**Hacking agriculture - when open source meets agricultural tools**

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Can agricultural tools, like free software, become ‘free’? Are the founding principles of open source - the ability to share, distribute, modify and reproduce information - transferable to agriculture? If in the computer field, open source is now a reality, the question that interests us in this paper is whether and how physical objects like tractors or piercing rolls can be created and disseminated through ‘free’ processes.

We will look at two case studies: an integrated management software for farmers developed by - and called - *Ekylibre*; and a collective that provides farmers with machines that can be self-constructed, l’*Atelier Paysan*. Both structures will be studied by retracing their history and form of organization, studying how they enact the principles of open source, and by describing their tools within their economic and political context.

Since a few years now, open source has developed in the field of agriculture. Farmers as well as agricultural research now use open source technology systems. Open source materializes through the technical resources of the farmer (IT tools, and material and biological tools) and the world of agricultural research (biotechnologies, access to scientific knowledge and materials). The open source logic aims to redefine organizations and hierarchies in favor of the farmer. ‘Free’ agriculture is opposed to - and defined in relation to - a conventional and ‘closed’ agricultural system. In the latter, innovations are sold to users/consumers in the form of goods or services. The technology contained in the object is generally unavailable to the farmer. In this system, even if farmers have a certain expertise in the use of tools, most of the knowledge of these tools is not accessible. By reducing the relationship between the tool and the user to a monetary transaction, the farmer cannot produce any technical knowledge.

The objective of open source agriculture, however, is to give back knowledge and skills to the farmer. The idea is to constitute a social identity based on knowledge sharing, the acquisition and appropriation of skills, and developing networks between actors. Open source aims to establish a more balanced and virtuous relationship between technologies and their social environment. If open source is today increasingly visible and discussed within the agricultural world, we claim that a differentiation and a detailed description of available free agricultural tools has become necessary. Such an effort of classification is needed given the variability of media and materials through which open source materializes. We propose to differentiate between the free sharing of:

• agricultural and research software (such as the steering of the farm or the Geographical Information Systems (GIS));

• seeds (and the genetic information contained in them);

• agronomic knowledge and scientific publications;

• genetic engineering;

• mechanical tools for working the land.

Our two case studies, *Ekylibre* and l’*Atelier Paysan*, are similar in several respects. Both refer to the open source movement and are devoted to knowledge sharing - knowledge that is disseminated via websites, demonstrations, trainings, discussions via forums. *Ekylibre* and l’*Atelier Paysan* are both structures that are closely related to communities of users - users that can be either ‘passive’ users or ‘active’ developers.

A software tool and a physical tool can both claim to be free and be modifiable and shareable. They can each in their own way, be designed as open innovations, closely entangling - and sometimes even blurring the distinction between - developers and users. However, if we look more closely, we observe that the social architecture, the materiality and the economics of these tools may differ (for example, despite being based on open software, *Ekylibre* sells some services to its clients). The ecological and political aims are, for instance, notably different.

We will see in this paper that the principles of open source can be mobilized and put into practice in the agricultural world. Open source is not only translated into free software tailored to farmers’ needs but also into physical tools. In the academic literature, open source is usually conceptualized as a political and ethical project, depending on a specific form of sociability and community. Even if this analytical framework is relevant to examine the expression of open source in the agricultural world, we argue that there is room for accounts that empirically describe and analytically problematize how open source is materialized in individual cases.

If we can see an open source software like *Ekylibre* or an agricultural tool developed by l’*Atelier Paysan* as political objects, the term political does not refer to the same thing in both cases. The degree - or quality - of the political nature of a free tool is something that we must clarify and empirically trace. If *Ekylibre* and l’*Atelier Paysan* are both related to user communities, they are conceived, organized and ‘economicized’ differently. It is therefore not enough to note that the idea of ​​open source can be put into practice, and qualified by words such as free, shareable, collective, alternative, etc. We will examine how and to what extent open source tools can be qualified as such.