide ideas for new strategies and solutions to address future challenges.

The methodological approach was structured in three phases. The first research phase focussed on the identification of existing and emerging initiatives and their characterisation using social media searches (e.g., Facebook, Instagram, local radio) and interviews with community leaders and NGOs (including in person and online formats, according to the availability of informants and the level of local COVID-19 restrictions). The second research phase was based on an in-depth analysis of selected initiatives, which presented a significant impact in terms of dissemination and results in neighbourhoods of the north-eastern slopes of Medellín, using semi-structured interviews and compiling information promoted via social media channels. Finally, the third phase focussed on the analysis of the relevance of these collective actions for future challenges in relation to risk management, with a view to identifying pathways towards increasing resilience and reducing inequality within the specific context of informal areas of Medellín.

Using data collected in the first research phase from secondary sources, mainly from social networks, local newspapers and digital platforms, 31 existing or emerging initiatives were identified. Based on the availability of information and access to community groups and NGOs leading these initiatives, a detailed characterisation of around 40% of these was carried out, which resulted in identifying a set of categories according to each initiative's purpose, as detailed in **Table 1**. The identified purposes include: i) Activism, actions based on social mobilisation networks; ii) Alternative communication; iii) Solidarity; and iv) Productive networks. The analysis in the second research phase focussed on initiatives belonging to each category, considering the availability of information, and the impact of the different groups in informal urban areas and territorial improvement processes. Semi-structured interviews were carried out with actors from two groups from each category (a total of 8 interviews, indicated in **Table 1**), selected based on their interconnections with a range of sectors and actors. Most of these interviews took place in person, but some were conducted virtually due to availability and COVID-19 restrictions.

The following sections aim to build understanding of the institutional and community-led actions in response to the COVID-19 pandemic in Medellín, which is a key step in evaluating the effectiveness of these different measures in reducing vulnerability and inequality in informal neighbourhoods, as well as identifying possible gaps that could be addressed in future processes of risk management and approaches to the social production of habitat. *DRM in Colombia and Medellín* reviews the institutional policies and governance mechanisms that have been implemented in

[3]The leading research team has been involved in research activity in Latin America during the last 5 years seeking to increase resilience and climate change adaptation through co-production of strategic action and integrating different forms of knowledge.

[4]The Global Challenges Research Fund (GCRF) is a UK-government fund, aimed at addressing challenges faced by developing countries, providing agile responses, strengthening capacity for research, innovation and knowledge exchange, and promoting challenge-led disciplinary and interdisciplinary research.

TABLE 1 | Classification of the collective action networks identified in the research (Source: Authors).

Type of network	Purpose	Principal actors	Initiative
Activism and social mobilisation proposals and networks	Initiatives that emerged or were strengthened during the pandemic, aimed at generating community proposals to face the crisis and improve living conditions. These were initiatives arising from social demand and responding to the actions led by the municipal administration (3 initiatives identified in total).	Mesa de Vivienda Comuna 8*; Mesa Interbarrial Medellín; Corporación Jurídica Libertad; Corporación Contracorriente; Colectivo La Moradia; Colectivo TejeAraña*	Movimiento de Laderas (Movement of Slopes)
		Corporación Con-Vivamos; Corporación Nuestra Gente; Fundación Sumapaz	Alianza de la Nororiental (North-eastern Alliance)
		Open volunteering	Frena La Curva (Iberoamerican initiative that was supported locally by residents and collectives)
Alternative communication networks	Initiatives that have been strengthened during the pandemic, aimed at generating virtual spaces as a strategy to strengthen the social fabric, and provide a channel for voices critical of the forms of state intervention. The means used included virtual radio, conferences and live programs through various virtual platforms (6 initiatives identified in total).	Ciudad Comuna*	Por Los Barrios (shared via Facebook Live)
		Ciudad Comuna; Emisora la Cuarta Estación	#MinimoParaLaVida
		Movimiento de Laderas*	#RentaBásicaYa
		Emisora la Cuarta Estación	Online radio channel sharing initiatives and voices critical of local goverment decisions.
Solidarity networks	Initiatives that emerged during the pandemic, aimed at guaranteeing the basic needs of vulnerable groups, such as the food security of families or elderly adults, through the collection of funds or food parcels (13 initiatives identified in total).	Elemento Ilegal*	El Faro Solidarity Campaign
		Community leaders - Comuna 8*	#2000porla8
		Con-Vivamos	Amadrina una Familia (Adopt a Family)
		Community leaders - Comuna 13	Berracas de la 13
		Comunidad Trans Medellín	Fondo Diverso de Emergencia COVID-19
		University of Antioquia Seedbed Network - Expedición Dignidad	Ollatón Comida Plural
		Mucho Colombia; Plato Sin Frontera	Cooking as a social action
Productive networks	Initiatives that emerged or were strengthened during the pandemic, aimed at primary food production. At the rural level, these include medium and small-scale production focusing on produce for sale, with surpluses for self-consumption, which are distributed through supply centres or directly to the consumer. This category also includes small-scale production of food in small urban spaces called 'urban gardens' or 'eco-gardens', coordinating benefits for a local group of families (9 initiatives identified in total).	Social network initiative for sales of flowers from growers	Medellín Florece - Ramos de Flores
		Vitae Sano	Del Campo a la Mesa, fair trade and solidarity markets
		Red Nacional de Abastecimiento Agroalimentario (National Agrifood Supply Network)	Actions by farmers to reduce the impacts of the crisis in the agricultural sector
		Corporación Huerta Agroecológica El Jardín*	Self-supply, with sale or barter of surpluses
		Red de Huerteros de Bello Oriente*	Self-supply, with sale or barter of surpluses
		Siembra Viva	Donation of healthy foods, urban agriculture kits, fair trade
		Mucho Colombia	Local fair trade and solidarity markets
		Platos sin Fronteras	Cooking as a social action, donation of healthy foods
		AgroArte	Urban and rural agriculture

The first two columns show the categorisation that was made in the first research phase, with the total number of initiatives identified in each category shown in the 'Purpose' column. The last two columns show the groups and corresponding initiatives that were characterised in detail in the second research phase, including the groups where actors participated in semi-structured interviews (indicated by a star in the 'Principal actors' column).

