Environment and Urbanization
http://eau.sagepub.com/

Local disaster risk reduction in Latin American urban areas

Jorgelina Hardoy, Gustavo Pandiella and Luz Stella Velásquez Barrero

Environment and Urbanization 2011 23: 401
DOI: 10.1177/0956247811416435

The online version of this article can be found at:
http://eau.sagepub.com/content/23/2/401

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
iied
International Institute for Environment and Development

Additional services and information for *Environment and Urbanization* can be found at:

Email Alerts: http://eau.sagepub.com/cgi/alerts

Subscriptions: http://eau.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations: http://eau.sagepub.com/content/23/2/401.refs.html

>> Version of Record - Oct 10, 2011

What is This?

Downloaded from eau.sagepub.com by guest on November 1, 2013



Local disaster risk reduction in Latin American urban areas

JORGELINA HARDOY, GUSTAVO PANDIELLA AND LUZ STELLA VELÁSQUEZ BARRERO

Jorgelina Hardoy has a degree in Geography from the University of Buenos Aires and an MA from Rutgers, the State University of New Jersey, USA. She has been a staff member of IIED–América Latina since 1994, and her work focuses on developing multi-stakeholder partnerships to improve environmental conditions and reduce social vulnerability and risk in low-income neighbourhoods, including those related to climate change. She is also currently involved in the upgrading and regularization programmes implemented in Barrio San Jorge and Barrio Hardoy in Buenos Aires.

Address: IIED–América Latina, Melo 2698, Florida 1602–Vicente López, Buenos Aires, Argentina; e-mail: jhardoy@iied-al.org.ar; tel: ++ (54 11) 4760 3817; website: www.iied-al.org.ar

Gustavo Pandiella has been a staff member of IIED–América Latina since 1990. He is a Researcher working on and coordinating action–research projects that focus on developing multi-stakeholder partnerships to address urban environmental issues. He is completing a degree in Anthropology from the University of Buenos Aires.

Address: IIED–América Latina, Melo 2698, Florida

ABSTRACT It is widely acknowledged that disaster risk reduction is a development issue best addressed locally with community involvement, as an integral part of local development. Yet there are many constraints and realities that complicate the attainment of this ideal. This paper reviews the experience in disaster risk reduction in a range of cities, including Manizales, Colombia, which has integrated risk reduction into its development plan and its urban environmental management. The city government has also established an insurance programme for buildings that provides coverage for low-income households. The paper further describes and discusses the experiences of other city governments, including those of Santa Fe in Argentina and Medellín in Colombia. It emphasizes how, in order to be effective, disaster risk reduction has to be driven locally and must include the involvement of communities at risk as well as local governments. It also has to be integrated into development and land use management. But the paper emphasizes how these key local processes need support from higher levels of government and, very often, inter-municipal cooperation. Political or administrative boundaries seldom coincide with the areas where risk reduction needs to be planned and implemented. The paper also includes some discussion of innovations in national systems and funds to support local disaster risk reduction.

KEYWORDS development / local risk reduction / urban areas

I. THE LOCAL NATURE OF DISASTER RISK REDUCTION

Disasters materialize at the local level: lives and livelihoods are lost, houses and infrastructure are damaged and destroyed, and health and education are compromised. Vulnerability and hazards interact, generating specific risk conditions that are socially and geographically specific, dynamic and in constant flux.[1] Risk management also becomes possible at the local level, precisely because risk conditions are specific to time and place. There is a widespread consensus that risks and disasters are part of the development problem, that risks are a function of human activity and responses, and that risk reduction should be addressed locally (at the local scale and with local actors) together with issues of environmental degradation, participation, accountability and access, all of which underpin vulnerability.

Increasingly, disaster risk reduction is understood as being an integral part of local development. Most issues of land use management, regulation and provision of services and infrastructure fall on local governments. These responsibilities include zoning, ensuring the availability of sufficient

Environment & Urbanization Copyright © 2011 International Institute for Environment and Development (IIED).

Vol 23(2): 401–413. DOI: 10.1177/0956247811416435 www.sagepublications.com

land for housing and enterprises, preventing the use of dangerous sites such as flood plains or slopes, and ensuring that buildings meet health and safety standards. But often, risk reduction is seen as a burden for local governments, when in practice all these actions help reduce risks from everyday hazards and contribute to local development. When risk reduction is recognized as being relevant to local development and the reduction of everyday risks[2] and not just to hypothetical large-scale disasters, it is more likely to be prioritized by local governments and other actors.

Local governments need to promote the active participation of local actors to have any measure of success on development and therefore on disaster risk reduction. There is a clear trend towards recognizing that the local community has to be engaged in the process from the very beginning, that disaster risk reduction needs to be community driven to be sustained over the long term, that actions must respond to local needs and possibilities and that they should address multiple problems at the same time. "Community driven" does not necessarily mean that the actions are designed and promoted by the community alone, but rather, working together in association with local governments and other local actors.

However, local disaster risk reduction has its limitations.[3] The local level cannot and should not be equated to the municipal level. Political and administrative boundaries seldom coincide with the manifestation of risk production processes. A flood or slope failure is not necessarily limited to or circumscribed by the administrative area of a municipal government. Nor are the underlying causes of risk limited to particular administrative boundaries. For example deforestation, changes in land use and agriculture production patterns, channelling and dyke construction all affect a river's flow and the drainage pattern of important sections of a river basin, which will ultimately affect the flood risk of an urban centre down river. The possibility of addressing these types of risks falls beyond a local government's capacity alone even though it might be actively committed to working in association with local communities. Therefore there is a need to address disaster risks at multiple levels. While local engagement is essential for disaster risk reduction, many disaster risks need coordinated action among a range of local governments and through different government levels and sectors, which of course is a challenge.

