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Local knowledge, scientific knowledge and food security in the Mediterranean region

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Abstract

Intricate linkages between climate change and socio-political dynamics in the Mediterranean region may give rise to new risks for crops and food security. As one of the world's biodiversity hotspots, the Mediterranean is also a major cradle of domestication and harbors a vast array of wild crop varieties and traditional landraces. We examine various situations in which local historical knowledge configures landscapes and produces agro-biodiversity – living matrices incorporating nature and culture and contributing to the history of the Mediterranean region.

These landscapes are suffering from urbanization and inappropriate public policies that overlook the importance of local farmers' knowledge. This chapter aims at evaluating local practices within a set of agroecosystems and their inputs to secure food security within the context of climate change.

The following cases are analyzed: (1) the use of wild olive (oleasters) grafted with olive varieties to create biological heterogeneity – an old technique perpetuated by farmers in northern Morocco and currently being replaced by large scale monoclonal olive plantations; (2) the ongoing taming of interactions between the Black truffle, their host trees and companion plants managed by truffle growers – currently under ecological experimentation; (3) the secular domestication of the Argan tree and associated bee keeping, favoring diversity through the engineering of differentiated spaces and protection of rich nut diversity – the latter is now marketed for the cosmetic industry; (4) locally differentiated bee populations in Cévennes in France, linked to local practices, and undergoing threats due to changes in practices and hybridization with imported bee populations.

The models described form part of a framework of biocultural and spatio-temporal interactions which it is now essential to understand. Above all, the situations described all bear within them key ideas for a more joined-up relationship between local and scientific knowledge.

Résumé

Les effets conjoints du changement climatique et des dynamiques sociopolitiques accroissent les risques sur les espèces cultivées et la sécurité alimentaire en Méditerranée. *Hotspot* de biodiversité à l'échelle mondiale, cette région est également un des berceaux de la domestication ; en outre, la région comporte de nombreux parents sauvages ainsi qu'un grand nombre de cultivars et de races traditionnelles. Nous examinons diverses situations illustrant le rôle des savoirs locaux historiques dans la configuration des paysages et de l'agrobiodiversité – des matrices vivantes incorporant nature et culture et ayant contribué à l'histoire de la région. Ces paysages souffrent de l'urbanisation et de politiques publiques ne prenant pas en compte l'importance des savoirs agricoles locaux. Ce chapitre évalue les pratiques locales dans une série d'agroécosystèmes et leurs apports à la sécurité alimentaire dans un contexte de changement climatique.

Nous abordons les cas d'étude suivants : (1) l'utilisation de la diversité biologique d'oliviers sauvages (oléastres) greffés par des variétés d'oliviers, une ancienne technique perpétuée par les paysans du nord du Maroc et en cours de remplacement par des plantations d'oliviers monoclonaux, à une large échelle ; (2) l'appivoisement en cours de la Truffe noire, de son arbre hôte et de ses plantes compagnes par les trufficulteurs ; la gestion des plantes compagnes fait désormais l'objet d'expérimentation en écologie ; (3) la domestication séculaire de l'arganier associée à l'apiculture, favorisant la diversité à travers la différenciation des espaces et la protection d'une riche diversité de noix ; cette dernière est en forte demande pour l'industrie cosmétique ; (4) la différenciation

des populations locales d'abeilles dans les Cévennes en France, en lien avec des pratiques locales menacées par des changements de pratiques et l'hybridation avec des populations d'abeilles importées. Tous les modèles décrits font partie d'un cadre spatio-temporel et d'interactions bioculturelles qu'il est désormais essentiel de mieux saisir. Surtout, les situations décrites comportent toutes des idées clés pour une meilleure synergie entre savoirs locaux et savoirs scientifiques.

Introduction

Agricultural practices keep evolving, both because of social changes and the recomposition of various regions, and thus need to adapt to climate change and the sustainable management of resources, including biodiversity and water, to the increase in population and the emergence of new risks for crops.

Local knowledge is now at the heart of environmental issues; it is recognized by the Convention on Biological Diversity (CBD, Earth Summit, 1992), the Aichi targets (Nagoya CBD, 2010) and Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES, 2015).

In the Mediterranean region, the gap between coastal urbanization and the hinterland exemplifies contemporaneous territorial dynamics, which lie at the origin of new links between urbanized areas, active agricultural areas, and less active areas (grazing areas, extensive crops, etc.) and “natural” areas (forests, wetlands, lagoons, etc.). The appeal of “modern” lifestyles, definitive or temporary migrations, the emergence of new social and economic inequalities, tensions of an agriculture that expresses divergent interests, ecological interactions, and water flows between these different territorial areas constitute issues which are either poorly controlled or insufficiently addressed by public modes of action.

The links between scientific knowledge and local knowledge requires that the latter be fully considered – no easy matter for entire swathes of human know-how that have often been sidelined, especially in the early 20th century with the advent of agricultural modernization and the foregrounding of an agricultural production paradigm based on specialization and improved varieties – all based on massive inflows of chemical inputs – which failed to take account of biodiversity and ecological processes. This agricultural model is now highly debatable in light of the environmental crisis we are experiencing on a global scale, particularly related to the impact of modern agriculture on greenhouse gases, energy issues (oil needed to produce chemical inputs), emissions and therefore climate change.

The deficit in agricultural production raises issues related to the farming systems and food of the people of the Mediterranean that will be considered over the

long term (drawing on archaeology, history and environmental archaeology). They enable scenarios to be developed for the management of natural resources in the long term, and for changes and the human impacts of biodiversity from a sustainable development perspective. Farming systems – an example of sustainability – are considered from an agro-sylvo-pastoral point of view and as a complement to the fishery environment.

The Mediterranean, one of the world's cradles of domestication, can help us reflect on the interactions between human societies and the environment, because of its role both as a biodiversity hotspot and as a place where human societies have interacted with nature since the Neolithic. The Mediterranean paradox (Biodivmex Mistrals, <http://biodivmex.imbe.fr/>) lies in the fact that Mediterranean agricultural landscapes have long nurtured Mediterranean societies, while retaining a large part of their biodiversity.

This chapter examines various situations in which local historical knowledge in the Mediterranean configures landscapes and produces agro-biodiversity – living matrices incorporating nature and culture and contributing to the construction of the history of these societies.

The questions raised are numerous and are located at the intersection of human activity, the biology of bees and their links to the territories, the complex interactions between truffles, their host trees and their companion plants, techniques for olive grafting onto oleasters that have been totally forgotten by science, and argan trees that have been domesticated and configured for millennia, and are now a key feature of the cosmetic industry. All the models described form part of a framework of biocultural and spatio-temporal interactions which it is now essential to understand. Above all, the situations described all bear within them key ideas for a more joined-up relationship between local knowledge and scientific knowledge.