Colombia on a national and municipal level in terms of DRM, as well as institutional efforts towards comprehensive neighbourhood improvement at the local level, and collective actions taking place in informal settlements of Medellín prior to the pandemic. *Institutional Responses to COVID-19 in Colombia* then summarises the institutional responses and policies in Colombia and Medellín to the COVID-19 crisis. Finally, *Interrogating Collective Action Towards an Integrated, Co-Produced Social Construction of Habitat in Medellín's Informal Urban Settlements* explores the collective actions initiated by community organisations at a local level in response to the risks related to COVID-19, through the analysis of the qualitative data collected as part of this research.

DRM IN COLOMBIA AND MEDELLÍN

Institutional Efforts

Major milestones in DRM in Colombia include, notably: (1) the transition from centralisation to state decentralisation (before and after the Political Constitution reform in 1991); (2) supporting the latter, the democratic election of mayors and

governors, contributing to the decentralisation of power into three levels of government[5]; (3) the recognition of an urgent need to respond to major disasters[6]; and (4) an increased research and policy interest on risk and disaster management (Vallejo, 2010).

The emerging relationship between socio-political structural changes, disasters and knowledge facilitated the establishment of the first National System for Prevention and Disaster Response (*Sistema Nacional de Prevención y Atención de Desastres*), which in practice focused on disaster management. More recently, this evolved into a National Disaster Risk Management System (SNGRD), responsible for urban and environmental public policies. This new system, in theory, represents a paradigm shift in the notion of risk, moving away from an approach based on the study of hazards (the socio-technical vision)[7], as well as the preparation and response to a disaster, towards an approach that recognises that risk management is a social process and as such, it is a syncretic – yet asymmetric–process between socio-technical and socio-cultural visions[8] (Cardona et al., 2003).

The SNGRD structure establishes duties and responsibilities at the national, departmental and municipal levels, which entails an articulation of three main sets of planning and management instruments for development: the Land Use Plan (POT), the Development Plan, and the Disaster Risk Management Plan. These instruments are oriented towards sustainable development, and aim to contribute to enhancing well-being, economic growth, and the quality of life of citizens.

At the local level, the Municipal Disaster Risk Management Plan (PMGRD) did not specifically contemplate the risk of a pandemic, but did identify conditions of social fragility that increase susceptibility to damage and loss. In addition, the POT, as an instrument for physical-spatial planning, proposes limits to growth on the hillsides of Medellín and promotes an inward growth model in which ambitious urban renewal projects and Comprehensive Neighbourhood Improvement (*Mejoramiento Integral de Barrios*–MIB) schemes are established, among other urban strategies. MIB processes focus on less consolidated or informal areas of the city, aiming to reduce socially constructed vulnerabilities. However, in practice their application relies dominantly on the detailed study and evaluation of the physical risks affecting these areas (e.g., landslides, floods). On the other hand, over the past few decades state-led activities and interventions have aimed to 'formalise' informal urban development through regularisation and land titling (Alfaro d'Alençon et al., 2018). However, these strategies have been highly criticised due to a lack of understanding of the effects on land value of land regularisation, which has driven out low-income communities.

In Medellín, the decentralisation of decision-making in relation to urban planning and the increased level of power given to local government has generated the previously mentioned constitutional changes through the creation of the POT, as well as a procurement driver which enabled funding for large-scale projects through public-private partnerships (Ortiz, 2012; Echeverría Ramírez et al., 2009; Dávila et al., 2013). However, the demand for housing has continued to grow, aggravated by armed conflict-related migration (Garcia Ferrari et al., 2018). This growth generated planning strategies oriented towards neighbourhood upgrading in the 1990s to improve security and liveability through concerted governance processes, which led to 'social urbanism' in the early 2000s. Projects under this approach enabled social participation and consultation in the diagnosis, planning and execution phases, promoting the formation of a range of local committees to aid the consultation process (Echeverri Restrepo and Orsini, 2010).

Collective Actions Led by Local Organisations in Medellín

The 1991 Constitution of Colombia institutionalised basic rights, such as access to housing, public services, health and education. Since then, community strategies have been changing and adapting to a shifting socio-political and environmental context. A culture of mobilisation first arose around the fulfilment of the rights enshrined in the Constitution. This socio-political context generated the establishment of strategies within communities to achieve political influence within the design of plans, programmes, projects and public policies, and more broadly the inclusion of community interests in government agendas through planning instruments for urban development and land use planning. This evolution brought issues of access to decent and adequate housing, the comprehensive improvement of neighbourhoods and, ultimately, disaster risk management into the realm of collective action.

Although risk management has not been a formal aspect of neighbourhood upgrading in Medellín, community-led initiatives have promoted the importance of actions at the neighbourhood scale in terms of urban renewal and risk management, arguing that the collaboration between government and society (aided by academia) can help generate appropriate technical solutions (Velásquez, 2015). Most of the organisational initiatives that ultimately played a relevant role in community care in the face of the current health emergency represent social processes that have been demanding suitable housing for more than a decade and have their origin in struggles for access to public services and the right to the city in the 1980s and 1990s. The slopes of Medellín have been developed through self-built processes, which stem from the need for both housing and habitat, but also from community relationships and organisation. This process of development of informal neighbourhoods in Medellín therefore links the social construction of the habitat and the co-production of the

[5]These and other relevant elements are part of the current 1991 Political Constitution.

[6]Between 1970 and 2011 in Colombia, 28,702 physical events were recorded (torrential floods, floods, fires, landslides, among others), affecting 27,750,701 people and causing around 40,000 deaths. Between 2010 and 2011 only, the La Niña phenomenon was responsible for a quarter of the registered deaths in the previous decade (OSSO Corporation and EAFIT University, 2011).

[7]Natural science and engineering approaches, including toxicology and epidemiology.

[8]This approach groups together different approaches and theories such as those from sociology, psychology and anthropology.

territory with collective and participatory forms of community organisation to improve living conditions, provide suitable housing and habitat, and reduce levels of vulnerability and inequality.

These social organisations in Medellín have established defence channels in relation to government institutions, promoting the voice of the community in the protection of their self-built neighbourhoods. As a result, interaction mechanisms have been achieved with institutions in the implementation of the MIB programmes, as an alternative to the eviction and elimination of these informal areas. Such was the experience of the 'Comprehensive Improvement Program for Subnormal Neighbourhoods' (PRIMED) in the 1990s, as part of which a series of studies and urban interventions were carried out, and risk (e.g., risk of landslides) was significantly reduced in the three areas where it was implemented. These successful experiences in Medellín demonstrate that there can exist political will within institutional frameworks for the development of MIB strategies with an emphasis on risk management.