Local initiatives need to articulate and receive support from higher levels of government, while national and regional initiatives can only be effective if they engage with local actors. Key aspects here are the decentralization level of a country, the complexity of the political–administrative bureaucracies, the efficiency/inefficiency of the state apparatus, and the power and resource struggles between sectors and levels. Sometimes, national governments are against strengthening local governments, or local governments haven't developed the needed technical, administrative and financial capacities to disregard the national level.[4]

Often, city and municipal governments, as well as most national systems and the international community, promote risk management at the local level but not local risk management. They support some aspects of locally implemented risk reduction but do not address, through the committed work of local actors, the underlying social vulnerability to risk, often associated with prevailing chronic or everyday risk conditions.[5]

1602–Vicente López, Buenos Aires, Argentina; e-mail: gpandiella@iied-al.org.ar; tel: ++ (54 11) 4760 3817; website: www.iied-al.org.ar

Luz Stella Velásquez Barrero is an Associate Professor and Researcher at the Institute of Environmental Studies (IDEA), National University of Colombia, Manizales. She trained as an architect and has a PhD from the Universitat Politécnica de Catalunya, Barcelona, Spain. She has been closely involved in developing the Local Agenda 21, or Biomanizales, for the city of Manizales, and has participated in similar processes developed in other cities of Colombia.

Address: Universidad Nacional de Colombia Campus Palogrande–IDEA, Edificio de Posgrados piso 5, Manizales, Colombia; e-mail: bioluzve@hotmail.com; tel: ++ (57) 68879300 ext 50190/ 50198. Also: Carrer Bolivia 144–146, Barcelona, Spain, CP 08018; e-mail: bioluz@biociudades.org; tel: ++ (34) 931803014; website: www.biociudades.org

This paper was prepared as a background paper for the Global Assessment Report 2011 of ISDR.

1. Lavell, Allan (editor) (2005), *La Gestión Local del Riesgo. Conceptos y Prácticas. Programa Regional para la Gestión del Riesgo en América Central*, CEPREDENAC–PNUD, Ecuador, 101 pages.

2. See reference 1.

3. See reference 1.

4. Mansilla, Elizabeth with Alice Brenes and Julio Icaza (2008), "Centroamérica a 10 años de Mitch. Reflexiones en torno a la reducción del riesgo", CEPREDENAC and the World Bank, Washington DC, page 76.

5. See reference 1.

II. INTEGRATED LOCAL URBAN DEVELOPMENT – THE INCLUSION OF DISASTER RISK REDUCTION IN DEVELOPMENT

In Latin America (and elsewhere), there has been a shift in the way disaster risk reduction is implemented, from centralized emergency response actions to integrated management of risk systems involving multiple stakeholders at different geographical levels (national, regional, local). This means that there is an increasing tendency to integrate disaster risk reduction as a cross-cutting issue in many different government policies.

It is important to have a government system that supports this. There are two key factors that tend to contribute to changing the approach used, namely decentralization processes and state reforms in many countries and the occurrence of several major disasters in the region.[6]

In some nations, stronger local democracies (for instance, with a shift to elected mayors and city councils) and decentralization (so city governments have a stronger financial base) have enhanced the role of local governments in local development, transferring responsibilities and, in the best cases, resources. City governments have assumed new roles and responsibilities, including modifying their approach to risk management, integrating different actors into the process and implementing risk management within development planning.

Good examples exist of city governments that have improved local development in ways that incorporate attention to land tenure, housing, social equity, environmental sustainability and disaster risk reduction. Most are local governments that develop relationships with those who live in informal settlements and have the capacity to govern with and for them. Most have developed the capacity to ensure the necessary economic growth in ways that are compatible with the long-term well-being of all citizens, defending collective interests against the pressures of individual and political interests. Most of these good examples come from nations or cities where citizen pressures and political reforms have been making local governments more accountable and responsive to their citizens. Important innovations have been described elsewhere and include: participatory budgeting, which started in Porto Alegre;[7] the provision of land for housing with infrastructure to avoid the formation of illegal settlements, through the joint work of government with community organizations as, for example, in Ilo;[8] improvements in the public transportation system (Curitiba);[9] and the integrated urban development process implemented in Manizales (Colombia).[10]

III. THE CASE OF MANIZALES[11]

The city of Manizales in Colombia is well known for its development and environmental action programmes. It set in place an ambitious urban development process, which integrates urban environmental management with local risk management. The process includes the Biomanizales (the city's environmental policy) and the Bioplan (the city's action plan to facilitate policy implementation); also an integrated disaster risk management plan, all of which are integrated within Manizales Calidad SXII, the city's development plan. The continuity of these policies through different government administrations has allowed the process to mature and allowed time for different projects and

6. Lungo, Mario (2007), "Gestión de riesgos nacional y local", in Caroline Clarke and Carlos Pineda Mannheim (editors), *Riesgo y Desastres. Su Gestión Municipal en Centro América*, Publicaciones Especiales sobre el Desarrollo No 3, IDB, Washington DC, pages 19–27.

7. Cabannes, Yves (2004), "Participatory budgeting: a significant contribution to participatory democracy", *Environment and Urbanization* Vol 16, No 1, April, pages 27–46.

8. Díaz Palacios, Julio and Liliana Miranda (2005), "*Concertación* (reaching agreement) and planning for sustainable development in Ilo, Peru", in Steve Bass, Hannah Reid, David Satterthwaite and Paul Steele (editors), *Reducing Poverty and Sustaining the Environment; the Politics of Local Engagement*, Earthscan Publications, London, pages 255–279.

9. Ceneiva, Carlos (1998), "Curitiba y su red integrada de transporte", in Eduardo Rojas and Roberto Daughters (editors), *La Ciudad en el Siglo XXI. Experiencias Exitosas en Gestión del Desarrollo Urbano en América Latina*, IDB, Washington DC, pages 101–109; also Dos Santos, Cleon (1998), "Curitiba, la planificación como proceso. Una tentativa de análisis", *Medio Ambiente y Urbanización* Vol 14, No 53, pages 17–22.

