



The development of soil and water conservation policies and practices in five selected countries from 1960 to 2010

J. de Graaff^{a,*}, A. Aklilu^b, M. Ouessar^c, S. Asins-Velis^d, A. Kessler^a

^a Land Degradation and Development Group, Wageningen University, P.O. Box 47, 6700 AA Wageningen, The Netherlands

^b Addis Ababa University, Department of Geography and Environmental Studies, P.O. Box 150223, Addis Ababa, Ethiopia

^c Institut des Régions Arides (IRA), 4119 Médenine, Tunisia

^d Department of Environmental Planning, Centro de Investigaciones sobre Desertificación-CIDE (CSIC, Universitat de València, Generalitat Valenciana), Carretera de Moncada a Náquera, Km 4.5, 46113 Moncada, Valencia, Spain

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ABSTRACT

Since the 1930s there has been worldwide concern about the effects and impacts of land degradation. After the problems experienced in the Dust Bowl in the USA, much attention was paid to soil and water conservation in both developed and developing countries. Initially Governments stimulated the establishment of physical control measures, such as terraces, check dams and reforestation. This was achieved through top-down regulations, and Forestry Departments were often in charge of the implementation. Subsequently the measures were implemented through more specialized agencies, and later with incentives, such as food aid in developing countries and subsidies in developed countries. In some cases farmers were mobilized to work together on the establishment of the conservation measures. Because of the low success rate of this top-down approach with line interventions, it was realized that a more participatory approach had to be followed. The emphasis then shifted to area interventions such as cover crops, mulching and composting. In some countries voluntary ways of collaboration between farmers were developed. More recently Conservation Agriculture has become popular, focusing on less soil disturbance, continuous land cover and crop rotations. This paper analyses whether and to what extent countries have followed such general trends in their soil and water conservation policies (since the 1990s often referred to as sustainable land management) or whether countries have also followed their own specific strategies. A historical (1960–2010) and comparative analysis of the development of these sustainable land management policies and practices is undertaken in five selected countries: Indonesia, Ethiopia, Tunisia, Spain and Bolivia.

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Introduction

Although Thomas Jefferson in 1789 already remarked that “The earth belongs in usufruct to the living”, it is in particular in the last 200 years that soils have in many areas been damaged beyond repair (FAO, 1988). The extreme wind erosion events in the USA in the 1930s in the so-called Dustbowl area formed in fact a sort of wake up call. Since that time many attempts were made to reduce land degradation, by planting trees, constructing terraces, etc. While it was initially colonial powers and dictatorial regimes in the vulnerable (sub-) tropical areas, that “ordered” such measures to be taken, after independence and installation of more democratic regimes similar measures were promoted, but preferably on a

voluntary basis. In the period 1960–1990 one generally referred to “soil and water conservation” projects and policies. Since the introduction of the term sustainable, which became popular after its use by the Brundlandt Commission (WCED, 1987) in their publication “Our common future”, a gradual shift towards the use of the term “Sustainable land management (SLM)” can be noticed. Although some authors (e.g. Pimentel et al., 1995) have suggested that the impact of land degradation is not as catastrophic as others (e.g. Stoorvogel and Smaling, 1990) have suggested, land degradation is a major concern in many countries, and this requires adequate sustainable land management policies, strategies and practices.

Over the past five decades, national governments have devised various policies and strategies to protect their land and water resources and to control and avoid land degradation and rehabilitate degraded lands. In this paper we compare soil and water conservation (SWC) related policies and SWC practices implemented in five different countries to see whether these policies have followed similar trends and had similar outcomes, and what factors have influenced those policies and resulting SWC practices.

* Corresponding author. Tel.: +31 0318 418398; fax: +31 317426101.

E-mail addresses: jan.degraaff@wur.nl (J. de Graaff), amsalu.aklilu@gmail.com (A. Aklilu), ouessar.mohamed@ira.rnrt.tn (M. Ouessar), sabina.asins@uv.es (S. Asins-Velis), aad.kessler@wur.nl (A. Kessler).

