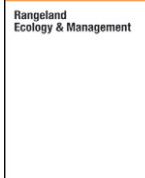




Contents lists available at ScienceDirect

## Rangeland Ecology &amp; Management

journal homepage: <http://www.elsevier.com/locate/rama>

# Human Population Growth, African Pastoralism, and Rangelands: A Perspective<sup>☆</sup>

Jerry L. Holechek<sup>a,\*</sup>, Andres F. Cibils<sup>b</sup>, Konimba Bengaly<sup>c</sup>, Jenesio I. Kinyamario<sup>d</sup>

<sup>a</sup> Professor, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003, USA

<sup>b</sup> Professor, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003, USA

<sup>c</sup> Professor and Director, Centre d'Expertise de Recherche Actions et de Développement, Université de Ségou, Ségou, Mali

<sup>d</sup> Professor, School of Biological Sciences, University of Nairobi, Nairobi, Kenya

## ARTICLE INFO

## Article history:

Received 31 August 2016

Accepted 14 September 2016

Available online xxxx

## Key Words:

Africa  
cattle  
food crisis  
grazing  
livestock  
nomads  
range management

## ABSTRACT

Pastoral livestock production systems in Africa that have existed for centuries are now threatened by changing demographics, improved communications, increased availability of modern weapons, open rangeland shrinkage, global warming, and large-scale migration of people from rural areas to rapidly expanding cities. Human population increase coupled with globalization has led to major conflicts over natural resources in several African countries. If current growth rates persist, the population of Africa will double in 33 yr. Land resources available for farming are now fully used in several African countries. There is growing concern about the capability of these countries to feed their future projected populations. Africa's three most populous countries (Nigeria, Ethiopia, and Egypt) are all net food importers. Demand for meat and milk in Africa is projected to double by 2050. Roughly one-half of Africa can be classified as rangeland. Some form of pastoral grazing is the most efficient way to use most of these lands and sustain traditional cultures. Because most African rangelands are now stocked at or above grazing capacity, there is little potential to increase livestock production by increasing animal numbers. However, because offtake levels across Africa are much lower than in other parts of the world, considerable potential exists to increase meat and milk production. Local development projects oriented toward keeping people on the land and self-sufficiency have considerable potential to improve living and environmental conditions for small farmers and pastoralists. Improved and equal education opportunities for both genders, family planning assistance, renewable energy development, empowerment of women, improvement of soil and water resources, and wildlife conservation should be areas of development focus. Maintaining migration corridors, providing legal rights to historic grazing lands, and providing support services along migration corridors such as watering points, markets, schools, and health care are important strategies to sustain pastoralism.

Published by Elsevier Inc. on behalf of The Society for Range Management.

## Introduction

Over the past 30 yr we have worked on rangeland development projects, participated in rangeland tours, provided humanitarian aid, trained students, and contributed expertise in several African and Middle Eastern countries (Turkey, Ethiopia, Sudan, Kenya, Egypt, Morocco, Mali, Jordan, Uzbekistan, Israel). It is our observation that the news media in general focuses heavily on the social instability, human suffering, loss of life, and human rights abuses that are now occurring from conflicts in countries such as Iraq, Libya, Sudan, South Sudan, and Syria, but there is little analysis of the underlying causes.

<sup>☆</sup> This paper was funded by the New Mexico Agricultural Experiment Station. Partial support was provided by the US Department of Agriculture, National Institute of Food and Agriculture, Hatch Projects 1009205 (Holechek) and 100985 (Cibils).

\* Correspondence: Jerry L. Holechek, Dept of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003, USA. Tel.: +1-575-646-1649

E-mail address: [holechek@nmsu.edu](mailto:holechek@nmsu.edu) (J.L. Holechek).

