

## Executive summary

This study examines the case of Ogura oilseed rape technology in France. Ogura is a patented hybridisation technology developed by the French public research institute INRA that is used to make Oilseed Rape (OSR) hybrids with higher yields. The first hybrid seeds based on the Ogura innovation were introduced in 2000 and resulted in rapid adoption by farmers over the last decade. This technology is available on the market through non-exclusive licenses to several seed companies for which INRA receives royalty income.

Agricultural innovations are necessary to increase farmer productivity and global food supply. But research & development (R&D) require substantial investments and costs. Without the opportunity to recoup investments, limited resources are allocated to agricultural innovations. Over the last decades, Intellectual Property Rights (IPR) provided market protection to innovators and increased the incentive for R&D investments by enabling innovators to recoup investments, to generate income for shareholders and to fund new R&D. This legal environment stimulated R&D investments and the introduction of innovations, which have spurred agricultural productivity and food supply significantly.

However, IPR in agriculture are increasingly being questioned in society because some argue that it allows developers to extract too much profit at the cost of consumer. There is thus a trade-off between the need for R&D investments to produce new innovations (future benefits) and the distribution of the benefits from existing innovations to users and society (present benefits). Against this background EuropaBio and Crop Life International commissioned Steward Redqueen to develop an economic framework to analyse the socio-economic effects and the economical logic of IPR in agriculture.

Research in this area has so far focused on the partitioning of benefits once an innovation is available in the market and only qualitatively described the importance of the innovation incentive. The analysis in this report is an effort to include both perspectives and the trade-off between current and future benefits. A framework is developed that compares IPR regimes based on *the probability of innovations happening (the incentive)* and *the consumer benefits once an innovation is available in the market*. This framework has been applied to the development and adoption of Oilseed rape hybrids developed by using the Ogura technology ('Ogura hybrids) in France and compares the actual situation (non-exclusive use of IPR) with exclusive use of IPR and a situation without IPR.

The results of this economic study show that:

- Even under favourable market conditions (increasing crop prices), it took INRA and seed companies approximately 15 years to recover their R&D investments;
- The Ogura hybrids have been adopted by 83% of farmers and will have delivered a projected € 1.0 billion economic benefit over the patent life;
- About 50% of this total economic benefit accrues to farmers and 25% further downstream towards processors and end consumers of livestock products.
- Most likely all downstream benefits will trickle down to the consumer over time

The report also examines the influence of the strength of IPR through economic modelling of what would have happened had Ogura hybrids been commercialised *either* without competition through exclusive use of patents *or* under full competition without an IPR system. These results show that the decision for an IPR regime involves a trade-off between current and future benefits:

- Whether or not certain processes and products are protected by IPR, pricing power of seed producers is constrained by the presence of alternatives and the heterogeneity of farmer preferences;
- In the case of Ogura, it can be heuristically argued that deviating from the non-exclusive use of patents would have reduced societal benefit:
  - In the absence of IPR the total societal surplus would have increased slightly by € 16 million (+10%), but it would have been rather unlikely that Ogura would have been developed – at least by a private sector company – because of the inability to recoup the investment as the innovator surplus would have vanished;

- Exclusive use of patents would result in lower societal benefits of € 46 million (-39%) in exchange for a somewhat higher probability of innovations happening because innovator benefits would increase by € 11 million (+31%);
- In other words, a small increase of (hypothetical) societal surplus would have eliminated the incentive to innovate whereas a modest increase of the incentive would have come at considerable societal cost.
- Even in the case of exclusive use of patents, farmers (and parties further downstream) would still receive at least 60% of the total economic benefits.

Finally, the report indicates some other socio-economic effects of Ogura:

- Using the same resources, Ogura led to 320,000 tons extra OSR production in France without additional resource use. This translates into a reduction of 66 kg carbon per ton OSR;
- In 2012, € 123 million extra farm benefits resulted into almost 1,200 jobs.

## General Lessons

1. Intellectual Property Rights are essential to enable innovation by providing innovators the ability to recoup investments and fund new R&D.
2. Stronger IPR increase the probability of innovations happening.
3. Most of the social welfare coming from patented innovations accrues to farmers and further downstream towards processors and end consumers, which, in the case of Ogura, is about four times higher than what accrues to the technology developer and seed companies combined.
4. The market power of an agricultural technology is primarily determined by the ability to increase performance (in this case yields) and not by the strength of its IPR.
5. Even when IPR are used exclusively, the pricing power of a seed producer is constrained by the presence of alternatives and the heterogeneity of farmer preferences.
6. The absence of IPR would have a considerable cost for society since the key innovation incentive would be eliminated and thus the chance of new innovations happening and their economic benefits would be significantly reduced.

## Key Figures of the Ogura case

**€ 1 billion**

societal benefits during the Ogura patented life

**75%**

of societal benefits accrue to farmers and consumers

**15 years**

to obtain break-even for technology provider INRA and seed producers

**320,000 tons**

annual extra Oilseed Rape production by using Ogura hybrids without extra use of resources

**€ 123 million**

extra farm income from the use of Ogura hybrids in 2012

**83%**

adoption level of Ogura hybrids by farmers in 2012