10. Velásquez, Luz Stella (1998), "Agenda 21: a form of joint environmental management in Manizales, Colombia", *Environment and Urbanization* Vol 10, No 2, October, pages 9–36; also Marulanda, Liliana M (2000), "El Biomanizales: política ambiental local", Documentación de la Experiencia de Gestión Ambiental Urbana de Manizales, Colombia, Instituto de Estudios de Vivienda y Desarrollo Urbano (IHS) Dentro del Marco de Implementación del Proyecto: Apoyo para la Implementación de Planes Nacionales de Acción del Habitat II (SINPA), Mimeo; and Velásquez Barrero, Luz Stella (2010a), "La gestión del riesgo en el contexto ambiental urbano local: un reto permanente y compartido. Caso Manizales, Colombia", Background Paper prepared for Global Assessment Report 2011 (GAR 11), UNISDR.

programmes to develop where knowledge, experience and resources come together, even though different administrations might have emphasized different aspects.[12]

Perhaps the main achievement, or the success factor, is the programme's capacity to integrate local and regional government, the private sector and universities and representatives of community organizations into a participative process.[13] This integrated process provides a better chance of investing in actions that are right and can be sustained in the long term.[14] New legislation continues to support and strengthen the process; for example, the Urban Planning Law (1999) (Ley de Ordenamiento Territorial) requires that all urban plans be discussed by local planning committees (*consejo territorial de planeación*) that involve the participation of civil society, universities and institutions.[15]

Since the 1980s, the local government has implemented a municipal disaster prevention system that makes risk management an integral part of local policies. This system includes: risk mapping; micro-zoning to identify risk zones and so build accordingly; construction codes identifying settlements particularly at risk from landslides; working with their inhabitants to relocate them to safer sites; and converting the land into neighbourhood parks with measures to stabilize the slopes.[16]

The disaster risk reduction programme also includes community preparedness and education, institutional coordination, research, and particular initiatives to reduce vulnerability and enhance resilience. For example, the Guardianes de Ladera (slope guardians) programme involves 112 women heads of households who live where they work. They receive training and, in turn, work on raising awareness, maintaining and controlling slope stabilization works, reporting problems and communicating experiences to others. In parallel, a support team was created made up of professionals and technicians from Corpocaldas,[17] the municipality of Manizales, the Red Cross, Aguas de Manizales and IDEA,[18] from the National University.

Environmental observatories have been created to monitor progress made on the environmental conditions in the city's 11 *comunas*, through a simple set of indicators. These indicators are represented visually by environmental lights (*semáforos ambientales*) and have been operating for many years as a communication and public awareness tool.[19] This has further involved the community and generated support in implementing the city's environmental plan.

Several innovative financing mechanisms have been applied, including tax reductions for those who take measures to reduce housing vulnerability in areas at high risk of landslides and flooding, and an environmental tax on rural and urban properties that is reinvested in environmental protection infrastructure, disaster prevention and mitigation, community education and relocation of at-risk communities.[20] The city has also established an insurance programme for buildings owned by low-income people,[21] which also extends to buildings that house organizations working for the public good. Once 30 per cent of insurable buildings in the city participate, insurance coverage extends to the properties mentioned above. The municipality collects premiums, keeping a small handling fee, but the insurance company takes responsibility for claims and has a direct contractual relationship with the insured individuals.[22]

Manizales' long-term experience relies on its capacity to coordinate its work with other government levels, both regional and national. At

11. Mostly based on Velásquez Barrero (2010a), see reference 10.

12. See reference 10, Velásquez Barrero (2010 a); also Velásquez Barrero, Luz Stella (2010b), *El Biomanizales: Manual de Bioarquitectura y Biourbanismo*, Facultad de Ingeniería y Arquitectura, Universdad Nacional de Colombia, Sede Manizales, 109 pages.

13. See reference 10, Marulanda (2000); also Hardoy, Jorgelina and Gustavo Pandiella (2009), "Urban poverty and vulnerability to climate change in Latin America", *Environment and Urbanization* Vol 21, No 1, April, pages 203–224, also in Jane Bicknell, David Dodman and David Satterthwaite (editors), *Adapting Cities to Climate Change. Understanding and Addressing the Development Challenges*, Earthscan, London, pages 225–250.

14. See reference 10, Velásquez Barrero (2010a).

15. See reference 10, Velásquez Barrero (2010a).

16. See reference 10, Velásquez (1998); also see reference 10, Velásquez Barrero (2010a).

17. Corporación Autónoma Regional de Caldas, which is responsible for environmental management and sustainable development in the department of Caldas, Colombia.

18. IDEA: Instituto de Estudios Ambientales, Universidad Nacional de Colombia, Manizales (Institute of Environmental Studies, National University of Colombia, Manizales).

19. See reference 10, Velásquez Barrero (2010a).

20. See reference 10, Velásquez Barrero (2010a).

21. Fay, Marianne, Francis Ghesquiere and Tova Solo (2003), "Natural disaster and the urban poor", *En Breve* No 23, October, World Bank, Washington DC, pages 1–4.

22. See reference 21, page 3.

the regional level, for instance, Corpocaldas has been involved in many of the processes described earlier. Coordination with the national level is supported by the decentralization process implemented in Colombia, where both responsibilities and resources have been transferred to lower levels of government at a scale and depth not so common in Latin America.[23] The environmental and local development process has also benefited from the support of and capacity to work with research institutions such as IDEA. Examples of coordinated work between sectors and different government levels are the regional seismic observation network that involves all coffee-producing regions (*eje cafetero*), the river basin management public–private consortium, and of course the National System for Prevention and Response to Disasters (Sistema Nacional para la Prevención y Atención de Desastres), which works in collaboration with the municipal office for the same (Oficina Municipal para la Prevención y Atención de Desastres–OMPAD).

