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Economics of Land Degradation in Argentina

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SUMMARY

1. In one decade only, the share of people living below the international poverty line (1.25 USD per capita per day) in Argentina has fallen from 12.6% in 2002 to 0.92% in 2010. However, the dramatic change has come at an environmental cost. In almost the same period, the cost of land degradation – the long-term loss of ecosystem services due to land use and land cover change, wetland degradation, and/or use of degrading management practices on grazing and cropland that did not experience land use and land cover change – was 74 billion USD per year or about 29% of the country's GDP in 2007.
2. The major drivers of land use and land cover change in Argentina include the expansion of grazing land and cropland (replacing 10% of the forests), especially for the production of soybeans.
3. The major drivers of loss of marshlands have been human settlements in wetlands and soil mining for brick-making. Gully formation due to soil erosion in the grasslands in Patagonia and elsewhere has also drained water from wetlands.
4. The measures Argentina has taken against land degradation include investments in restoring degraded lands; regulating agricultural expansion into forests; afforestation; protecting wetlands and limiting the use of agrochemicals.
5. The returns to taking action against land degradation are very high and justify taking action against land degradation. Land users get about 4 USD for every USD invested in the restoration of degraded lands. Low investment in the restoration of degraded lands suggests that there are other constraints that need to be addressed to incentivize land users to take action against land degradation.
6. Argentina's dramatic economic and agricultural development over the past decade and its consequent land degradation offer useful lessons for both developed and developing countries. The country's successful strategies and challenges make the country much better prepared to face the emerging challenges and take advantage of its past experiences.

Introduction

The past decade has seen a decline in the share of people living below the international poverty line (1.25 USD per day) in Argentina, falling from 12.6% in 2002 to only 0.9% in 2010. In addition,

conservation agriculture became popular and its adoption rate among farmers rose to 64% - the highest in the world. However, the rapid economic and agricultural development has come at a high cost of land degradation.



Policies and strategies for action against land degradation

Argentina has designed a number of policies and strategies to address deforestation, loss of wetlands and other types of land degradation. The Minimum Standard of Natural Forest Protection Law (2009), for example, stipulates that the federal government pays provinces which protect forests. Argentina has also ratified the United Nations Convention to Combat Desertification, the Ramsar Convention on wetlands and other international and regional environmental agreements. Additionally, the management of natural resources is highly decentralized, as are research and extension services. However, in order to implement these policies and strategies in an effective way, they need to be informed by empirical evidence. This study was done in response to such a need.

Land degradation due to land use and land cover change

The largest land use and land cover changes Argentina has experienced over the past decade are caused by expanding soybean production - making Argentina the third largest soybean producer in the world.¹ Soybean production has been driven by an increasing domestic and international demand for animal feeds, edible oil and biofuels. However, Argentina has lost about 70 billion USD of ecosystem services due to land degradation (27% of the GDP) over the same period. Most of the land use and land cover changes occurred in the country's humid and sub-humid zone (Figure 1). The cost of doing nothing

against land degradation is about 487 billion USD over a time horizon of 30 year – an amount too costly to ignore. The returns to taking action against land degradation have a factor of about four, i.e. every dollar spent yields 4 USD.