The role of social organisations that have been evolving over time is therefore a key element in addressing gaps in risk management. Whereas in the early stages these organisations led actions towards access to public services and suitable housing, more recently the debate has turned towards integrated land use planning. This is due to the fact that in many homes it is not possible to connect water or sewerage, and improve housing conditions or land titling, mainly due to being located in areas classified as 'at high and non-mitigatable risk'. The government-community interactions led to addressing the problem of urban informality through MIB programmes oriented towards improving housing and infrastructure, as well as providing land titling and on-site resettlement. MIB programmes have more recently focused on risk management, which requires understanding and mitigating hazards before a disaster occurs, as well as recognising the importance of socio-economic factors (Velásquez and Carvajal, 2019).

Since the review and adjustment of the POT in 2014, dialogue and debate have constituted a fundamental element for local organisations around the generation of public opinion and social participation within MIB programmes and risk management. Tensions with government institutions have been tackled through organised negotiation meetings, such as open councils, public hearings and popular consultations, all mechanisms of social participation in the 'defence of the territory'. In addition, recent exercises of co-production of landslide risk management strategies within a 'dialogue of knowledges' between the community and academia, have allowed a better understanding of the range of perceptions around landslide risk and possible measures to mitigate it, and included the participation of the community in monitoring risks and in the construction of small-scale mitigation works (Smith et al., 2020).

These experiences have demonstrated the pertinence of mechanisms of negotiation between local communities, local organisations, academia and government institutions to achieve a better quality of life in informal settlements. The community-state dialogue processes have succeeded, for example, in characterising 98% of *Comuna* 8 through micro-zoned risk studies and a Risk Mitigation Plan that articulates technical works with their respective designs and budgets to reduce exposure to risk. In addition, these strategies consider some minor interventions that were carried out by local residents and identified in the community risk management plans, such as controlling the precipitation triggers that produce dangerous landslides by conducting rainwater to the main drainage networks. However, in terms of implementation, only small-scale works have been carried out and it would be necessary to include a larger proportion of the affected areas in future works to amplify their impact.

Access to drinking water is another issue linked to MIB strategies. In some settlements, regulations do not allow the provision of public service in a conventional manner. This has been addressed through community construction of aqueduct and sewerage infrastructure, exemplified in a number of neighbourhoods in the upper sectors of *Comuna* 8, where between 2010 and 2016 approximately 2,200 families were able to mitigate risks. These works were developed under a mechanism of social contracting with local Community Action Boards (*Juntas de Acción Comunal*–JAC), which represent neighbourhood-based elected community organisations. In addition, since 2016 the United for Water (*Unidos por el Agua*) programme has been seeking to achieve coverage in areas of difficult access through the construction of unconventional systems with a prominent engineering component. Furthermore, water management is more complex in areas located outside the urban perimeter, which require community drainage systems that are not part of the integrated water system of the city, since they require permission from the environmental authority. The success of these alliances lies in the political will of government to ensure the continuity of these types of interventions that have been achieved through citizen mobilisation, consultation and participation.

INSTITUTIONAL RESPONSES TO COVID-19 IN COLOMBIA

Responses at the National Level

The COVID-19 pandemic has generated a variety of public policy measures, which have contributed to a range of impacts in society, e.g. illness and psychological stress, loss of income, employment, reduced productivity, etc. (Lavell and Lavell, 2020). In the case of Colombia, the management of the pandemic was delivered through an organisational responsibility chart based on the structure of the SNGRD, which is composed of three DRM processes, namely, risk awareness, risk reduction and disaster management. In spite of this, the decisions the government has taken [e.g. the declaration of a national health emergency, restrictions to mobility, and the promotion of teleworking facilitated by Information and Communication Technologies (ICT)], were not specifically integrated as a strategy within the SNGRD structure. They were, however, aimed towards reducing exposure to the virus while the health system was methodically strengthened.

In response to the health emergency and the implemented social distancing measures (referred to as Preventive and Obligatory Social Isolation–ASPO), the Mitigation of Emergencies Fund (FOME)[9] was created within the existing National Fund for Disaster Risk Management–FNGRD[10]. In other words, in response to the declaration of a state of economic, social and ecological emergency, the national government created a new structure with an autonomous budget for the management of the pandemic, relegating the SNGRD. Although the FOME has an administrative board appointed by the President, the National Unit for Disaster Risk Management–UNGRD[11] does not exercise control on the FOME, as it is governed by the FNGRD, which results in ineffective bureaucratic power dynamics. The creation of the FOME is viewed as constituting a setback in the DRM process that Colombia has had, and as empirical evidence highlighting "that there is still a divorce between discourse and practice and that attention continues to be focused on the management of disasters, once these have occurred, and in corrective risk management" (UNISDR, 2015b, p. 137).

The management of the pandemic in Colombia generated a public policy structure that, according to the typologies identified by Roth (2004), has been made up of prescriptive instruments (obligation and interdiction) such as the isolation regulations. In different sectors of the economy, incentive instruments were also applied (to induce positive behaviours), such as a reduction in interest rates or flexibility in the payment of taxes, in addition to coordination instruments, such as the creation of an administrative board for the management of the FOME.

Most importantly in terms of analysing local community responses to institutional measures, the generalisation of the ASPO strategy throughout the country (a prescriptive instrument) was a decision that clearly ignored the socio-territorial dynamics at different scales. The adopted measures followed the same approach as more developed countries, ignoring social, economic, and cultural conditions, and the (un) availability of resources and services, which constitute factors that intensify pandemic-related risks (Weston, 2020). In other words, the decisions taken to face the health crisis shone light on a previously existing social construction of vulnerabilities. Lavell and Lavell (2020) label this process as a 'socially acquired vulnerability' that, if intertwined with the intrinsic vulnerability to the virus[12], generates a much greater impact on individuals. The institutional policies that were put in place therefore appear to overlook the relationship between these different types of vulnerabilities, and fail to adopt risk management strategies that acknowledge and integrate the local social complexities.

