



SPOTLIGHT ON ARGUMENTS: ADAPTATION IN SEMI-ARID REGIONS

Community-Based Adaptation (CBA) in Latin America is a large field, with many complimentary issues, such as agroforestry, water management, meteorological forecasting, and even the link between CBA and development itself. Each entry below highlights one of these CBA arguments, then describes some of the key publications related to the issue and how they contribute to the Latin American debate.

Community-Based Adaptation (CBA) or Development?

Climate change effects usually have more extreme consequences for the poorest, so the development level of a community is a helpful indicator of vulnerability to climate change, especially in semi-arid regions. The implication for CBA, as put by Huq and Reid (2007), is that “CBA can be viewed simply as an additional layer of community-based development activities, practices, research and policies.” However, as Lemos *et al.* (2007) argue, development professionals must also “learn about the unique ability of climate change to compromise effective sustainable development”. Development and adaptation are thus closely linked, and neither works well without the other.

Many Latin America CBA projects exemplify this conceptual link between CBA and development. For example, they focus on traditional development indicators such as education, income and health. Simões *et al.* (2010) document a CBA approach that focuses on income generating activities, such as drought-adapted farming and market access. Obermaier (2011) shows how local efforts to reduce poverty and vulnerability in Brazil are strongly related to public policy support and integration of federal-level policies into CBA. This is testament to the reality that reducing poverty implicitly also helps reduce vulnerability to climate change. Finally, programmes beneficial to health, such as clean fuel burners for domestic use and water access, have been implemented in Latin America to address both development and CBA. An example of this is the [Institute for Sustainable Development and Renewable Energy](#) (*Instituto de Desenvolvimento Sustentável e Energias Renováveis* - IDER).

Huq, S., Reid, H. 2007. [A Vital Approach to the Threat Climate Change Poses to the Poor](#). IIED Briefing.

Lemos, M., et al. 2007. [Developing Adaptation and Adapting Development](#). *Ecology and Society* 12(12): 26.

Obermaier, M., 2011. Old and New Dilemmas in the Sertões: Climate Change, Vulnerability and Adaptation in the Semi-arid Northeast. PhD dissertation, Federal University of Rio de Janeiro.

Simões, A.F., et al. 2010. [Enhancing Adaptive Capacity to Climate Change: The Case of Smallholder Farmers in the Brazilian Semi-arid Region](#). *Environmental Science & Policy* 13 (8): 801-808.



Collective Action for CBA

The lack of properly defined property rights that characterises many scarce natural resources in semi-arid regions makes collective action an important element for adaptation. The cross-country [CAPRI Programme](#) (Systemwide Program on Collective Action and Property Rights), run by the [Consultative Group on International Agricultural Research \(CGIAR\)](#), documents how collective action is present in strategies such as cooperatives among smallholders that can help achieve economies of scale, or local safety nets created by families or friends that help the poor deal with climate-related shocks. Spreading information and technology practices for climate change strategies also rely heavily on collective action for successful transfer. For example, as Scott and Silva Ochoa describe for Mexico, small-scale water harvesting irrigation systems have relied on collective action to provide irrigation for crops at the watershed level, to mobilise labour and other resources, and to facilitate decision making about the distribution of benefits. Countries facing threats from climate change could benefit from considering the state of collective action institutions and practices in local communities as they design and implement adaptation strategies.

CAPRI. 2010. [The Role of Collective Action and Property Rights in Climate Change Strategies](#). Policy Brief Number 7. CAPRI, Washington, DC.
Scott, C. A., Silva Ochoa, P. 2002. [Collective Action for Water Harvesting Irrigation in the Lerma-Chapala Basin, Mexico](#). Water Policy 3, 555-572.

Strengthening Adaptation through Meteorological Forecasting

Innovative use of meteorological forecasting can be an important CBA strategy in semi-arid regions where recurrent droughts and water scarcity have serious impacts for small-scale farmers. Reliable advance meteorological information can be of great benefit to farmers in terms of risk management, productivity and planning.