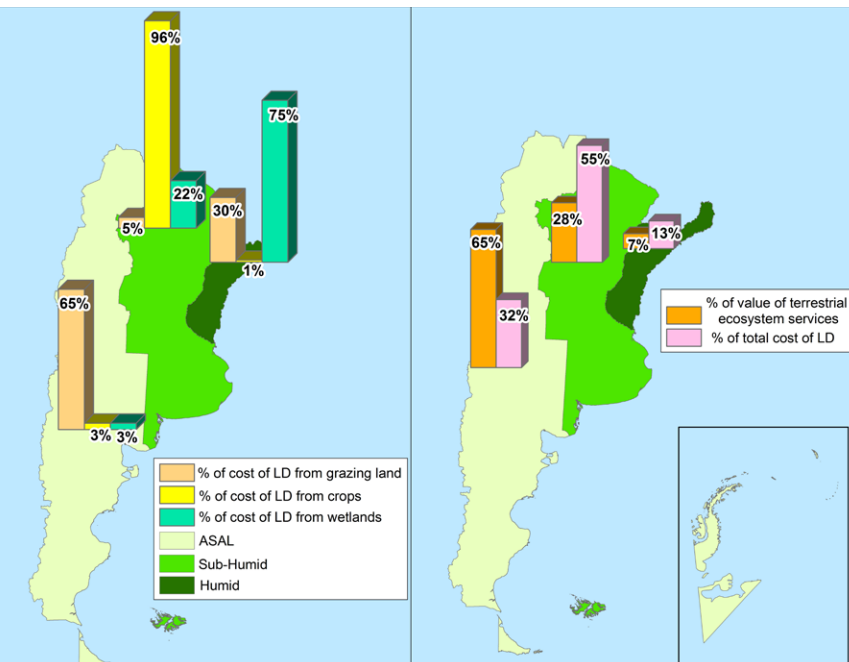
Rewarding land users who invest in land restoration needs to be planned at country, regional and global levels, because only 46% of the benefits are accrued by land users and the rest by off-beneficiaries.

Land degradation on wetlands

Wetland degradation is largely due to human settlement and drainage in marshlands, as well as to soil mining for brick-making. The length of wetland drainage channels increased from 97 km in 1975 to 504 km in 2001. The increasing canalization and its poor construction also led to the loss of wetlands, flooding and sedimentation. The annual cost of wetland degradation is about 3.8 billion USD. The humid zone accounts for the largest cost of wetland degradation (Figure 1). Given the high cost of wetland degradation and that Argentina ratified the Ramsar Convention on wetlands it is obliged to protect the wetlands using stricter zoning rules.

Land degradation on cropland: Argentina has the world's highest adoption (64%) of conservation agriculture – a practice that increases farm energy efficiency and generates other environmental benefits. Although the use of fertilizer and other agrochemicals has increased tenfold over the last 20 years, soil nutrient mining remains one of the major causes of land degradation. The cost of land degradation on croplands

Figure 1: Ecosystem service endowment and severity of land degradation across agro-ecological zones and types of land use in Argentina.



Notes: ASAL = Arid and semi-arid lands, LD = Land degradation

for soybean, maize, rice and wheat is 81 million USD. This number does not include environmental degradation due to the overuse of agrochemicals², which not only leads to air pollution and contamination of water resources, but also causes loss of pollinators and other fauna and, in the end, affects human health.³

Land degradation on static grasslands: Argentina loses about 0.6 billion USD per year due to degradation of grazing lands. This is equivalent to about 11% (5.490 million USD) of Argentina's GDP spent on livestock in 2005.⁴ The losses consist of reduced milk and meat production and do not include the loss of other ecosystem services.

Conclusions and policy implications

The high returns to taking action against land degradation justify the prevention of land degradation and restoration of land. This requires stricter regulation of agricultural expansion

into forests and other higher value biomes, but also afforestation of areas. Further, regulations for wetlands and wetland restoration are required. Land restoration has various benefits, such as the increase in farmers' income, carbon sequestration, reduction of soil erosion, and other ecosystem service benefits. Several case studies we conducted in the country show the potential that sustainable land management strategies can achieve. Argentina's dramatic economic and agricultural development and the consequent land degradation offer useful lessons for both developed and developing countries. The country's successful strategies and challenges make the country much better prepared to face the emerging challenges and take advantage of its past experience. This will help the country to implement effective policies and strategies for restoration of degraded lands and this will offer useful lessons to the rest of the world.

Endnotes

- 1 FAOSTAT (2015). Online agricultural database. <http://faostat3.fao.org/faostat-gateway/go/to/home/E>. Accessed on January 23, 2015.
- 2 Jergentz S., H. Mugni, C. Bonetto, and R. Schulz (2005). Assessment of insecticide contamination in runoff and stream water of small agricultural streams in the main soybean area of Argentina. *Chemosphere* 61(6) 817–826.
- 3 Tomei, J., & P. Upham (2009). Argentinean soy-based biodiesel: An introduction to production and impacts. *Energy Policy*, 37(10), 3890-3898.
- 4 FAO (2005). Livestock sector Brief. Argentina.

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