It is our experience that many of these conflicts are based around disputes regarding control and use of rangelands brought on by changing demographics and communications. Pastoralism is typically an important component of these disputes, although seldom mentioned. Open rangeland shrinkage, climate change, improved communications, and increased availability of modern weapons are important factors now threatening pastoral systems that have existed for centuries (ARGRA, 2014; Brown, 2008, 2011; Pica-Ciamarra et al., 2007; Reid et al., 2014). So far, the general approach to solving these problems at the United Nations level has been to negotiate agreements among conflicting ethnic groups, encourage change toward more democratic governments, and partition countries as in the case of Sudan and South Sudan. However, we doubt these approaches can be successful unless they are coupled with programs that ameliorate underlying demographic and natural resource problems. Our objectives in this viewpoint article are to identify and examine factors causing rangeland conflicts, discuss possible interventions to improve both human living conditions and rangelands, and identify other significant papers that deal with the future of pastoralism.

<http://dx.doi.org/10.1016/j.rama.2016.09.004>

1550-7424/Published by Elsevier Inc. on behalf of The Society for Range Management.

Please cite this article as: Holechek, J.L., et al., Human Population Growth, African Pastoralism, and Rangelands: A Perspective, Rangeland Ecology & Management (2016), <http://dx.doi.org/10.1016/j.rama.2016.09.004>

Our primary focus is on the sub-Saharan countries of Northern Africa, although examples from other areas are included. The issue of whether pastoralism can be sustained in Africa is a key question we also address.

### Human Population Growth

World human population is now estimated at nearly 7.4 billion compared with 2 billion in 1922 (United Nations, 2015; US Census Bureau, 2002). Since 1950 the world human population has increased about 180% compared with a near quintupling in Africa, slightly more than doubling in the United States, tripling in China, and increasing by 10% in Europe. The world annual growth rate has dropped from the peak of 2.3% in 1963 to 1.4% in 2000 and 1.1% presently (United Nations, 2015). Actual number of people added to the world population peaked in 1990 at 87 million and has since dropped to about 75 million per year. The world human population is projected to reach 9–10 billion in 2050 and could peak at around 12 billion before stabilizing sometime in the 2070–2100 period (Brown, 2008, 2011; United Nations, 2015). Whether 12 billion people can be supported on our finite planet is not certain and will depend on adequacy of energy, water, and food along with environmental quality. By some estimates the world's human populations may now be using 30–50% more basic resources than the world can sustainably supply (Wackernagel, 2012; Wackernagel and Rees, 1996; Wackernagel et al., 2002). In addition, the threat of global warming is of growing concern.

The decline in the growth rate of human population first came from developed countries in the mid-1960s when birth control pills became available and later spread to Asian and South American countries (United Nations, 2002, 2015). The population growth rate is now near 0.8% in the United States, 0.2% in the European Union, 0.5% in China, and –0.2% in Japan (United Nations, 2015) (Table 1). Most Asian and South American countries have declining population growth rates currently between 1.0% and 1.4%. Population growth rates remain high across Africa and Middle Eastern countries with the average near 2.2% per year. This equates to a doubling time of 33 yr when the rule of 72 is applied (percent growth divided by 72 gives doubling time). If unchecked at the present growth rate, the population of Africa and the Middle East will double by 2050, quadruple by 2080, and be about seven times higher in 2100. There are indicators relating to food production, freshwater availability, climate change, soil degradation, loss of farmland, species endangerment, depletion of energy reserves, and pollution that human populations in several African and Middle Eastern countries are now at or in excess of carrying capacity (Brown, 2011, 2012; Cribb, 2010). Food shortages, economic decline, civil unrest, and flight of large numbers of refugees are becoming more frequent occurrences in these countries typically referred to as failed or fragile states (Brown, 2008, 2011; Fund for Peace, 2016).

### Demographic Trap

The term “demographic trap” has been used to describe the situation of chronic high population growth (1.5% or more per year) in countries with high birth rates but lowered death rates that deplete their resources and degrade their environment to the point where social instability and food shortages lead to a “failed or fragile state” (Cohen, 1995; Brown, 2008, 2011, 2012; Fund for Peace, 2016). Syria, Somalia, Pakistan, Libya, Sudan, South Sudan, and Yemen are examples of countries classified as failed or fragile states (Fund for Peace, 2016).