The publications below highlight recent thinking and research in forecasting in Latin America. Davey and Brookshaw examine how forecasting information is currently employed, where challenges lie for dissemination and accuracy, and the potential agricultural benefit of increased forecasting. Martinez *et al.* (2009) give a detailed explanation of how to employ a regional climate information system to reduce agricultural risk, while Martinez (2011) explains why climate forecasting should be regional rather than national, and identifies characteristics that will improve the chances of success. On the other hand, Lemos (2007) critically reviews experiences with regional climate forecasting in a Brazilian science-based development programme, finding that scientific accuracy and knowledge transfer methods still need to be improved significantly before forecasting can effectively help farmer adaptation.

Davey, M., Brookshaw, A. 2011. [Long-range Meteorological Forecasting and Links to Agricultural Applications](#). *Food Policy* 36 (1) 88-93.
Martinez, R., Mascarenhas, A., Alvarado, A., 2009. [Technical Guide For the Implementation of a Regional Climate Information System Applied to Agricultural Risk Management in the Andean Countries](#). CIIFEN, Cuenca.
Martinez, R. 2011. [Building Sustainable Regional Climate Information Systems](#). *Climate Research* 47: 41-45.
Lemos, M.C. 2007. [Drought Governance and Adaptive Capacity in North East Brazil: A Case Study of Ceará](#). Human Development Report Office, Occasional Report 07/50. UNDP.

Governance of Water Resources: Integrated Water Resource Management

In semi-arid regions, the all-important issue of water scarcity and access is increasingly being considered a governance crisis, rather than a water crisis. As such, the current paradigm of water resource governance advocates Integrated Water Resource Management (IWRM), meaning integrating social, economic and sustainability factors into allocating and monitoring water use. In practice, IWRM should bring together the various stakeholders in the system, including government, private sector and civil society, in order to collaboratively manage activities and inputs.



This selection of articles looks at different IWRM aspects. Hooper (2011) examines water management practices throughout time, then focuses on what today's development experts consider to be key: the integrated coordinated approach. Berry and Mollard (2010) offer an extensive critique of social participation in water management, looking at issues like irrigation, supply, rights, policy and law regarding water disputes. Finally, to highlight a country case study and research on the effectiveness of the approach, the Engle and Lemos (2010) publication argues that IWRM did indeed promote adaptive capacity in the 18 river basins they analysed.

Berry, K.A., Mollard, E. 2010. [Social Participation in Water Governance and Management: Critical and Global Perspectives](#). Earthscan, London.

Engle, N.L., Lemos, M.C., 2010. [Unpacking Governance: Building Adaptive Capacity to Climate Change of River Basins in Brazil](#). *Global Environmental Change* 20 (1):4-13.

Hooper, B.P. 2011. [Integrated Water Resources Management and River Basin Governance](#). Universities Council on Water Resources. *Journal of Contemporary Water Research and Education* 126(1) 12-20.

Avoiding Maladaptation

Maladaptation describes government decisions or development projects that, despite their good intentions, actually end up being harmful, either by increasing the negative impacts of climate change or inadequately responding to its challenges (Barnett and O'Neill, 2010).

The case studies from the other two publications presented here help demonstrate how maladaptation has occurred in the Latin American context. In Chile, a complex irrigation system was built to cultivate the semi-arid *Limaí* basin. However, as Young *et al.* show, this new infrastructure has boosted water demand and the number of livelihoods dependent on the basin. The problem is that now adverse consequences are expected from climate change scenarios predicting strong stream flow decline and change in seasonality, harming particularly those on higher lands. Podestá *et al.* offer an experience from the current agricultural production systems of the Argentine Pampas. These practices evolved in response to favourable climate conditions, but a potential reversal to drier conditions because of climate change will actually cause the practices to become harmful.