23. Velázquez Barrero (2010a) observes that during the Uribe administration again there has been a tendency to centralize.

IV. OTHER CITY CASES

Often, as in Manizales, disasters have triggered new approaches that incorporate disaster risk reduction into local urban development. For instance, landslides in 1987 in Medellín, Colombia's second largest city highlighted the deficiencies of the city administration in terms of risk management. The city had systems in place to respond to emergencies, but after the 1987 disaster and the cold spells of 1988 and 1989, the local government created the Sistema Municipal de Prevención y Atención de Desastres (SIMPAD – Municipal System for Disaster Prevention and Response).[24] The system was envisioned to be integrated with local development, and thus part of its function was to ensure that disaster prevention was factored into the city's development plan. Linked to this was the Programa de Mejoramiento de Barrios Subnormales de Medellín (PRIMED – Low-income Neighbourhood Integrated Improvement Programme). The city government showed political will and commitment to including risk reduction in all areas and government actions,[25] and was backed up by a national government that has been supportive of locally developed actions as well as supporting disaster risk reduction at the national level.

24. Cardona Arboleda, Omar D, Luis F González Miranda and Luis F Linares López (2007), "Organización institucional para la gestión de riesgos", in Caroline Clarke and Carlos Pineda Mannheim (editors), *Riesgo y Desastres. Su Gestión Municipal en Centro América*, Publicaciones Especiales sobre el Desarrollo No 3, IDB, Washington DC, pages 142–185.

25. See reference 24.

After Hurricane Mitch, governments in Central America finally initiated actions to reform their national legislation and transform the traditional institutional frameworks that dealt with emergency situations into risk reduction systems that were multi-sectoral and inter-institutional.[26] However, a review 10 years later of what had been achieved points to the difficulties in actually implementing disaster risk reduction. Instead of including notions of risk and vulnerability in all local development plans (trying to address the structural causes of risk and therefore preventing and mitigating future disasters), systems and institutions were created that addressed disaster risk in isolation from other offices and institutions working on development.[27] In each country, a commission or national system for risk management and disaster prevention was set up, although in the end risk reduction was the result of projects rather than processes, in part due to pressure from donors.[28]

26. Gavidia, Jorge (2006), "Priority goals in Central America. The development of sustainable mechanisms for participation in local risk management", *Milenio Ambiental* No 4, pages 56–59, Journal of the Urban Environment Programme (UPE) of the International Development Research Centre, (IDRC) Montevideo.

27. See reference 4.

28. See reference 4.

Not all cities have managed to develop the kind of long-term integrated development programmes that exist in Manizales, Curitiba

or Porto Alegre, to name a few. However, innovations do exist, actions that show how city governments (but mostly certain areas within city governments) are approaching traditional urban problems such as land tenure, regularization and housing in different ways.

The municipality of San Fernando, within the metropolitan area of Buenos Aires, through the Unit of Urban Planning and Land Regularization has for some years been developing neighbourhood upgrading and housing programmes with access to formal tenure, aiming to reduce social and urban inequality within an integrated urban development strategy. The urban transformation process that is implemented goes hand in hand with social community work and therefore the long-term social transformation of what it means to be part of the formal city – for instance, with rights and responsibilities regarding services, taxes, participation and channels of communication. The social community work is undertaken through neighbourhood committees, workshops and other means, which involve the active participation of neighbours.

One of the constraints faced in San Fernando is that funds come from national government and have special requirements attached. Most neighbourhood upgrading and housing programmes need to have hydraulic approval indicating that the area is not at risk of flooding – and this approval is usually narrowly focused and outdated. When land is scarce and many interventions aim at improving the living conditions of already settled neighbourhoods, hydraulic restrictions may become a barrier. At the same time, programmes come with fixed requirements on housing size, type of building, price, etc., which gives little scope for innovation. However, the Unit of Urban Planning and Land Regularization managed to negotiate with national and provincial government and implemented an urban upgrading programme in Barrio Alvear, a low-income informal settlement on low-lying land by the river, which is at risk of surge generated by the *sudestada* (southeasterly winds). They build houses on stilts, a construction method not innovative in itself but innovative in that it is funded by government. This avoids relocation, something that neighbours have been fighting against, and ensures new housing, infrastructure and access to formal tenure.

V. COMMUNITY INITIATIVES

Civil society groups such as local NGOs and grassroots organizations have key roles in local development, including in disaster risk reduction. All stakeholders should be involved in analysis, strategic development planning, budgeting and decision-making, as participation and empowerment are key factors contributing to the sustainability of development processes. Community organizations tend to have strong ties within their communities and a deep understating of the functioning and conditions of the place, including the social and political forces that shape the community.

In Barrio Parque el Rey, in the municipality of Moreno (Argentina), a local community organization that manages a soup kitchen and gives extra-curricular school support to local children, acts as an "unofficial" evacuation centre during floods caused by intense rains. The area is low, with marshlands and lagoons, which coupled with individual practices such as elevating plots or building small walls to keep water

out have altered the local drainage pattern, increasing flood risk in the neighbourhood. The evacuation centre is becoming more organized and better supplied with food, mattresses, bedding, etc. and neighbours have learned to move there as soon as conditions turn bad. Initiatives like this, however, will remain highly localized unless they receive recognition and support from local governments and/or other civil society organizations.

The work needed to develop and sustain community initiatives is often underestimated. It is assumed that organized bodies exist within communities, with consolidated leaders who are interested in working on the issue of disaster or any other topic prioritized by external actors.[29] Every community is, in fact, built upon a complex web of social, economic and cultural dynamics, mediated by power relations and conflicts. It often takes much more time, energy and imagination to develop strong community organizations that can withstand the ups and downs of local development processes than it does to build basic infrastructure. Institutions, agencies and governments often don't recognize that the work to create community organization has to precede any other activity.[30]

The following section discusses the case of Santa Fe in Argentina, where an interesting process of collaboration among community organizations (both formal and informal) began after the floods of 2003.

