

Although numerous studies point to the key role of technological progress in improving the productivity of the agricultural sector, we still know very little about the causes of this progress. There are macroeconomic models referring to R&D expenditure, human capital or learning-by-doing. However, these are not translated into microeconomic studies where farms are analysed. The category 'growth due to technical progress' often describes changes that cannot be explained by the other factors, becoming 'a measure of our ignorance'. Previous research attempts to explain increases in production that are not due to increases in inputs through changes in weather conditions or diffusion of innovations (i.e. learning from neighbours). In this project, however, we follow a different path, linking progress to the introduction of specific investments in precision farming technologies. These tools make it possible, among other things, to determine the exact fertiliser requirements of the soil and then to apply them precisely. They thus contribute to reducing production costs, as well as the environmental impact of agriculture.

In the project, we approach the relationship between technical progress and precision agriculture in a comprehensive manner. This means that, in addition to the relationship described above, we are also investigating the factors that influence farmers' decisions to invest in precision farming tools. In line with the unified theory of technology acceptance and use, we test the impact of farmers' views on technology such as (a) expected performance (What will be the benefits of using the technology?), (b) expected effort (How difficult is it to use the technology?), (c) social influence (Have people important to me also used the technology?) and (d) favourable circumstances (Is help available?).

Finally, we take into account the impact of the investment not only on economic but also on environmental issues. Indeed, agricultural activity can generate a significant ecological footprint, manifesting itself in greenhouse gas emissions, pollutants associated with the use of plant protection products and excessive fertilisation. Our estimated productivity will be adjusted for these side effects.

The study will be conducted on the basis of data collected in Poland, among large farms specialising in field crops. It is these units that utilise a large proportion of the country's arable land, and are also the most likely to benefit from precision agriculture, thanks to the economies of scale present there.

The results of our research will enable better planning of the agricultural policy implemented in the country. They will help to improve the targeting of support, and to motivate farmers more effectively to implement precision farming solutions, the positive effects of which benefit not only the users themselves, but also society as a whole. Indeed, more innovative and productive agriculture means more affordable food, produced with less strain on the environment.