Institutional Strategies for Pandemic Management Adopted in Medellín

The main actions for the management of the pandemic in the city of Medellín were grouped under the programme *Medellín Me Cuida* (Medellín Cares for Me) and its associated online platform. This strategy was led directly by the municipality, together with newly-created 'temporary territorial managers'[13] (*gerencias territoriales*) for the 16 districts (*comunas*) and five townships (*corregimientos*) of the city. As a strategy, *Medellín Me Cuida* had two main lines of action. On one hand, it offered a registration platform for companies and employees that required support for mobility, using data management tools and bio-safety protocols[14] (*Medellín Me Cuida Empresas*, or Medellín Cares for Me - Business). The programme therefore establishes a process of technological surveillance, reducing and controlling the mobility of employees in the formal economy (home-work-home). On the other hand, *Medellín Me Cuida Familia* (Medellín Cares for Me - Family) aims to follow up on positive cases and collect information from people who require humanitarian aid. According to the *Medellín Me Cuida Familia* platform, its purpose is to:

1. Identify and characterise each family group that resides in the municipality of Medellín, the metropolitan area and the surrounding municipalities.
2. Determine who requires special attention and help in the framework of the social emergency caused around the spread of the COVID-19 virus.
3. Obtain data and information to manage and mitigate the effects of the health emergency.

With the information from the *Medellín Me Cuida* platform, the fusion of data from different databases and the use of artificial intelligence, priority was given to areas that correspond to population groups with intrinsic vulnerability to the virus (i.e. with basic health conditions) or with high socioeconomic fragility (socially acquired vulnerabilities). In parallel, *Innova por la Vida* (Innovate for Life) is a multisectoral platform that concentrates capacities in science, technology and innovation to generate rapid solutions that contribute to the prevention, care and control of the virus.

The above elements make up the third Strategic Line of the current Development Plan (Medellín Futuro 2020-2023), which has a comprehensive public health approach focused on prevention and strengthening the city's health system based on innovation, including new technologies, surveillance systems and

[9]A fund through which resources are channelled to the sectors affected by COVID-19.

[10]Law 1523 of 2012 created the National Fund for Disaster Risk Management, formerly known as the National Fund for Calamities, for public interest and social assistance, focusing on needs that originate in situations of disaster.

[11]The objective of the UNGRD is to direct the implementation of disaster risk management, formulate sustainable development policies, and coordinate the operation and continuous development of the SNGRD (article 3 of Decree 4147 of 2011).

[12]In this case, Lavell and Lavell (2020) refer to the pre-existing vulnerability of the individual with respect to pre-existing health conditions.

[13]These are members of the cabinet, managers, secretaries and directors of decentralised entities. See: https://www.semana.com/nacion/articulo/Medellín-en-los-barrios-pasan-hambre-y-la-alcaldia-trata-de-entregar-ayudas/663743.

[14]Decree 539 of April 13, 2020, adopted biosecurity measures to mitigate, prevent the spread of the novel virus and carry out the proper management of the COVID-19 pandemic, within the framework of the State of Economic, Social and Ecological Emergency.

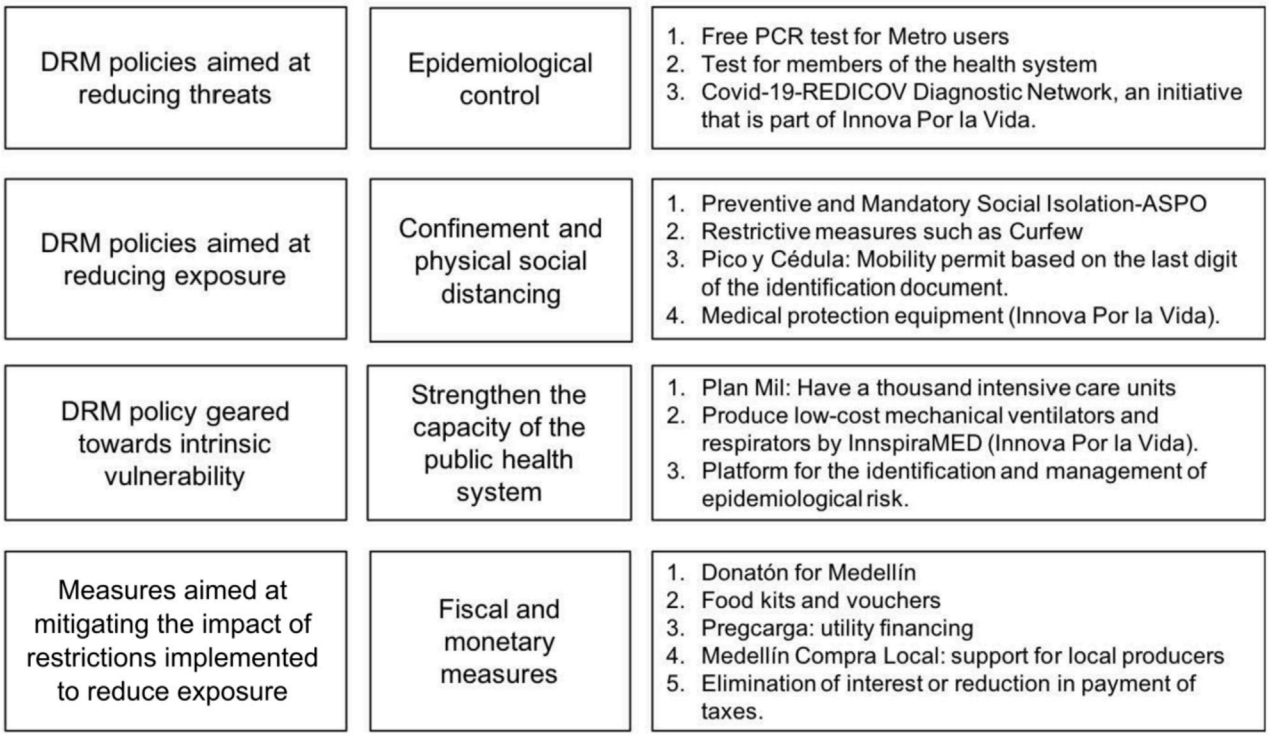

FIGURE 1 | Types of risk management policies applied during the COVID-19 crisis in Medellín. (Source: Author's adaptation from Lavell et al., 2020).

environmental wellbeing. Similarly, this strategic line focuses on women, youth and the most vulnerable population groups. However, some programmes focus on mitigation actions without considering the need for actions around social capacity-building.

To summarise, the main institutional actions that were undertaken in the city of Medellín to face the pandemic are categorised in **Figure 1**, in relation to various orientations in policy as a response to the risk components of threat, exposure and vulnerability.

