

HIDEHARU TSUKADA, OSAMU IMURA & KUN SHI

CHAPTER 10

CONSERVATION AND MANAGEMENT OF GRASSLAND BIODIVERSITY IN EAST ASIA

1. INTRODUCTION

East Asia has various types of grasslands, such as inland arid and semi-arid natural grasslands in China and Mongolia, and artificially managed semi-natural grasslands in wet monsoon areas like Japan. Diversified utilization and livestock farming are carried out on these grasslands. A variety of grasslands have been maintaining diversified organisms characteristic to grassland ecosystems. However, in those grasslands, irrespective of the types and areas, deterioration of the diversity of grassland organisms is going on. The causes of the decline in biodiversity differ, depending on the particular grassland in question. In the Chinese and Mongolian grasslands, overgrazing associated with retrogression and desertification due to increases in the human population and settlements has resulted in the decline and even extinction of some species of wildlife. In the wet monsoon areas, decreases in grassland area and insufficient management of grasslands due to the decline of livestock farming and the rural lifestyle have led to a deterioration of grassland biodiversity. Accordingly, there is an acute need for conservation and management of grassland biodiversity in these areas.

Different grasslands require different strategies for the conservation and management of their biodiversity. This paper summarizes the present conservation issues in the grasslands and presents future prospects for the conservation and management of the grasslands in East Asia.

2. GRASSLANDS IN EAST ASIA

The grasslands of East Asia are at the eastern fringes of the vast plain that stretches 8,000 km from Eastern Europe west to North-eastern China. Worldwide, there are about 40-50 million km² grasslands comprising about 40% of the total land area. The extent of the grassland area in Asia is estimated to be about 9 million km², and comprises about 17% of the world's grasslands (Table 1). The major two grassland-containing countries, China and Mongolia, account for the majority of this area.

China has about 4 million km² of grasslands, and Mongolia has about 1.3 million km² of grassland area.

Table 1. World Regions, Grassland Area (million km²)

Asia	Europe	Middle East and N. Africa	Sub-Saharan Africa	North America	C. America and the Caribbean	South America	Oceania
8.89	6.96	2.87	14.46	6.58	1.05	4.87	6.86
16.6(%)	12.5(%)	5.4(%)	27.0(%)	12.3(%)	2.0(%)	9.1(%)	12.8(%)

Revision from White *et al.* (2000)

Table 2. Conversion (%) of Grassland Ecoregions

Ecoregions ^a	Current Grassland ^b	Estimated Conversions:		
		Cropland	Urban	Other
Asian/Daurian Steppe	71.7	19.9	1.5	6.9
North American Tallgrass Prairie	9.4	71.2	18.7	0.7
South American Cerrado Woodland and Savanna	21.0	71.0	5.0	3.0
Central and Eastern Mopane and Miombo Woodlands	73.3	19.1	0.4	7.2
Southwest Australian Shrublands and Woodlands	56.7	37.2	1.8	4.4

Revision from White *et al.* (2000)

^a Ecoregions are defined as "relatively large unit of land containing a distinct assemblage of natural communities and species, with boundaries that approximate the original extent of natural communities prior to major land-use change" (Olsen *et al.* 2001)

^b Percentage of current grassland remaining.

In general, grasslands are distributed in arid zones. The world has been divided into a set of six aridity zones on the basis of the ratio of the mean annual precipitation to the mean annual potential evapotranspiration (White *et al.* 2002). The approximate distribution of world grasslands corresponding to the drylands encompasses three zones, i.e., arid, semi-arid, and dry sub-humid zones (White *et al.* 2002).

Grasslands are maintained not only by particular climatic factors, but also by certain human-related influences, such as burning, harvesting, and livestock grazing. Accordingly, the grasslands are also distributed among humid zones where the forest is the climax community. However, one noticeable feature of the grasslands in East Asia is that there is a huge extension of open landscape. When the percentages of