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The policy implications of Sahelian change

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Abstract

The paper is a response to the surprise with which some policy makers responded to news that greening had been detected in the Sahel. It first views Sahelian environmental change and related policies through the lenses of scientific models of pastoral and agricultural systems. For pastoralism, the lenses are models of equilibrial ecology, those of state-and-transition and those of more recent development. For agricultural systems, they are models of commercialization, modernization and degradation, and those that stress the endogenous development of peasant agriculture. The conclusions are that little, if any, of the recent greening, if and where it has occurred, could be attributed to policy; and that as yet neither models nor interpretations of the satellite imagery yet give firm guidelines for policy. Nonetheless, the review suggests a lesson for the development of policy: it needs to be more dynamic, and in three contexts: (1) the contingencies of pastoral and agricultural economies; (2) continual and sometimes drastic changes in the environment; and (3) changes in political, social, economic and scientific ideas. But policy must retain consistency, and be attuned to the global as well as to local context.
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1. Introduction

The starting points of this paper are first the work on recent Sahelian change reported elsewhere in this volume, particularly by Olsson, and second the surprise

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with which news of this work was greeted by some policy-makers (particularly in response to a report of the work in the *New Scientist* by Pearce (2002), which appeared just before the World Environment Conference in Johannesburg).

Very briefly, Olsson uses the Normalised Difference Vegetation Index (NDVI) as a measure of vegetation cover. Since the beginning of the collection of NOAA AVHRR satellite data in 1982, the NDVI shows the "greening" of large areas, particularly in the northern Sahel. The greening is patchy, erratic, and as Olsson notes, difficult to explain. Olsson's paper, and others in this collection, open up debates about the reality of "greening" and the technical difficulties in interpreting the data.

My objective is different. It is to respond to the surprise with a general argument about how policy might react to "greening" (and its obverse, "yellowing") whenever it occurs. This moves beyond recent change to earlier and, more important, to inevitable future episodes of greening, as of yellowing. I argue that changes detected with satellite imagery are, in themselves, inadequate measures of productivity, and that the models through which they can be assessed do not yet make adequately statements about productivity. This presents problems for policy-makers, but they could nonetheless learn some lessons from the experience.

2. Models, explanations, policies

2.1. Rangeland

Rangeland covers by far the greater part of the Sahel, especially of the northern Sahel, which Olsson's ork shows to have experienced the most greening. Here it covers well over 95%.

For rangeland, unlike agriculture, policy has been based on broad scientific models. The first of these, in the global context, used contemporary ecological concepts in which plant and animal communities experienced succession towards an equilibrial state. The model, now known as the "range" model, emerged in the early 20th century (see the review by Briske et al., 2003). The nature of the equilibrial or "climax" state was appropriate to local climatic and edaphic conditions. Range scientists rapidly adapted the model to policy, in Africa as elsewhere, although most pastoralists in Africa successfully resisted them (Behnke et al., 1993). The policies were based on the assumption that the climax in rangeland was also the most productive state for livestock in the long term.

The range model, especially for dry rangeland, was called in to question by studies in the 1980s and 1990s. In the best-known empirical study, Ellis and Swift (1988) claimed that the stock numbers in Turkana herds in dry, northern Kenya were more a function of rainfall than of damage to pastures by grazing. A new model, the "state-and-transition" model, applied better to this kind of evidence than did the "range" model (Westoby et al., 1989). In the state-and-transition model, recurrent change in semi-arid rangeland was likely to be caused less by "overgrazing" than by exogenous drivers such as fire or insect attack, as well as rainfall. A stimulant to the

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