INTERROGATING COLLECTIVE ACTION TOWARDS AN INTEGRATED, CO-PRODUCED SOCIAL CONSTRUCTION OF HABITAT IN MEDELLÍN'S INFORMAL URBAN SETTLEMENTS

Collective Actions in Informal Communities of Medellín in Response to the COVID-19 Pandemic

The measures established at the national and municipal levels to confront the pandemic unveiled and exacerbated the precarious conditions in which thousands of residents live in the peripheries of Medellín, mainly due to a lack of economic income, as most of these residents access employment informally. Under the mandatory isolation regulations, the situation worsened, as evidenced by the country's unemployment rate of 19.8% in June 2020 (DANE, 2020a). As previously mentioned, there is a significant lack of basic services in these informal areas: in 2018, 22,729 homes in Medellín did not have sewerage, 12,848 did not have drinking water services, 263,142 did not have internet and around 55,000 people lived in overcrowded conditions (DANE 2019). Although there is no precise data on the geographic distribution, the Multidimensional Poverty Index map of Medellín identifies that the most precarious living conditions are predominantly concentrated on the north-eastern slopes, specifically in the perimeter strip or urban-rural edge (DANE, 2020a). The range of vulnerabilities found in these areas indicate social disadvantages pre-existing the onset of the COVID-19 crisis. Personal hygiene, purchasing sanitising products, and maintaining sanitary conditions at home is therefore challenging. Due to the reduction in income, the low saving capacity, and the predominance of informal labour with a daily wage, the immediate effect of isolation measures was food insecurity. Faced with this challenge, communities living in informal areas mobilised by using red rags as a symbol of lack of food, which was also accompanied by *cacerolazos*, a spontaneous form of protest intended to draw the attention of institutions and the media.

In this context, community initiatives and participatory organisations aimed to create or adapt risk management strategies, generating a range of emerging networks and practices where collective actions were carried out to respond or adapt to the COVID-19 crisis. The actions were a response to the critical needs generated by government restrictions, and to the insufficient institutional capacity to respond to the severe socioeconomic effects of the pandemic in these informal areas,

as expressed by an interviewee from the collective 'Elemento Ilegal': "*We consider the actions of the government as null because the [food parcel] deliveries that were given from the government were not actually deliveries from the Municipality, but rather that [they] channelled the resources and organised logistics and distribution, but it was not that the administration used its own funds to attend the emergency*"; and an interviewee from the 'El Faro Neighbourhood Solidarity Campaign': *"The government here in El Faro [...] only came once to distribute some aid, and I did not like that aid, because if the government wants to help it should help completely. It is ok if [the government] helped residents with 100,000 pesos*[15]*, but [...] the other aid that we hoped to receive did not come. In four months we received government aid only once"*.

The initial responses, such as the demonstrations and small protests blocking access roads, as well as the use of red rags and *cacerolazos*, began 15 days after the isolation was decreed. These collective actions did not present organisational structures, but rather arose spontaneously from the despair of residents in the face of hunger. In parallel, solidarity campaigns emerged, particularly aimed at guaranteeing food security through the collection of economic aid or food parcels. The '*Ciudad Comuna*' Corporation is an alternative communication platform that potentiated initiatives such as '*#2000porla8*', and the 'El Faro Solidarity Campaign'. The Corporation promoted and supported dissemination and protest events on its social networks, such as on the live program '*Por los Barrios*' (For the Neighbourhoods). On this program, the conditions generated by the pandemic were discussed every Saturday morning through Facebook Live, as well as proposals around the defence of the rights of the community and their collective identity. These types of social media spaces were also developed by another key actor, the NGO '*TejeAraña*' Collective, which organised the content and communication strategy based on their knowledge in community management. Another significant actor was the artistic and cultural collective '*Elemento Ilegal*' of *Comuna* 8, which led the 'El Faro Solidarity Campaign' and supported the '*#2000porla8*' initiative. Unlike other actors, the focus of '*Elemento Ilegal*' is on young people, promoting activities around graffiti art, Hip Hop, photography, dance and theatre. Overall, these initiatives arose at different scales, such as: (1) actions carried out at the local scale by the local Community Action Board (JAC) in the El Pacífico neighbourhood, or the Hip-Hop collective '*Elemento Ilegal*' in the El Faro neighbourhood; (2) actions at the scale of *comunas* by community cooperation initiatives, such as '*#2000porla8*' and '*Jóvenes por la 8*', which focused on the upper areas of *Comuna* 8; and (3), actions at the wider territory scale (e.g. the north-eastern slopes, including *Comunas* 1, 3 and 8), such as the initiative implemented by the NGO 'Con-Vivamos' named *Amadrina una familia* (Adopt a family).

It is also important to highlight the coordinated action led by local organisations and NGOs that joined efforts in responding to the COVID-19 emergency. For example, the NGO 'Con-Vivamos' has led for nearly 30 years a variety of processes in Comuna 1 and 3, relating to issues of community strengthening, local development, human rights and peacebuilding. Con-Vivamos leads the North-eastern Alliance (*Alianza de la Nororiental*), a group which seeks to vindicate the different popular processes that have taken place for nearly 100 years in these areas, in order to continue to influence local government decisions, and involves Con-Vivamos along with the '*Nuestra Gente*' Corporation, and the Sumapaz Foundation. Similarly, the Laderas Movement is a group of organisations and leaders that seek to create an impact on local government decisions, through proposals based on the accumulated knowledge of its members, and which include the Housing Board of *Comuna* 8, the '*TejeAraña*' Collective, the '*Jurídica Libertad*' Corporation, '*Mesa Interbarrial*', the '*Contracorriente*' Corporation and the '*La Moradia*' Collective. This movement's actions aimed to draw attention to the precarious living conditions and vulnerabilities in these areas, in order to identify priorities when responding to the emergency, and build proposals for stabilisation and recovery from the crisis in low-income neighbourhoods.

In addition, some initiatives that emerged before the pandemic were made more visible during the crisis due to their importance for food security. This was the case for community and family gardens in the urban fringe. For example, the local government urban intervention project '*Jardín Circunvalar*' led to the creation of a network of orchards. This network, together with other individual initiatives, gained in strength during the health crisis, as a means to reduce food insecurity. This type of network also promoted the sale of surpluses, bartering processes, and awareness of the importance of this type of small-scale agriculture in the city. These types of initiatives have evidenced the possibility of growing food in a clean and organic manner, contributing to processes of sustainable territorial autonomy in the long term.