This is new research; taking stock of knowledge and analysis is only beginning. Overall, these cases suggest that to avoid maladaptation in other regions, policymakers could consider links between complex agricultural ecosystems, uncertain trajectories of future climate and land use changes when planning CBA projects.

Barnett, J., O'Neill, S. 2010. [Maladaptation](#). *Global Environmental Change* 20: 211-213.

Young, G., et al. 2010. [Vulnerability and Adaptation in a Dryland Community of the Elqui Valley, Chile](#). *Climate Change* 98: 247-276.

Podestá, G., et al. 2009. [Decadal Climate Variability in the Argentine Pampas: Regional Impacts of Plausible Climate Scenarios on Agricultural Systems](#). *Climate Research* 40:199-210.

Organic Agriculture as a CBA Strategy?

Organic agriculture is often viewed as a potential CBA strategy that can reduce vulnerability and increase the adaptive capacity of rural farmers; it is thought to build resilience by using local resources and practices, instead of purchasing and importing expensive inputs. However, Latin American experience seems to illustrate that this is not always the case.

Research in Mexico (Tovar *et al.*, 2005; Gonzales and Nigh, 2005) found evidence that engaging in organic agriculture actually led to the further marginalisation of small farmers. The research demonstrates how the bureaucratic requirements of international certification seemed to reinforce inequalities in the agriculture sector, as they tended to provide privileged organic status to only large, agribusiness-style producers, while smaller, indigenous, process-based cultivations were excluded. Eakin and Wehbe (2009) emphasise the difficulties for smallholder farmers to comply with certifications in the



case of coffee farmers in the Vera Cruz region of Mexico. Farmers adopt less ecologically beneficial practices, migrate or seek off-farm opportunities even where opportunities for sustainable agriculture exist. This seems to happen particularly where environmentally sound farming requires considerable capacity building, labour, time or investment. African and South Asian countries considering certified organic productions as a CBA strategy could benefit by being aware of the potential downsides as well.

Eakin, H.C., Wehbe, M.B., 2009. [Linking Local Vulnerability to System Sustainability in a Resilience Framework: Two Cases from Latin America](#). *Climatic Change* 93, pp. 355-377.

Tovar, L.G., Martin, L., Cruz, M.A.G., Mutersbaugh, T. 2005. [Certified Organic Agriculture in Mexico: Market Connections and Certification Practices in Large and Small Producers](#). *Journal of Rural Studies* 21 (4) 461-474.

Gonzalez, A. A., Nigh, R. 2005. [Smallholder Participation and Certification of Organic Farm Products in Mexico](#). *Journal of Rural Studies* 21 (4) 449-460.

Agroforestry Systems for Latin American Family Farmers

Agroforestry integrates agricultural and forestry techniques by combining different vegetation with crops and livestock. Latin American NGOs and governments are supporting this practice to promote more diverse, productive, profitable, healthy and sustainable land uses. Among the main benefits of agroforestry are recovery of natural fertility of the land, increased biodiversity, dissemination of knowledge on ecosystem degradation and cultural acceptance of practices. Farmers without access to finance can also benefit from non-irrigated agroforestry systems that yield crops, fruit and wood for different purposes.

In Northeast Brazil, initiatives such as that of the [Caatinga Association](#) encourage use of low-cost technologies for recovery and sustainable use of degraded areas to improve local income and quality of life. Restoration of specific areas in the Tehuacán Valley in semi-arid central Mexico using agroforestry is another encouraging example in favour of the practice, as Moreno-Calles describes. Calle et al discuss how the promotion of silvopastoral, a type of agroforestry practice, in Quindío, Colombia was so well received by farmers that it will be replicated in other areas of the country. Asian and African countries can obtain valuable results from agroforestry techniques, specific to their semi-arid regions, to combine poverty alleviation with biodiversity conservation in adaptation plans and actions.

Moreno-Calles, A. et al. 2010. [Agroforestry Systems and Biodiversity Conservation in Arid Zones: the Case of the Tehuacan Valley, Central Mexico](#).

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