29. Colina, F, J Delgado, V Jiménez, J Lafaille, A Linayo and J L Mosquera (2004), "Pilot study of community-based disaster management strategy for earthquakes; case of La Vega", ProVention Consortium Community Risk Assessment Toolkit Case Study, FUNDAPRIS–JICA, 56 pages.

30. See reference 29, pages 14–15.

VI. THE CASE OF SANTE FE[31]

The city of Santa Fe in Argentina (with a population of 489,595 in 2001[32]) is set between the low-lying areas of the Parana River basin and the Rio Salado, and much of the city has expanded into this low-lying land. To defend itself against flooding, the city had to create embankments and dykes. In 2003, the Salado River flooded one-third of the city, displacing 139,886 people and affecting 27,928 households.[33] In certain neighbourhoods, with three metres of water inside their homes, people had to be evacuated from the second floor. It took a month for water levels to drop and two months for people to return to their homes (if indeed they could, even then). Among the factors contributing to the flooding were increased and more intense rainfall, deforestation and changes in land use both along the river basin and around the city. Two sections of the infrastructure intended to defend the city against the waters of the Salado River were completed by 1995, however, the last section was not completed until after the floods. In addition to this, the pumps and drainage systems installed to evacuate water in protected areas did not work because of vandalism, a lack of maintenance[34] and the fact that the electric power was down and there were no portable power systems. Other infrastructure such as the highway connecting Santa Fe with the city of Rosario created barriers to water runoff, although studies had pointed to the need to double the size of highway bridges.[35] The floods caught the city authorities totally unprepared, even though the Instituto Nacional del Agua (INA) was monitoring water flows and peaks and had informed both city and provincial authorities of the potential flood risk.[36] Further floods in 2007 once again exposed the lack of official action, and the same city areas were flooded. This time water receded more quickly and the flood defence infrastructure work had been completed. However, the emergency system implemented by the city government did not work; when the authorities transmitted evacuation information by radio during the night, no one heard it.

31. Based on interviews held in August 2010 with Sandra Gallo (Canoas), Guillermo Infran (INUMA) and Arnaldo Zapata (Secretaría de Aguas, Ministerio de Agua, Servicios Públicos y Medio Ambiente of the province of Santa Fe); also see reference 13, Hardoy and Pandiella (2009).

32. Instituto Nacional de Estadísticas y Censos (INDEC) (2001), *Censo Nacional de Población y Vivienda*, INDEC, Buenos Aires.

33. Natenzon, Claudia (2006), "Inundaciones catastróficas, vulnerabilidad social y adaptación en un caso argentino actual. Cambio climático, elevación del nivel medio del mar y sus implicancias", Paper submitted to Climate Change Impact and Integrated Assessment, EMF Workshop IX, Snowmass, Colorado, July 28–7 August.

34. See reference 33.

35. See reference 33.

36. Asociación Civil Canoa, available at http://canoa.org.ar/DDHH02.html.

During the emergency period following the floods in 2003, action from civil society (evacuees, NGOs) involved organizing the evacuation centres, preparing activities for children, giving emotional support, organizing life itself. As the government had been unprepared for such an emergency, most of the efforts fell to the evacuees and other community members and institutions that could help them. The floods had brought together people from very different socioeconomic backgrounds, as both middle- and low-income neighbourhoods had been affected. They organized themselves into a *movimiento de inundados* (a movement of flooded people) to demand justice and solutions. Three months after the floods, a public demonstration took place in the plaza in front of the government building, and a black tent was set up as a symbol of their claim for justice (i.e. that those responsible would be taken to court). It was intended that the tent (Carpa de la Memoria y la Diginidad – Carpa Negra) would stay in the plaza until all those affected by the floods had been given answers and those who were responsible had been taken to court. It remained there for 170 days, after which the different organizations within the *movimiento de inundados* decided to take different approaches. Initially, groups had undertaken different roles according to their own interests and perceptions of appropriate action. After a while, the initially shared goals became less clear and each organization started to follow its own particular path, differentiating themselves by the type of work they promoted and their organizational style (some had a more hierarchical structure, while others believed in more collaborative work). Differences also emerged as a result of their way of working with government (as some were more ready than others to collaborate with government).

The following are examples of the kinds of civil society groups that emerged:

- **Comité de Solidaridad** (Solidarity Committee), mostly formed of institutions and NGOs (Canoas, Escuela de Psicologia Social, Acción Educativa) that supported evacuees and the Human Rights House of the province of Santa Fe. They have been compiling information on victims, post-traumatic effects, etc. to prepare the court cases. This group later split into two: those who pursued judicial claims and who prepared the first court cases (preparing, forexample, a list of victims and those who suffered different kinds of physical and psychological trauma); and those who pursued social goals for the evacuees and started working on disaster risk reduction.
- **Marcha de las Antorchas** (March of the Torches), where people march around the plaza in front of the government building every Tuesday, following the example of the Madres de Plaza de Mayo,[37] calling for justice and keeping the issue on the public agenda.
- **IN-NU-MA** *(inundaciones nunca mas* – floods never again) is a civil society institution created after the floods to work on the social needs of the people living in the neighbourhoods affected by the flooding.

Despite differences among the groups, there is a shared learning and respect. They all get together on the twenty-ninth of every month at the plaza to keep the memory alive, and on every anniversary they hold an assembly and prepare a document that is sent to the government.