Analysis of Collective Actions in Response to the COVID-19 Pandemic in Informal Neighbourhoods of Medellín

This analysis seeks to generate an understanding of the evolution of institutional and community actions during the current health crisis in the case of Medellín. Based on the collection of qualitative data from the interviewed actors (**Table 1**), we investigate: (1) the perceptions of risk accumulation existing in vulnerable informal settlements; (2) the challenges and opportunities highlighted by the collective actions that could be addressed or harnessed in future processes of social construction of the habitat and co-production of urban settlements, to build resilience; (3) the ways in which the collective actions identified in Medellín contribute to reducing inequity and increasing inclusion; and (4) what can be learnt from the current situation to effectively coordinate collective actions involving government and community organisations.

Community Perceptions of Risk Accumulation

The actors interviewed in relation to the current pandemic-related risks voiced that the existing conditions of vulnerability have been aggravated by the current health crisis, as well as by public policy strategies that have been implemented in response, due to the high degree of poverty, overcrowding, and

[15]100.0000 Colombian pesos currently equates to around 25 USD.

precariousness pre-existing in the informal settlements: *"There are problems that already existed and they got worse, it was very dramatic, especially during the quarantine when there were more doubts than certainties and (...) a lack of clarity on how the administration was going to meet the social demands that were unattended, such as food and housing issues"* (as voiced by an interviewee from the Con-Vivamos Corporation within the North-eastern Alliance). The perception of the limited capacity of the municipality in dealing with the crisis was recurrent among those interviewed, evidencing that the state's strategy has been limited to the delivery of humanitarian aid without the periodicity required to meet people's needs, while investing its efforts predominantly in strengthening the health system. The accumulation of risks was made apparent by the *"exacerbation and perhaps greater visibility of situations that were already quite latent and complex and that have been the subject of analysis and protest of community organisations in Comuna 8"*, as expressed by an interviewee from the '*Por los Barrios*' program, from the '*Ciudad Comuna*' Corporation). These accumulated risk factors were related to the lack of access to public drinking water and sewerage services, the limited coverage of the health system and the risk of landslides during the bi-annual rainy seasons. These characteristics increase the complexity of the current social and economic challenges, but also call into question the present and future provision of infrastructure by the state, due to scarce resources and changing political and institutional priorities in the face of these complex issues.

Although the risks to health associated with exposure to COVID-19 represent an important aspect of the problem, one of the main impacts of the pandemic on these vulnerable communities was related to issues of food insecurity resulting from the ASPO measures, which is linked to pre-existing poverty and economic instability due to a lack of employment and limiting conditions in the informal sector: *"From the policies of the national and local government, there has not really been a real will to guarantee decent conditions so that families can cope with confinement. Proposals such as basic income, the guarantee of freezing the payment of public services has not been possible, there have been policies that deal with the "shock" but they do not integrally cover the needs of the most vulnerable families in the territory. (...) The great dilemma that families face is between obeying quarantine measures or risking being infected by the virus in order to go out and search for food and resources to provide sufficient conditions for survival. (...) The proposals for food security and health coverage, the truth is that we have seen they are insufficient for the needs and for the amount of population that the territory of the region has"*, as expressed by an interviewee from the '*Por los Barrios*' Initiative, by the '*Ciudad Comuna*' Corporation). The most affected inhabitants are those with disabilities, those of advanced age, and large families composition, as they do not have the capacity to meet their basic needs, which results in increased vulnerability. The concept of "daily risk" was highlighted in our interviews, indicating that risk factors in terms of health, employment and nutrition intersect for vulnerable communities: "The risk is [. . .] unemployment for a large part of the people, food scarcity for others" (as voiced by an interviewee from the '*Huertas Agroecológica El Jardín*' Corporation).

Finally, an increase in intra-familial violence and issues surrounding armed violence linked to small-scale drug-trafficking was highlighted by some interviewees, along with limitations in assistance programmes for victims of the armed conflict. In terms of education, the future implications of a lack of schooling due to poor access to ICTs were noted, which is an additional factor of vulnerability and risk that will have repercussions in future years. In other words, the pandemic encouraged the accumulation of social risks in informal neighbourhoods of the north-east sector of Medellín and amplified them, in part as a result of the institutional actions that were taken to mitigate the health impacts of COVID-19. Some of these social risks impacted the residents of these informal areas abruptly and in the short term (e.g., unemployment, physical and food insecurity), whereas others will continue to impact residents more gradually, with long-term socio-political implications (e.g., conflict, education disruption). However, we found that local perceptions of these risks tend to focus on the immediate needs rather than on the longer-term impact, due to the urgent nature of seeking solutions to immediate problems such as a lack of resources, food security and income.

Opportunities and Challenges for Co-Production of Urban Settlements

The vision that was expressed for the future of community social organisations is to link efforts with institutional actions, as voiced by an interviewee from the '*Por los Barrios*' program, from the '*Ciudad Comuna*' Corporation: "*to continue doing social work [but] I think that it is not so much our challenge, it is the challenge of the Municipal Administration alongside communities because we at least did our part to satisfy the communities, whereas the Municipal Administration did not fulfil its duty, to serve the communities to meet and satisfy their needs*". In line with this vision, we present some perspectives on the possible dynamics and relations between the community and the state going forward, in order (i) to address the imbalance observed between collective action and institutional action in informal urban settlements; and (ii) to identify future pathways for strengthening the social construction of habitat, risk management, and other mechanisms to build resilience in the territory.

First, there is an evident need for greater articulation between urban management and social and community organisations at different scales, as expressed by an interviewee from the '*Red de Huerteros de Bello Oriente*' in *Comuna* 3: *"The response from the administration is very slow and it really is not an action that can be applied full time and in an articulated way. In other words, with the administration, an articulation [with local community organisations] is made at a minimum level, but let's say that a permanent dynamic still cannot be consolidated"*. For example, in Medellín the Local Administrative Boards (*Junta Administradora Local*–JAL), which represent the lowest tier of local government, have the legal capacity to demand the Municipality's response to local issues. In parallel, the Community Action Boards (*Juntas de Acción Comunal*–JAC), which represent neighbourhood-based elected community organisations, have the outreach and networks to ensure community participation. The 'temporary territorial managers' created in response to the COVID-19 crisis

(see *Institutional Strategies for Pandemic Management Adopted in Medellín*) were intended to build dialogue with the Local Administrative Boards (JALs), as well as some, but not all, the Community Action Boards (JACs). The exclusion of some of the community boards may be related to their legal condition or to the fact that those who were excluded are organisations formed in informal neighbourhoods, but are not formally recognised by the administration. In this situation, the need for local knowledge and understanding of the real needs within informal areas rendered other local organisations, such as NGOs (e.g. Con-Vivamos), vital: *"to facilitate the delivery of food packages, identifying which were the most vulnerable neighbourhoods (. . .). We identified early that the Mayor's office had a very insufficient database (. . .). Really, the most vulnerable were not included (. . .)"*, as voiced by a member of Con-Vivamos.