Since World War II, a drastic lowering of human death rates has occurred throughout the world due to vaccination for deadly diseases, lowered infant mortality, improved diet, and improved health care (Cohen, 1995; United Nations, 2002, 2015; The Economist, 2015). Of these factors, vaccination and near elimination of deadly diseases are considered to be the most important factors in human population growth. Initially after the transition from deadly disease eradication, populations rapidly increased due to constant and sometimes increased

**Table 1**

Numbers, growth, and density of the human population in various parts of the world in 2015

Location	Population (millions)	Percent net growth per yr	Doubling time (yr)	Density (people/km <sup>2</sup> )
World	7 349	1.07	67	14
European Union	507	0.40	180	116
United States	323	0.77	94	35
China	1 375	0.44	164	145
India	1 284	1.25	58	436
Brazil	206	0.80	90	25
Argentina	44	0.95	76	16
Mexico	122	1.21	60	65
Australia	24	1.09	66	3
Canada	36	0.76	95	4
Russia	147	(–0.03)	–	9
Germany	82	(–0.18)	–	233
Select Mid-Eastern countries				
Saudi Arabia	32	1.49	48	14
Turkey	79	1.12	64	99
Syria	24	1.97 (–9.73)	37	121
Iraq	37	2.23	32	80
Iran	79	1.22	59	48
Afghanistan	27	2.29	31	48
Pakistan	193	1.49	42	240
Africa	1 145	2.20	33	36
Select African countries				
Morocco	33	1.02	71	76
Egypt	90	1.84	39	90
Mali	18	3.00	24	14
Niger	21	3.28	22	15
Sudan	40	1.78	40	22
Ethiopia	92	2.89	25	97
Nigeria	187	2.47	29	195
Kenya	47	2.11	34	79
Tanzania	55	2.80	26	59
Botswana	2	1.26	57	4
South Africa	55	(–0.48)	–	45

Data from Central Intelligence Agency, 2015. CIA World Factbook. Washington, DC, USA: CIA. 3360 p. and United Nations, 2015. New York, NY, USA.

birth rates (Cohen, 1995; Jacobsen, 1983; The Economist, 2015). However, in nearly all developed countries a fertility transition has eventually occurred in which birth and death rates became more balanced. This transition has been most pronounced in Europe, Japan, and Russia, where populations are near stability. Some important factors causing declining birth rates are industrialization, increased education, equal rights and education for women, and improved methods of birth control (Brown, 2008, 2011; Butler and Kanyoro, 2015; Holechek et al., 2003; Jacobsen, 1983; Rieff, 2015). Political, social, and economic factors are all important in the transition toward a stable population. We refer the reader to Cohen (1995), Jacobsen (1983), Holechek et al. (2003), Cribb (2010), Brown (2008, 2011, 2012), Holechek (2013), and the Economist (2015) for detailed discussions on why lowering population growth rates and eventual population stabilization are critical in improving human living conditions and environmental sustainability.

Some of the most rapid human population growth rates are occurring in Middle Eastern Islamic countries that also have high oil reserves (Brown, 2008, 2011; United Nations, 2015). These countries are increasingly using their oil to support their growing populations, which is accentuating the decline of their oil reserves (Rubin, 2012). Syria is an example of a country that depleted its oil reserves in the 2005–2010 period, causing its government to suffer a drastic reduction in oil export income (Mushalik, 2015). The Syrian human population has increased almost fivefold since 1950 (United Nations, 2002). Before the civil war, which began in 2011, annual population growth in Syria was nearly 3% per year (United Nations, 2015). The combination of rapid population growth, oil depletion, drought, rising food prices, ethnic frictions, and authoritarian government explains the social

Download English Version:

<https://daneshyari.com/en/article/5745273>

Download Persian Version:

<https://daneshyari.com/article/5745273>

[Daneshyari.com](https://daneshyari.com)