

HFFA Research GmbH

The value of applying Metazachlor in EU oilseed rape production:

An assessment of effects on selected
economic and environmental indicators

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List of abbreviations

AAEA	– Agricultural and Applied Economics Association
AHDB	– Agriculture and Horticulture Development Board
BEIS	– Department for Business, Energy and Industrial Strategy
CBD	– Convention on Biological Diversity
CIS	– Commonwealth of Independent States
CNV	– Constructed Normal Value
DG Agri	– Directorate General for Agriculture and Rural Development
EU	– European Union
FAO	– Food and Agriculture Organization
GDP	– Gross Domestic Product
GEF-BIO	– Global Environment Facility Benefits Index of Biodiversity
GHG	– Greenhouse Gas
HGCA	– Home Grown Cereals Authority
KTBL	– Kuratorium für Technik und Bauwesen in der Landwirtschaft
LfL	– Bayerische Landesanstalt für Landwirtschaft
LWK	– Landwirtschaftskammer
MENA	– Middle East and North Africa
MTZ	– Metazachlor
NBI	– National Biodiversity Index
OBT	– Observação da Terra
OECD	– Organization for Economic Cooperation and Development
OSR	– Oilseed Rape
PPDB	– Pesticides Properties Data Base
SGE	– Service Géologique de l'Etat

- UK – United Kingdom
- UNEP – United Nations Environment Programme
- USDA – United States Department of Agriculture
- WRI – World Resources Institute
- WTO – World Trade Organization

Executive summary

This research aimed at providing a condensed and science-driven judgement on various economic and environmental values and benefits of applying Metazachlor (MTZ) in agriculture of the European Union (EU) using the case study of oilseed rape (OSR) production. Therefore, two scenarios were defined and analyzed. A first scenario looks at implications of switching from plant protection measures with MTZ to “Chemical weed control without MTZ”, and a second scenario investigates the impacts of moving towards “Mechanical weed control without MTZ”. The various economic and environmental analyses lead to several conclusions.

Essentially, a positive yield impact is measurable when applying MTZ alone or in mixtures. A potential ban on MTZ would cause a remarkable yield decrease in OSR production of the EU and its member states. The measurable negative yield impact is close to four percent if “Chemical weed control without MTZ” or “Mechanical weed control without MTZ” had to be applied.

Therefore, the production of OSR is larger when MTZ is used. The measurable negative yield impacts are higher than potential cost saving effects if MTZ was banned. This translates into an altogether positive supply signal of still applying MTZ. With the active ingredient, almost 400,000 tons of OSR are currently produced in the EU in addition to what would be harvestable in a potential scenario “Chemical weed control without MTZ”. Even more OSR – almost 550,000 tons – would not be harvestable without MTZ, but with mechanical weed control.

The higher yields and supply quantities due to MTZ enable OSR farmers to increase market revenues from production. If not available, the missing yield and subsequent production quantities would transfer into market revenue losses following a potential ban on MTZ. For the EU as a whole and its OSR production it amounts to more than EUR 150 million in the “Chemical weed control without MTZ” scenario and over EUR 210 million in the other scenario. This substantial amount of farm income is currently still available due to MTZ and supports farmers to keep competitiveness high.

The entire value chain profits from MTZ applied in OSR as well. Because of higher or more transport, crushing, processing, packaging, trading activities, etc. along the value chain, additional income is also generated in other sectors of the economy due to the increased agricultural production volume with MTZ. For the EU as a whole, this income is worth almost EUR 110 million in the case of “Chemical weed control without MTZ”. When switching to “Mechanical weed control without MTZ”, almost EUR 150 million would be missing along the various downstream segments of the agricultural value chain.

Thus, the profound use of MTZ in OSR production across the EU enlarges the national income. Sectoral income changes and income variations along the value chain affect overall GDP. Consequently, a positive national income impact can be associated with the applications of MTZ in OSR farming across the EU. It is as large as EUR 260 million in the first scenario and more than EUR 360 million in the second scenario.