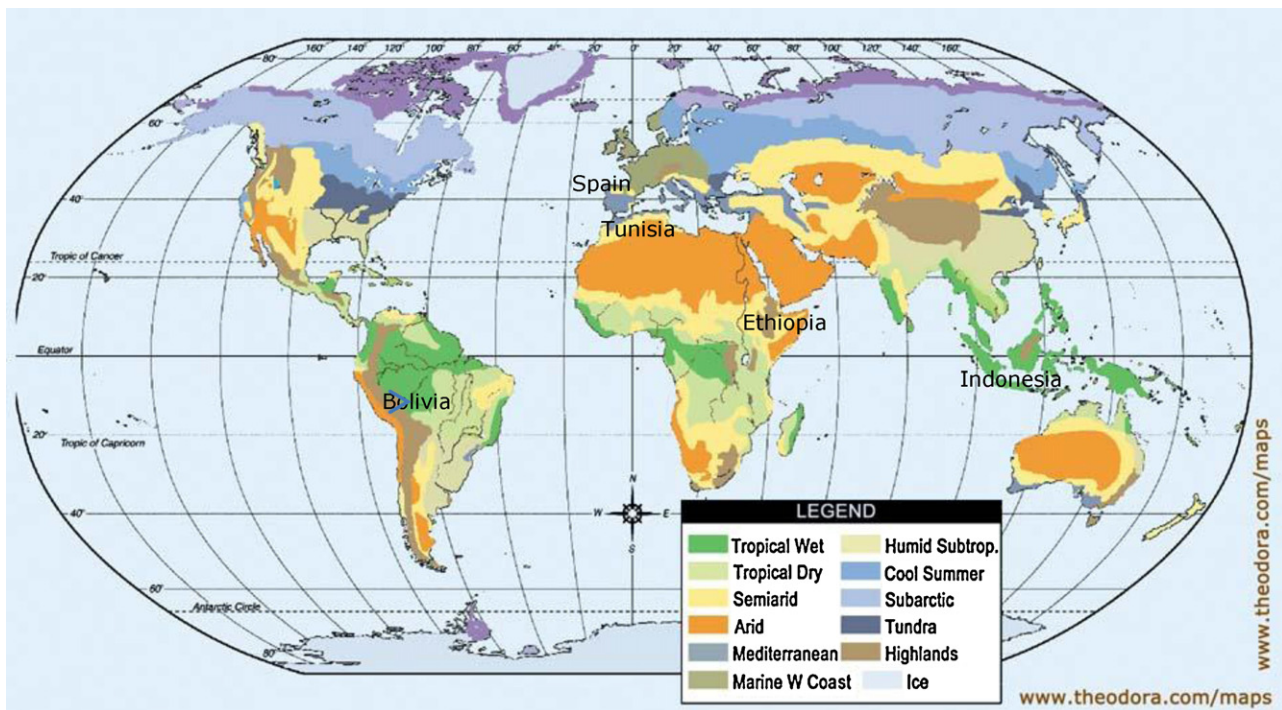


Fig. 1. Climatic zones in the world, and in the five case study countries.

Materials and methods

For this comparative study, five countries have been selected in different continents and with different agro-ecological zones, from east to west: Indonesia, Ethiopia, Tunisia, Spain and Bolivia. Of the three tropical countries, Indonesia has largely a tropical wet climate, Bolivia a tropical savannah climate and a highland climate (with dry winters) and Ethiopia both a highland climate and a semi-arid to arid climate in the lowlands. Tunisia has a Mediterranean climate (with dry summers) in the north, dry steppe climate in central part and desert climate in the south. Spain has both a Mediterranean climate and a maritime temperate climate (Fig. 1). Because of their sloping and mountainous land and the climate conditions, all five countries are notorious for having problems with land degradation.

We have first collected some basic comparable data on the state of land use and land degradation in these countries to show their apparent vulnerability to erosion and desertification, and their need for soil and water conservation. Thereafter we have analysed laws and regulations, policies, institutions and programmes for soil and water conservation (SWC) that have been developed in each country in the past five decades (1960–2010), which are dealt with in separate sub-sections. On the basis of that a comparative analysis is made. We realize that policies and SWC measures can vary considerably by area (e.g. agro-ecological zone) within each of these

countries and that a multitude of projects may follow different approaches. We therefore focus here on the main stream of regulations, policies and actual SWC measures or practices that were applied in the respective countries during the course of this fifty years period.

Land use and land degradation in the five selected countries

The five countries considered in this analysis differ not only considerably in size, in agro-ecological zonation and GNP per capita, but also in related aspects as land use and (rural) population density (Table 1). In all countries, except Spain, the population is growing relatively fast. And these countries have in common that they all five have experienced major problems with land degradation in the past decennia, and in particular with water erosion in their mountainous zones, as can be seen on the GLASOD map (Oldeman et al., 1991) and in the land degradation figures in FAOSTAT and Terrastat (Table 2). Indonesia and Ethiopia are large countries with an average high population density (Table 1), in particular in rural areas. In Indonesia this has led to severe deforestation and soil erosion on the very densely populated island of Java and on parts of other islands, where oil palm plantations are rapidly expanding at the expense of the large areas of natural forest. In some areas in Ethiopia there is no forest and thus no fuelwood left, and people have become used to “dung cakes” as source of household energy,

Table 1
Land use (in 2009) and population (in 1961 and 2009) in the five countries.

Country	Total land area (million ha)	Cropland in 2009 (% of total)	Irrigated in 2009 (% of cropland)	Forest land (% of total area)		Population (million)		Population density (p km ⁻²)	
				1990	2009	1961	2009	1961	2009
Indonesia	181	24	16	65	53	94	237	52	131
Ethiopia	100	15	2	15	12	25	81	22	81
Tunisia	16	32	9	4	6	4	10	28	67
Spain	50	35	22	28	36	31	46	61	91
Bolivia	108	4	5	58	53	3	10	3	9

Source: FAOSTAT (2011).

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