



# The building of sustainable wheat growing: the role of local-based knowledge in the process of extension of scientific knowledge

François Hochereau, Claire Lamine

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## **The building of sustainable wheat growing:**

### *The role of local-based knowledge in the process of extension of scientific knowledge*

Hochereau François, INRA-SENS, hochereau@inra-ifris.org

Lamine Claire, INRA-Eco-Innov, Claire.Lamine@grignon.inra.fr

Agricultural innovations in western societies have traditionally been produced and diffused in a top-down way from Science to the grass-root level(1). Even if farmers took sometimes the initiative for the innovation, the production and validation of suitable knowledge was completely delegated to the research and extension system. In recent years, growing environmental and public health concerns have been encouraging research to renew its approaches in developing multi-actor innovation processes that include farmers, public and private stakeholders, and citizens at a territorial level(2). Knowledge production has also to become context-driven, in the sense that scientists, extension consultants and local actors are brought together to respond to real-world problems and challenges. The development of low chemical input wheat cultivation in association to varieties resistant to diseases has reflected this broadening of research practices expressed by interdisciplinary work and inclusion of wider publics. From the mid-eighties to the beginning of 2000s, geneticists and agronomists of INRA worked together with other expertises (seed companies, plant development institutes and county agriculture agencies) to experiment farming methods and plant breeding assessment(3). The development of such input reduction methods was legitimated by growing environmental awareness among society as well as falls in wheat market which made low input strategies economically viable. But the extension of such knowledge doesn't refer only to a problem of legitimation; it has to be relevant to its potential users. This is why scientists have to deal with practical experience-based expertise in order to adjust their knowledge to the real practices of grassroots' people. In this case, farmers must be convinced that it should be useful to come up against the dilemma: optimizing production versus minimizing pollution.

We have studied different ways of involvement of grass-root actors during the late five years in three contrasted areas, examining especially the role of advisors of County Agriculture Agencies as intermediary experts between researchers and farmers. In one area, these advisors are closely connected to the public research community and act to try and develop together a new way of farming. In the second one, these advisors are more dependent on economics actors such as cooperatives or private consultants who control the diffusion of knowledge to the farmers. In the last one, they are more attached to the specific local situation in which they work and define the way of experimenting scientific knowledge in relationship to "their" local farmers' wishes. In every case, the adjustment of scientific knowledge relies on farmers who accept to try the new farming methods. We want to study in more details the "pockets of expertise"(4) which emerge from the grass-root actors and practices and would contribute to science. As different kinds of practical and experience-based expertises could be identified in each context, we have found that in our case, the extension of scientific knowledge looks either like:

- an Adoption process through which farmers embrace this scientific knowledge;
- an Arrangement process where they take only a part of the input reduction farming methods without changing their aim of high yield; in other terms, they adopt the knowledge as a mean to adjust farming methods but neglect environmental purposes.
- a Percolation process where it is less low input farming methods as change lever which is relevant for farmers than the recovery of their ability to observe closely the growing of crops and decide without being dependant on external expertise what

knowledge has to be developed. So scientific knowledge on reducing inputs is less important for those farmers than to develop by themselves a ground expertise on sustainable farming methods.

- (1) Bonneuil et Thomas, 2009, Gènes, pouvoirs et profits. La recherche publique dans les transformations des régimes de production des savoirs en génétique végétale de Mendel aux OGM, Ed. Quae ; Bertrand Vissac, 2002, *Les vaches* de la République. Saisons et raisons d'un chercheur citoyen. Paris, INRA
- (2) Stephen P. Gasteyer, Agricultural transitions in the context of growing environmental pressure over water, *Agric Hum Values*, 25:469–486
- (3) Hochereau F., 2008, "Du Productivisme au Développement Durable. Les vicissitudes de la prise en compte des résistances variétales dans la sélection du blé." In Christophe Bonneuil, Gilles Denis , Jean-Luc Mayaud (eds.), *Sciences, chercheurs et agriculture - Pour une histoire de la recherche agronomique*, Paris, L'Harmattan
- (4) Collins and Evans, 2007, *Rethinking Expertise*, Chicago, IL: The University of Chicago Press

*Mots clés : Process of extension of scientific knowledge ; sustainable development ; distributed knowledge and competences ; practical-based expertise*