In parallel, Canoas, a local NGO involved in the improvement of low-income settlements, which became much involved during the emergency and continues to participate in the solidarity committee,

37. Madres de Plaza de Mayo is a social movement initiated by women (mothers) in 1977 during the last military dictatorship in Argentina. They spontaneously started to get together to claim for their disappeared sons and daughters. They marched every week in silence along the Plaza de Mayo in front of the Casa Rosada (executive offices), at first asking for the disappeared and later for justice.

recognized that there wasn't much understanding among local actors of the concepts of risk, risk reduction, vulnerability and their relation to development issues. In the five neighbourhoods where they worked, they supported a neighbourhood process that generated awareness, training on risk reduction, the preparation of risk maps for the community, and the development of an emergency plan. The work that was developed was tested during the most recent flood events in the city in 2009–2010 (which were the result of heavy rains rather than river overflow). An evaluation found that these neighbourhoods were much better prepared and organized than the rest of the city, and city government is now reproducing the model developed there.

One of the biggest challenges in Santa Fe after the floods of 2003 and 2007 was solving housing needs. The mechanisms used were and continue to be very problematic. Three new neighbourhoods were developed with funds from the Red Cross. Six months after the floods, city government had still not started to use the money. Under pressure, they developed housing projects, but using technology that people considered appropriate for emergency housing and not for long-term permanent housing. The land allocated for these housing developments, and for two others developed with funds from government and other donors, was far away from transportation networks, and houses were allocated without complete infrastructure or social services. In general, there was little scope for participation; who was relocated where, the criteria used for selection and the house prototypes were not discussed much with those affected.[38] The immediate housing and relocation process in Santa Fe has certainly been complicated. People suffered post-traumatic effects, felt unsafe and couldn't return to their own homes, but sometimes it took more than four years to be relocated. A documentary on the floods covers the story of three women. It mentions that it took one year for a middle-income woman to return to her home. An old, low-income woman lived in a warehouse for three years and was then relocated to another neighbourhood far from where she had previously lived. The third woman had to relocate through her own means, losing her livelihood (her family produced bricks) and with hardly any help from government; she received less than US$ 100 to replace her lost home.[39]

38. Asociación Civil Canoa, available at http://www.canoa.org.ar/PrPe-Recons.html.

39. Elguezabal, Sergio (2007), "Refugiados ambientales: los exiliados del mundo", Telenoche Investiga.

VII. GOVERNANCE CHALLENGE: PARTICIPATORY MECHANISMS TO SUPPORT THE WORK OF CIVIL SOCIETY IN DISASTER RISK REDUCTION

After the floods of 2003 and 2007 in Santa Fe, city authorities began to recognize the impacts of 50 years with no official urban land policies. People had settled where and how they could, prioritizing proximity to work places or social networks. There was no long-term development plan for the city, or if there was one it wasn't enforced. Much less was there any attempt to work in collaboration with communities and representatives of civil society. The relocation programmes developed in Santa Fe, described above, show how programmes and policies continue to fail mostly because of this incapacity to engage in collaborative processes.

Civil society alone cannot effectively act on disaster risk reduction and modify the conditions that produce disaster in the first place. Different experiences have shown that it is possible but not likely that

local risk reduction actions will transcend the local scale. In most cases, it is the coordinated work between government and civil society that brings about change. However, the channels and vehicles of participation to support this kind of coordinated work are rarely there. The effectiveness of disaster risk reduction is not just what a local government does but also what it encourages and supports.

Social participation is often talked about, but in practice it is usually passive participation, with little real involvement in the design and selection of programmes. Instead, local people either take training courses, or become emergency committee members, or are part of the mitigation works workforce.[40] This is common in many development initiatives.

40. See reference 4.

The case of Manizales shows how its long-term development process is sustained by the collaborative work of government (at different levels), research institutions, community representatives, the private sector, etc. However, most of this collaborative work engages only technicians from different government offices and academic institutions. There is much room for improvement in terms of involving local communities. Apart from the information produced by the environmental observatory, other simple indicators need to be developed to promote participatory planning. Also, the lack of continuity in community training and involvement has hindered community appropriation of the process and empowerment. An initiative being developed over the past year or so, and soon to be launched, is the Placodes (Plataforma de Capacitación para América Latina y el Caribe) – a training platform for Latin America and the Caribbean in which the Biomanizales participates. The platform aims to share experiences and train technicians, local governments and community organizations in adaptation to climate change.[41] This effort, aimed at addressing the challenges raised by climate change and variability, can inject new energy into the collaborative work implemented in Manizales. It adds new aims and goals to the Biomanizales, allowing for the renewal and development of policies and actions.

41. See reference 10, Velásquez Barrero (2010a); also Plataforma de Conocimiento para el Desarrollo Sostenible (Placodes) (no date), "Promoviendo el desarrollo local endógeno y resiliente al cambio climático y los desastres en América Latina y el Caribe", Universidad Nacional de Ingeniería de Nicaragua, Red Iberoamericana de Estudios Ambientales Urbanos, Universidad de Oriente Santiago de Cuba, ISDR, 8 pages.

In the case of Santa Fe, changes in government (both at the provincial and city level) have brought about changes in organizational structure and policies. Within the city, the current administration has created a disaster risk reduction unit, which is working on developing better emergency plans and community risk maps and is maintaining and completing needed infrastructure within the city. At the provincial level, within the Secretariat of Water of the Ministry of Water, Public Services and Environment, programmes have been developed according to key priorities. One is the urban flood protection programme and another, the drainage and water retention programme. The first aims to support urban areas in their work on risk reduction, mostly on infrastructure support, although they are clear that infrastructure work alone is insufficient. They use as a flood threshold for precipitation not only historical records but also the record precipitation of 180 millimetres/day that occurred during the 2007 floods. The second programme continues to support the idea of working and promoting the creation of more river basin committees formed by representatives of the local government and local rural producers with assistance from the province. It also works on the revision of all channelling and the creation of reservoirs for water retention, reducing peak flows during rains and replenishing the water table during dry periods. This programme, although not urban, has a direct effect on the flood risks of urban areas. These efforts have contributed to the fact

that during the heavy rains of 2009–2010 (190 millimetres over 11 hours) the city was less affected than in 2007.[42]

42. Interview held in August 2010 with Arnaldo Zapata (Secretaría de Aguas, Ministerio de Agua, Servicios Públicos y Medio Ambiente of the province of Santa Fe).

