



ENJEUX SCIENCES

DESERTIFICATION AND CLIMATE CHANGE ARE THEY PART OF THE SAME FIGHT?

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WHY DO WE NEED A HOLISTIC AND SYSTEMIC APPROACH?

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The previous chapters have described the many causes of desertification, often due to changes in local human activities (unsustainable exploitation, unsuitable practices, dysfunctional territorial governments) as well as natural climate events (e.g. droughts and floods), migration movements and agricultural development. Drivers of these changes are both socioeconomic (subsistence farming, unsustainable agricultural sectors, unsuitable production models, etc.) and biophysical (deforestation, declining soil fertility, water resource depletion). Similarly, the consequences of desertification affect not only the various ecosystem compartments (soil, water, atmosphere, biodiversity) but also those of the sociosystem (value chain, governance, land tenure, etc.) at different scales, from the field to the landscape to the global scale of Earth.¹¹

This means that actions to combat and prevent desertification and restore desertified land must reflect the different spatial and temporal scales involved in desertification processes. This requires a prior assessment of the causes and potential origins of local desertification as well as the various compartments affected (soil, water, atmosphere, fauna and flora, human societies). This global approach determines the holistic approach by taking into account the interactions between the different spatial and temporal scales. It complements the systemic approach, which describes these different compartments and the interactions between their components. Holistic and systemic approaches can be used together to understand how desertification works and its dynamics, and to assess the effects of actions to combat it.

The complexity of the phenomena involved

Whether the aim is to restore degraded land or prevent degradation altogether, a holistic approach is warranted, as the types of degradation (decline in vegetation cover, soil erosion, loss of

11. Also see chapter 3, “Why should we foster complementarity between local, regional and global scales?”



soil fertility and biological activity) often occur simultaneously and are interdependent, as are the management methods that caused them. While soil fertility can be improved on a field-by-field basis, practices are usually applied to all the fields and activities according to a farm- or community-wide strategy, such as collecting livestock manure from grazing land. Similarly, schemes to restore eroded land or prevent erosion are only effective if they extend to the catchment area or territory. Finally, vegetation cover must consider both herbaceous plants (including crops) and woody plants, which implies a territorial approach that considers land use and the role of trees in landscapes, and their contribution to meeting food, fodder, timber and fuel needs. These interventions cover a range of economic activities involving many stakeholders, thus justifying this holistic and participatory approach.

By addressing the different scales and compartments, these two approaches, developed jointly, can help stakeholders steer clear of the pitfalls of analyses and actions that are too local or too global, as well as those that overlook interactions and remain too focused on one compartment to the detriment of others. Two examples illustrate this point.

The misleading causes of major droughts in the Sahel

The major droughts in the Sahel in 1972–1973 and 1984–1985 caused significant degradation of steppe ecosystems (especially grazing lands) and substantial mortality of trees and domestic animals, not to mention human casualties in vulnerable human populations. Following these droughts, pastoral livestock farming in West Africa was pointed to as the main cause of the degradation and desertification of the Sahelian steppes. In the late 1980s, the reason given was excessive livestock density in the Sahel and an unsuitable and under-productive extensive management system that consumed large quantities of natural resources and was based on seasonal livestock mobility and rangeland fodder availability. It was not until the late 1990s (and even between 2000 and 2010) that multidisciplinary studies across the Sahel demonstrated that it was not the extensive system and pastoral mobility that were responsible for this environmental degradation. Rather, decadal

climate variations had played a significant role in the degradation of vegetation and the spread of bare soil observed in the 1970s and 1980s. The years of greater rainfall that followed led the vegetation to recover, at least partially and in certain landscape units. Furthermore, areas frequented by livestock did not show any greater degradation of the soil or vegetation: in fact, regeneration of the grass cover and certain shrub species was greater than in the areas without livestock (experiments over several decades). This clearly demonstrates the importance of considering all the factors (anthropogenic, biotic and abiotic) influencing social-ecological systems, the various temporal and spatial scales, and the interactions between ecosystem components.

The social consequences of planting trees

The second example of an overly sectoral vision is the uncoordinated decision by forestry services to plant trees to combat desertification. Certain species are selected to fix nutrients and regenerate the soil, such as *Acacia* spp. (including *Acacia senegal* for gum arabic), which are leguminous plants that fix atmospheric nitrogen in the soil. Planting has often been carried out in recent decades by forestry services or non-governmental organizations, with the aim of regenerating ecosystems. When carried out by public services, rehabilitation/restoration work involves implementing deferred grazing of the areas so they are not damaged by grazing herds.

Rather than having any real impact on desertification, these planting activities have often triggered more social problems. By excluding local people from being involved in the interventions (choosing the areas, species replanted, implementation methods) and the management of these areas (deferred grazing, establishment of sustainable practices such as seasonal rotations), these activities have had very little lasting impact on a local or global scale. Because of the many conflicts of interest between stakeholders over the relevant areas and resources and their small spatial footprint, these plantation activities have often failed, with low regeneration rates and unsustainable uses. Conflicts over use between the various stakeholders (crop and livestock farmers, market gardeners, loggers) have often led to the degradation



of resources and facilities by people and herds on seasonal and traditional rangelands, and to coercive measures by the forestry services (fines, confiscation of livestock, imprisonment, etc.).

Today, new strategies to combat desertification, such as those implemented for the Great Green Wall (GGW) initiative in the Sahel, seek to involve local populations in both determining and implementing activities, taking into consideration their practices and customs, their land-use rules and rights, and their needs in terms of access to resources and services. The challenges of territorial governance and cooperation at the various local, national and international levels remain significant and are the main impediments to this ambitious international project.

These new holistic and systemic approaches involving all stakeholders from the local to the international level, their uses and their interactions within a territory to decide on how to rehabilitate degraded land and the sustainable management of social-ecological systems are certainly more conducive to positive results. However, such systems are more complex to implement because of the number of players involved and the many interconnected mechanisms to be considered.

WHY DO WE NEED A TERRITORIAL APPROACH?

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The territorial scale encompasses all the economic, social and environmental variables that have an impact on the target territorial area, regardless of their origins and whether short or long-distance, within the relevant territorial area or beyond. The resulting principle is to adopt options tailored to each context for a given area, whatever its size (for example, in the Sahel, this could range from a field to the area around a village or even the entire Sahel).

The nature, speed and intensity of land degradation (as opposed to aggradation) vary and are the result of a combination of factors:

- The initial state and intrinsic quality of the land and its ecosystem, the resources it shelters and can renew, and the services it