Popular science summary

By 2050, the global population is expected to increase to 9.7 billion. At the same time, we may expect that incomes in developing and emerging countries will also increase, which will result in a growing demand for food and in changes in the structure of this demand. Meanwhile, we should remember that the agricultural sector produces not only food, but also feed, bioenergy and bio-based materials. In contrast, the resources needed for agricultural production (such as land, soil and water) are threatened by environmental degradation and climate change. In this context, it seems clear that the future belongs to more sustainable food systems, under which it would be possible to produce high-quality food without the deterioration of the environment. However, the question is how sustainability can be defined? We believe that it can measured by so called eco-efficiency levels. The standard production efficiency was operationalized as a ratio of an economic output (i.e. the value of products sold by a firm, sector, or economy) and the inputs use. In the concept of eco-efficiency, in turn, environmental side effects (undesirable outputs) and desirable public good are also taken into consideration. The model that we use assumes that bad outputs are separable from good outputs. In other words, it is possible to reduce negative environmental outcome (such as GHG emission) without depleting the value of agricultural production. It is also possible to expand production without increasing the pressure on the environment. Such an approach brings eco-efficiency closer to sustainability and is more reliable when technological progress in farming is taken into account. Calculations of eco-efficiency are especially important for small farms since the European Commission still has high hopes for them as providers of environmental public goods and organic food as well as food security keepers in local communities.

The first goal of our project is to estimate current eco-efficiency levels for small farms in Central and Eastern European Countries (Poland, Romania, Serbia and Moldova) in which environmental and social public goods, and bad outputs are included. Next, we will investigate socio-demographic, policy-driven and institutional factors that have an impact on eco-efficiency. Our approach also allows us to identify ‘slacks’ so we can directly estimate potential for reduction in on-farm inputs use and bad outputs and, on the other hand, potential for the increase in good outputs. In the second stage of the project we will carry out detailed case study on farms that experience slacks and finally we conduct discrete choice experiments on large sample of farms in each country (ca. 150 farms per country) to better understand farmers willingness (reluctance) to adopt environmentally friendly farming practices that could help them to reduce (or eliminate) slacks. The authors hypothesise that perceptual limitations and moral obligations play a dominant role in small farms and may prevent changes from occurring (unlike it is assumed by transaction costs economics which focuses on bounded rationality).

The novel contribution of this project concerns, in particular, behavioural and agricultural economics. We argue that the notion of bounded rationality is not sufficient to explain farmers reluctance to adopt ecological practices. Hence, the role of perceptual limitations should be emphasized. We will contribute to ecological indicators literature. We will develop eco-efficiency measure for small farms that control for bad outputs and public goods with regard to sustainable agriculture concept. Moreover, we incorporate the assumptions of theory of planned behaviour to choice experiments.