VIII. NATIONAL SUPPORT

Examples of good city and municipal practice are often linked to particular forms of support from higher levels of government. The innovations described above in Manizales and Medellín were supported by national government both through its support for decentralization, giving more power and responsibilities to local governments, and through national risk reduction systems that support risk reduction at the city and municipal levels; this includes the National System for Prevention and Response to Disasters (Sistema Nacional para la Prevención y Atención de Desastres). Since 1987, Colombia has been working first on designing and passing a national law, and later on implementing and adjusting the National System for Prevention and Response to Disasters. This system takes a broad approach to disaster issues, working on prevention as well as planning for sustainable development. It has national coverage and integrates public and private organizations, NGOs and citizen groups at different territorial levels (national, regional and local). It's decentralized and the main responsibility lies with the municipal administrations. Each territorial level operates through a committee. By law, a National Calamity Fund (Fondo Nacional de Calamidades) is dedicated to addressing the needs generated by disasters and to implementing a few preventive actions.[43] All these initiatives are the result of a new way of thinking about the role and responsibilities of state, citizens, academic institutions, NGOs and individuals.[44]

Several countries have enacted new legislation or are in the process of making amendments so as to meet the challenges of development and disaster risk reduction. In many cases this has included the transformation of emergency response agencies into national risk reduction systems.[45] For example, Nicaragua has implemented a national system similar in approach to the one implemented in Colombia. There is an increasing tendency to decentralize disaster risk systems and to enhance local capacity for disaster risk management.

However, most of these national systems are relatively new and need time to consolidate. In spite of interesting cases, the real involvement of local actors is only beginning to develop in most countries.[46] There is a worry that local governments can be allocated responsibilities for which they lack the capacities and resources.[47] As noted already, no government gets recognition for the disasters its programmes have prevented – and so risk reduction investments are not seen as priorities and have to compete for scarce resources with more pressing needs.

Often, the duration of policies is tied to the duration of particular party political groups/administrations, and programmes and experiences are frequently abandoned because of a high staff turnover.[48] Often, party political interests mediate the relationship between local, regional and national governments. For instance, the province of Santa Fe in Argentina, which is led by an opposition party that came into power in December 2007, has not received any funds from the national government other than from a national tax on soya bean production that is then distributed among the provinces, and some funds to finish work started by the previous administration.[49]

43. Von Hesse, Milton, Joanna Kamiche and Catherine de la Torre (2008), "Contribución temática de América Latina al informe bienal y evaluación mundial sobre la reducción de riesgo 2009", GTZ–PNUD. This was part of the Latin American contribution to the *2009 Global Assessment Report on Disaster Risk Reduction*, UNISDR, pages 19–20.

44. Zeiderman, Austin and Laura A Ramírez Elizalde (2010), "Apocalipsis anunciado: un viraje en la política de riesgo en Colombia a partir de 1985", *Revista de Ingeniería* No 31, Universidad de Los Andes, Bogotá, January–June, pages 199–131.

45. See reference 26.

46. Bollin, Christina and Friedegund Mascher (2005), "Honduras: community-based disaster risk management and inter-municipal cooperation. A review of experience gathered by the special inter-municipal association MAMUCA", GTZ, Eschborn, Germany, 32 pages.

47. See reference 43.

48. See reference 4.

49. See reference 42.

This issue can only be overcome where, as in Manizales, disaster risk reduction is seen as part of local development, where collective interests overcome individual and party political interests, and national governments support local governments, assigning both responsibilities and resources.

IX. CONCLUSIONS

Although it is widely acknowledged in the discourse that disaster risk reduction is a development issue that needs to be addressed locally through the collaborative work of local communities, local governments and other local key stakeholders, often disaster risk reduction still ends up outside the development framework.[50] A narrow focus persists, and there is a reticence to address disaster risk as a constant cross-cutting issue within a broader framework for addressing the challenges of development.[51] Disaster risk reduction is felt to be an additional burden for local governments, when in practice many of the needed actions also contribute to solving everyday hazards and local development problems. Immersed in the management of the "everyday", it is only a few local governments that have been capable of planning ahead in an integrated way and have had a more open attitude towards working with other stakeholders (community groups, the academic sector, etc.). It is no surprise therefore to find that those urban cases that have made the greatest improvement in terms of disaster risk management have also made good advances in issues such as land use and environmental planning, transportation systems, housing, transparency and participatory mechanisms. Probably, many of these urban cases will be better prepared to address the challenges of climate change and the needed climate adaptation actions.

But, as mentioned in this paper, many disaster risks require coordinated work and support among a range of local governments and across different government levels and sectors. National and regional initiatives in disaster risk management can only be effective if they engage with local actors, while local initiatives alone cannot address cross-cutting issues that transcend political and administrative boundaries and involve different sectors. Inter-municipal cooperation, as well as national and regional government support to local governments is essential, always keeping in mind that what they need to support is local risk management – an integral part of local development – and not risk management at the local level – some aspect of locally implemented risk reduction.

50. See reference 1, page 50.

51. See reference 6.

REFERENCES

Bicknell, Jane David Dodman and David Satterthwaite (editors), *Adapting Cities to Climate Change. Understanding and Addressing the Development Challenges*, Earthscan, London, 397 pages.

Bollin, Christina and Friedegund Mascher (2005), "Honduras: community-based disaster risk management and inter-municipal cooperation. A review of experience gathered by the special inter-municipal association MAMUCA", GTZ, Eschborn, Germany, 32 pages.

Cabannes, Yves (2004), "Participatory budgeting: a significant contribution to participatory democracy", *Environment and Urbanization* Vol 16, No 1, April, pages 27–46.