In addition, it is clear that one of the elements that was crucial for the success of the collective actions in response to the pandemic was the previously-existing associative network of community organisations, as detailed in *Collective Actions Led by Local Organisations in Medellín*. Most of the strategies and initiatives identified in this research were implemented and promoted by community-based organisations or NGOs, with responsibilities distributed between their members. In turn, this helped to generate new capacities within these organisations. The pre-existing collective capacity of local organisations was therefore key for increasing resilience during the pandemic, and has been strengthened by the recent experiences. This collective capacity represents a significant resource which can be leveraged to increase the effectiveness of future risk management processes.

Furthermore, the community organisations and initiatives described above are well poised to collect detailed information (e.g. monitoring data on possible risks) on the ground, for example through censuses that characterise families and identify different degrees of vulnerability in the population. A valuable state-community link therefore lies in the articulation of this local data with institutional planning instruments, which do not tend to incorporate up-to-date information in informal sectors. For instance, the Medellín Council has *"opened a commission to monitor what is going to happen and what is happening in the north-eastern sector [where] there are 4 or 5 councillors who have shown all their support to be able to carry this out"* (as voiced by a member of Con-Vivamos), demonstrating willingness for this articulation on both sides. These exercises are clearly valuable for interlinking institutional and community efforts, in addition to the mechanisms already established by law, such as public hearings and open councils. It is, however, important to consider the sensitivity of community data, as community organisations also voiced criticisms regarding the handling of this information by the municipality, due to complex political underpinnings. Many organisations expressed concern that community data can be used against them by government institutions. Thus, we identify an opportunity in harnessing community data for risk management, but highlight the need for transparency on how this data will be used by other organisations or institutions.

Finally, the research also evidenced the potential of developing or strengthening relationships between local social organisations and international and/or national initiatives. For example, '*TejeAraña*' Collective has joined the 'Frena la Curva'[16] initiative, an international collaborative platform for social mobilisation and mutual support. The platform aims to identify and mobilise resources, which, in the long term, could represent a tool for developing popular and cooperative alternative economy networks. In addition, the use of open data and open source platforms, such as the Ushahidi platform, can allow emerging initiatives in the city to be easily geospatially located, facilitating the development of networks of sellers and buyers, exchange or barter, mutual aid, and temporary community loans, among others.

The onset of the COVID-19 pandemic initially dispersed community organisations, which in turn led to the emergence of alternative communication initiatives that contributed to increasing the visibility of community action and key actors in managing complex risks in informal areas of the north-east of Medellín. Our research has highlighted the value in establishing the government-community links described above, however challenges remain that must be addressed in order to strengthen collective action and enhance the positive impacts these movements have had. In particular, concern was expressed in relation to ensuring the continuity of collective actions that have already been initiated. The challenge faced by these social organisations is the achievement of permanency and continuity in improving the habitat in these informal areas, as the relationship with the state and other types of actors that support and finance these processes has been weakened. Furthermore, solidarity initiatives indicated challenges related with the appropriation of Information and Communication Technologies (ICT), due to a lack of access to technology resulting from existing inequalities and a relative lack of access to the internet and data service networks in some sectors.

Impact of Collective Actions on Inequity and Inclusion

The collective actions and community organisations documented in this research in response to the COVID-19 crisis contributed to community resilience through efforts directly aimed at reducing vulnerability and inequity, and increasing inclusion. The impact of these initiatives was evidenced by the mitigation of risks at the local neighbourhood and *comuna* scales. Individually, these initiatives represent tools promoting education, communication, and the provision of basic needs, such as food and water. In addition, the research also identified initiatives contributing to food security through the exchange of goods, as is the case of productive networks such as family and community gardens. However, together these efforts generate a contribution to the materialisation of a collective imagination developed in a sustainable way, in other words, *"the construction of a social body responsible for its environment"* (as voiced by a social leader from Bello Oriente).

In the context of the ongoing COVID-19 crisis, the initiatives led by community organisations are central to development at the local level, and are articulated through networks of complementary social actions, such as the '*Movimiento de Laderas*' initiative

[16]The Colombian chapter of the Ibero-American initiative (i.e., spanning Latin America and Spain) Frenalacurva.net, where communities have organised to support efforts related to COVID-19. It is made up of digital volunteers or citizens interested in contributing time to assist in the response.

(Movement of Slopes of Medellín), '*Alianza de la Nororiental*' (the North-eastern Alliance), or the 'Network of Community and Social Organisations of the Barrio Bello Oriente'[17]. Within the processes of community articulation such as those promoted by '*Movimiento de Laderas*', proposals began to be made in relation to autonomy and self-management, exemplified by the *Escuela Popular de Autonomias* (Popular School of Autonomies), which contemplated three axes: water, energy and food autonomy. This approach does not seek to replace the role of the state, but to supply the needs across neighbourhoods through exploiting community capacities, generating processes of organisational strengthening around, for example, continuity in the provision of the community aqueduct system in service. In times of the pandemic, the creation of a school garden represented a formative process and a political action, in which children and adolescents not only learned to grow food (mainly vegetables and aromatic plants) but also acquired the sense of food sovereignty and the knowledge to care for native seeds as a way to guarantee permanent presence in the territory. Likewise, a proposal was made to generate electricity through an energy self-production test using a water wheel that could guarantee energy to the community centre, in preparation for a possible future disaster that could leave the territory without electricity. This proposal is intended to guarantee that the community centre can remain in operation and, in this sense, represents an action not only designed for the present, but also with a future perspective in the face of geophysical and hydro-meteorological risks, and climate change scenarios.

These observations show that the focus has shifted towards processes of neighbourhood strengthening mediated by community managers at the sector level, with an approach increasingly centred around self-management. In turn, these initiatives related to social mobilisation contribute to articulating and establishing new interactions among organisations. In addition, alternative communication networks have provided democratic spaces to make the voices of those inhabiting informal areas heard, in order to generate a more integrated and inclusive vision of actions related to food security, the right to education, as well as access to public services and suitable housing. In this sense, the collaborative vision generated between community organisations, as well as the interlinking of approaches, methodologies and ways of generating joint solidarity actions, have contributed to inclusion and empowerment of different actors and to the collective construction of the habitat. This research therefore highlights that articulating different organisations to generate proposals on the health crisis became an exercise in the construction of networks, which in the future could provide local *territorial* capacity that could be leveraged to reduce inequity and increase inclusion and resilience.

