**ABSTRACT**

This study incorporates coexistence measures in our analysis of the potential adoption of genetically modified (GM) crop technology. We illustrate that the incentives for GM technology adoption by farmers can be negatively affected by current restrictive coexistence policies. We further illustrate the possible adverse impact of the farmer’s choice of crop production on the environment compared to the alternative (GM crop production).

We conclude that current coexistence rules contribute in biasing the choice of farmers towards one system of production (Non GM crop) contrary to the main aim of coexistence which is to provide equal opportunities for free choice by the farmers. As a consequence of the farmer’s crop production choice, the environment is more adversely affected compared to the alternative.

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**INTRODUCTION**

To prevent economic externalities associated with GM crop production (admixture) from happening, some EU member states have developed coexistence rules to prevent admixture at the level of agricultural production. In this institutional setting, the innovators (GM farmers) are considered the economic externality producers and the ones who should bear the costs (monetary or not) associated with coexistence measures. This setting represents a priori a disincentive for adoption of GM technology by the farmer. The decision on whether or not to adopt GM technology in the EU is shaped by the implementation of coexistence measures.

In comparison to non GM crop production, the adoption of GM technology has significantly reduced pesticide spraying and, as a result, decreased the environmental impact associated with herbicide and insecticide use on these crops. The technology has also facilitated a significant reduction in the release of greenhouse gas emissions from this cropping area, which, in 2011, was equivalent to removing 10.22 million cars from the roads (Brookes and Barfoot, 2013). However, in relation to GM HT (herbicide tolerant) crops, over reliance on the use of glyphosate by some farmers, in some regions, has contributed to the development of weed resistance. As a result, farmers are increasingly adopting a mix of reactive and proactive weed management strategies incorporating a mix of herbicides. Despite this, the overall environmental gains arising from the use of GM crops compared to Non GM crops have been and continue to be substantial.

This study illustrates how restrictive coexistence policies can bias a farmer’s choice towards a crop production system where the associated agricultural practices have more adverse effects to the environment compared to GM crop production.

**DISCUSSION**

Current coexistence policies have a clear and direct effect on the farmer’s choice of crop production (GM or non GM) (Moschini, 2008; Areal et al., 2012). Coexistence measures which burden or increase the cost of production bored by the adopter turn to act as disincentives to the adoption of the technology.

The question of which crop production (GM or non GM crop) system adversely affects the environment more has been at the center of most debates. Brookes and Barfoot (2013) among others, clearly illustrates the benefits of GM crop technology to the environment compared to the alternative.

Appropriate coexistence policies should be able to provide equal chances for any crop production system to be chosen by a farmer (be it GM or non GM crop production) (see figure 2).

**CONCLUSIONS**

- Current coexistence rules contribute in biasing the choice of farmers towards one system of crop production (non GM). This contradicts the basic definition of coexistence, which aims to ensure a side by side development of various cropping systems without excluding any agricultural option, hence, giving the farmers a practical choice to chose between GM, conventional and organic crops.

- The farmer’s choice (policy-driven) of crop production definitely has a direct impact on the environment. The degree of adverse effect to the environment depends on the choice of crop production.

**REFERENCES**