Cardona Arboleda, Omar D, Luis F González Miranda and Luis F Linares López (2007), "Organización institucional para la gestión de riesgos", in Caroline Clarke and Carlos Pineda Mannheim (editors), *Riesgo y Desastres. Su Gestión Municipal en Centro América*, Publicaciones Especiales sobre

el Desarrollo No 3, IDB, Washington DC, pages 142–185.

Ceneiva, Carlos (1998), "Curitiba y su red integrada de transporte", in Eduardo Rojas and Roberto Daughters (editors), *La Ciudad en el Siglo XXI. Experiencias Exitosas en Gestión del Desarrollo Urbano en América Latina*, IDB, Washington DC, pages 101–109.

Colina, F, J Delgado, V Jiménez, J Lafaille, A Linayo and J L Mosquera (2004), "Pilot study of community-based disaster management strategy for earthquakes; case of La Vega", ProVention Consortium Community Risk Assessment Toolkit Case Study, FUNDAPRIS–JICA, 56 pages.

Díaz Palacios, Julio and Liliana Miranda (2005), "*Concertación* (reaching agreement) and planning for sustainable development in Ilo, Peru", in Steve Bass, Hannah Reid, David Satterthwaite and Paul Steele (editors), *Reducing Poverty and Sustaining the Environment; the Politics of Local Engagement*, Earthscan Publications, London, pages 255–279.

Dos Santos, Cleon (1998), "Curitiba, la planificación como proceso. Una tentativa de análisis", *Medio Ambiente y Urbanización* Vol 14, No 53, pages 17–22.

Elguezabal, Sergio (2007), "Refugiados ambientales: los exiliados del mundo", Telenoche Investiga.

Fay, Marianne, Francis Ghesquiere and Tova Solo (2003), "Natural disaster and the urban poor", *En Breve* No 23, October, World Bank, Washington DC, pages 1–4.

Gavidia, Jorge (2006), "Priority goals in Central America. The development of sustainable mechanisms for participation in local risk management", *Milenio Ambiental* No 4, pages 56–59, Journal of the Urban Environment Programme (UPE) of the International Development Research Centre, (IDRC) Montevideo.

Hardoy, Jorgelina and Gustavo Pandiella (2009), "Urban poverty and vulnerability to climate change in Latin America", *Environment and Urbanization* Vol 21, No 1, April, pages 203–224.

http://canoa.org.ar/DDHH02.html.

http://www.canoa.org.ar/PrPe-Recons.html.

Instituto Nacional de Estadísticas y Censos (INDEC) (2001), *Censo Nacional de Población y Vivienda*, INDEC, Buenos Aires.

Lavell, Allan (editor) (2005), *La Gestión Local del Riesgo. Conceptos y Prácticas. Programa Regional para la Gestión del Riesgo en América Central*, CEPREDENAC–PNUD, Ecuador, 101 pages.

Lungo, Mario (2007), "Gestión de riesgos nacional y local", in Caroline Clarke and Carlos Pineda Mannheim (editors), *Riesgo y Desastres. Su Gestión Municipal en Centro América*, Publicaciones Especiales sobre el Desarrollo No 3, IDB, Washington DC, pages 19–27.

Mansilla, Elizabeth with Alice Brenes and Julio Icaza (2008), "Centroamérica a 10 años de Mitch. Reflexiones en torno a la reducción del riesgo", CEPREDENAC and the World Bank, Washington DC, 81 pages.

Marulanda, Liliana M (2000), "El Biomanizales: política ambiental local", Documentación de la Experiencia de Gestión Ambiental Urbana de Manizales, Colombia, Instituto de Estudios de Vivienda y Desarrollo Urbano (IHS) Dentro del Marco de Implementación del Proyecto: Apoyo para la Implementación de Planes Nacionales de Acción del Habitat II (SINPA), Mimeo.

Natenzon, Claudia (2006), "Inundaciones catastróficas, vulnerabilidad social y adaptación en un caso argentino actual. Cambio climático, elevación del nivel medio del mar y sus implicancias", Paper submitted to Climate Change Impact and Integrated Assessment, EMF Workshop IX, Snowmass, Colorado, July 28–7 August.

Plataforma de Conocimiento para el Desarrollo Sostenible (Placodes) (no date), "Promoviendo el desarrollo local endógeno y resiliente al cambio climático y los desastres en América Latina y el Caribe", Universidad Nacional de Ingeniería de Nicaragua, Red Iberoamericana de Estudios Ambientales Urbanos, Universidad de Oriente Santiago de Cuba, ISDR, 8 pages.

Velásquez, Luz Stella (1998), "Agenda 21: a form of joint environmental management in Manizales, Colombia", *Environment and Urbanization* Vol 10, No 2, October, pages 9–36.

Velásquez Barrero, Luz Stella (2010a), "La gestión del riesgo en el contexto ambiental urbano local: un reto permanente y compartido. Caso Manizales, Colombia", Background Paper prepared for Global Assessment Report 2011 (GAR 11), UNISDR.

Velásquez Barrero, Luz Stella (2010b), *El Biomanizales: Manual de Bioarquitectura y Biourbanismo*, Facultad de Ingeniería y Arquitectura, Universdad Nacional de Colombia, Sede Manizales, 109 pages.

Von Hesse, Milton, Joanna Kamiche and Catherine de la Torre (2008), "Contribución temática de América Latina al informe bienal y evaluación mundial sobre la reducción de riesgo 2009", GTZ–PNUD. Part of the Latin American contribution to the *2009 Global Assessment Report on Disaster Risk Reduction*, UNISDR.

Zeiderman, Austin and Laura A Ramírez Elizalde (2010), "Apocalipsis anunciado: un viraje en la política de riesgo en Colombia a partir de 1985", *Revista de Ingeniería* No 31, Universidad de Los Andes, Bogotá, January–June, pages 199–131.