Applying MTZ helps farmers to reinvest under challenging and risky business framework conditions. Some farmers may be particularly affected by a ban on MTZ in OSR production. Profits would decrease by 15 to 20 percent in the scenario “Chemical weed control without MTZ” whereas entrepreneurial income would shrink by 20 to 30 percent in the scenario “Mechanical weed control without MTZ”. Such a cut might considerably worsen the economic performance of OSR farmers across the EU if MTZ was not available. Without MTZ, the already vulnerable agricultural system will certainly become more fragile. Many farmers definitely face weak economic performance with margins “on the edge”. For such farmers, the loss of a particular plant protection product, such as MTZ, might end in low reinvestments or even calamity.

Not only positive economic impacts are obvious; the global environment also profits from an application of MTZ in OSR production across the EU. First of all, it preserves already scarce global land resources. Global land conversion towards agricultural uses would increase by more than 230,000 hectares in the scenario “Chemical weed control without MTZ” or over 320,000 hectares when switching to mechanical weed control. The vast majority of this land additionally needed if MTZ was banned in OSR production of the EU is apparently located in Oceania (mainly Australia) and the CIS (mainly the Ukraine) still being the EU’s major trading partners with respect to OSR.

Since non-agricultural land sequesters carbon, MTZ also permits additional global GHG emissions. A tremendous part of this carbon would be released into the atmosphere in the form of CO₂ if the land was converted. Circumventing a ban on MTZ in OSR production of the EU, thus, avoids an emission of over 35 million tons of CO₂-equivalents compared to the alternative scenario “Chemical weed control without MTZ”. The GHG emission saving is even higher as regards the scenario “Mechanical weed control without MTZ”; in this case it is almost 50 million tons of CO₂-equivalents. This first figure almost equals to what a country such as Slovakia currently emits as GHG per year; and the second number is as large as the annual GHG emissions of Sweden.

Additionally, this currently not used land is home to many species; MTZ, thus, also prevents additional biodiversity losses at global scale. Converting a considerable

number of hectares of grassland and natural habitats – constituting eco-zones rather rich in species compared to more or less intensely used arable land in the EU – also requires to take a look at the associated biodiversity losses. It turns out that global biodiversity equivalent to a loss of more than 110,000 hectares of Brazilian natural or nature-like habitats would be lost referring to the first scenario; and as a consequence of not applying MTZ in OSR production of the EU, but using mechanical weed control instead, global biodiversity would decline as much as it would by slashing and burning almost 200,000 hectares of Indonesian rainforest.

Not banning MTZ in OSR production of the EU finally also avoids additional water use at a global scale. It can be concluded that a potential ban on MTZ in OSR production across the EU on balance would cause an additional water use of approximately 0.6 (0.8) billion m³ at a global scale if the application of MTZ – alone or in mixtures – is compared with “Chemical weed control without MTZ” (“Mechanical weed control without MTZ”). Less OSR would be produced in the EU after such a ban, and this decreased production would need less agricultural water remaining available for other purposes. Up to 0.9 billion m³ of water (in the second scenario) could be domestically “saved” this way. However, since water productivity in many other parts of the world is not as high as here in the EU, much more water would have to be used in other regions to cultivate a compensatory amount of OSR after banning the use of MTZ here. In total it amounts – again in the second scenario – to more than 1.7 billion m³. This higher agricultural water use abroad outweighs the lower water use embedded in domestic OSR farming post a potential ban and can be considered a current saving of the scarce global resource due to MTZ.

These findings are the result of conducting a comprehensive analysis based on the application of scientific modelling and calculation approaches. This allows to state that a policy-decision such as a potential ban on MTZ in OSR production of the EU would have various economic and environmental impacts, and such impacts are repeatedly substantial and too often negative. These disturbances must be taken into account when making policy (and private) decisions. Pros and cons of applying or not applying a certain technology – such as MTZ – need to be assessed in a balanced and holistic way. If such a comprehensive assessment results in societal (economic and environmental) benefits of applying the technology outweighing the costs, then the technology shall of course not be banned. In the case of not banning MTZ in OSR production of the EU such benefits to society are obvious. Losing MTZ as a management option thus means: These benefits will be lost as well. It is therefore absolutely necessary to have a rather broad tool box available in terms of management options enabling farmers across the EU to combat not only weeds being “enemies” of our arable crops, but all pests in a resource-efficient manner. MTZ is one of these tools, and it is a valuable instrument when looking at it from a wider societal perspective.



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