Lessons for Coordinating Institutional-Community Collective Action for DRM

In Medellín, the analysed examples of collective action in response to the COVID-19 crisis show that the main strategy that filled a gap in institutional action was solidarity to guarantee the minimum basic needs, that is, through offering food aid through market deliveries and basic needs kits. When mandatory preventive isolation was decreed and, due to the pre-existing situation of labour informality and unemployment, many residents were left without economic support, local organisations helped to solve this problem of hunger and malnutrition, while the state arrived much later to deliver food vouchers and with more exclusive criteria, drawing on little articulation with existing territorial processes.

Through the collective actions that are currently being implemented at a local level, we have identified that there are opportunities for collaboration and articulation of social and institutional efforts in the management of informal urban settlements. In particular, we find that if community-led data management can be integrated with other types of institutional data in a sensible and responsible way, it could help government institutions at a municipal level to access up-to-date information. This can include the characterisation of informal settlements, and the identification of priority areas for intervention through public policy, which in turn allows for more appropriate approaches to urban planning and development. We also highlight the opportunities that lie in articulating local level organisations with international frameworks that facilitate cooperation and resource mobilisation. Furthermore, greater multi-scale action between social organisations and territorial management can strengthen emergency response initiatives in the short term, and allow for more efficient processes of co-production and social construction of solutions and strategies to mitigate risks and promote a more sustainable habitat in the long term. Finally, expanding existing community organisation associative networks and internal capacity building can be leveraged in future risk and/or crisis management scenarios. In essence, the research shows that vulnerable communities in informal urban settlements can become key players in addressing their exposure to risk through collective actions, however, linkages must be forged with institutional frameworks and processes at multiple scales in order to strengthen state-community dynamics and facilitate sustainable, inclusive and equal development in cities.

Although the research recognises the need for stronger links between social and community-based strategies with institutional policy and action, it is also important to valorise the autonomy and self-organisation of communities, and to respect these levels of independence. Actions at the community level demonstrate capacity for bottom-up action from the territory, from which often more agile and pertinent responses arise than those of the state, due to the knowledge of the network of socio-affective relationships that are woven in the neighbourhoods and the range of organisational processes at the local level. Thus, the institutionalisation of neighbourhood practices is not desirable, but rather a more efficient coordination of the actions comprising the various sectors and actors: the state (considering its legal framework that generates institutional disarticulation), the private sector, academia and the communities.

Furthermore, the right to the city is understood as a struggle to decide and plan the future of the city but also a struggle for communities to self-build their own *territory*. This struggle

[17]ARBOL - a set of organisations and initiatives located within the Bello Oriente neighbourhood in *Comuna* 3.

implies a social and political impact on behalf of the community before the state, which is a path that social processes had already been following in Medellín, through mechanisms of negotiation or agreement with government institutions. A key element highlighted in this research is the change that is beginning to take place in the context of the COVID-19 emergency, through the incorporation of concepts of autonomy and self-management into the debate, where the community has taken a hands-on approach in the construction of local capacity for the development of these informal areas.

The health and socioeconomic crisis have shown that community organisations can engage in alternative pathways to mitigate risks via demand, mobilisation and negotiation with state institutions. Possible alternative community-based management and increased levels of autonomy could lead strategic actions. Examples of initiatives that are beginning to develop this approach in Medellín include the previously mentioned water management *via* the community aqueduct the peri-urban edge, and food production within community and family gardens. These actions could contribute to and collaborate with state-provided aid in emergency situations. In other words, we argue that the collective actions recently developed in Medellín to respond to the pandemic can balance the processes of advocacy and autonomy.

The collective actions observed through the management of the pandemic, and in line with the management of vulnerable settlements in the past, are aimed at improving the quality of life of communities in the informal neighbourhoods of the north-eastern urban-rural of Medellín. A key challenge for the future is to articulate a more complex intervention strategy between community actors, academia and government institutions, so that progress can be made towards the co-management of informal and vulnerable settlements, developing comprehensive improvement (MIB) programmes that address interlinked challenges, such as risk management, resources, access to food and services such as water and sewerage, as well as housing.

CONCLUSION

Social isolation measures implemented in Medellín to mitigate the health impacts of the COVID-19 pandemic had significant consequences for the livelihoods of people living in informal areas of the north-eastern edge of the city, and rapidly impacted their ability to meet their basic needs. These consequences arose as a result of overlapping pre-existing vulnerabilities related to poverty, a lack of basic services (e.g. drinking water and sanitation), and informal employment. A range of collective actions arose in these neighbourhoods in response to the growing needs, demonstrating the insufficient capacity of institutional actors to mitigate the socio-economic consequences of the pandemic, as well as an important pre-existing capacity for resilience in these informal neighbourhoods in the form of networks of social organisations. This research aimed to understand the evolution of risk mitigation and adaptation through these emerging actions and networks, and explore how these practices can be preserved, up-scaled and replicated in the long term, for the mitigation of and adaptation to other unprecedented risks, such as climate change. Through a series of interviews and qualitative analysis, the research identified that strengthening institutional-community links could benefit DRM and promote the social construction of the habitat by: i) articulating urban management and social and community organisations at different scales; ii) leveraging the existing capacities of social organisations; iii) providing detailed and up-to-date information and data at the local level for policy development and risk management; and, iv) connecting social organisations with initiatives at the national and international level. A key finding from the research is the importance of the concepts of autonomy and self-management in the debate on alternative forms of risk management, as illustrated by the communities in informal areas of Medellín taking a hands-on approach in the construction of local capacity for neighbourhood development. Overall, we find that vulnerable communities in informal urban settlements can actively address their exposure to risk through locally-oriented, bottom-up collective actions applied at a range of scales. However, key linkages with institutional frameworks that promote community agency are needed to strengthen state-community dynamics, ensure continuity of existing actions, and facilitate sustainable, inclusive and equitable development in cities.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available upon request to the corresponding author, without undue reservation.

AUTHOR CONTRIBUTIONS

The research presented in this paper is the result of an international collaboration including academics and communities in Medellin. One of the authors of the paper included above, CV is a Community Leader (Community Housing Board of Comuna 8). All authors contributed to the preparation of the manuscript.

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