The main scientific goal of the project to design a modelling approach allowing to determine the optimal allocation of resources at different scales of the agricultural sector based on the Sustainable Intensification and eco-efficiency concepts.

Implementation of the project will allow the answer to the question about the optimal structure of production factors in the conditions of growing social expectations for agriculture and increased environmental restrictions. We intend to search for possible improvements in the agricultural sector in line with the Sustainable Development paradigm resulting in higher ecoefficiency. Eco-efficiency is not only an indicator but also the concept of an ideal state in which there is no waste, i.e. in terms of ecological economics production does not generate negative externalities. The practical implementation of the eco-efficiency is to deliver "…competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level at least in line with the Earth's estimated carrying capacity". This can be reduced to the question “How to produce more from a resource unit without increasing environmental costs simultaneously meeting social expectations?”. The main goal formulated in this way refers to the question about the usefulness of the concept of Sustainable Intensification in meeting the expectations of modern agriculture related to both food production as well as the production of non-food raw materials and energy as well as the provision of agricultural public goods. The concept of sustainable intensification refers to such production systems as integrated, sustainable or precise agriculture. Its basic distinguishing feature is the assumption of the possibility of increasing agricultural productivity without generating additional negative externalities, which is possible due to a better use of knowledge about agricultural production processes. This approach corresponds to the concept of "smart farming" that has recently been promoted, especially among political decisionmakers. The search for a way to improve productivity in agriculture is determined on the one hand by the globally expected increase in demand for food, and on the other by the expectation of limiting the negative impact of agriculture on the natural environment. This issue is part of the wider problem of searching a new economic model that would enable the achievement of social development goals while minimizing environmental costs. The innovation in this area is considering not only food products of agriculture but also non-food materials, energy and public goods. In the theoretical layer, the project refers to such economic trends as environmental economics, ecological economics and the emerging economics of sustainable development. As a result of the project, a model of Polish agriculture will be developed adjusted to increased environmental constraints and growing social expectations. During the project an assessment of the demand for agricultural public goods will be made and the level of agricultural production will be determined reflecting the optimal use of production factors, taking into account agricultural and non-agricultural functions. The impact of production intensification on the sustainability of Polish farms in various production types and the sustainability of regions in connection with the processes of regional specialization and concentration of agricultural production will be assessed. The justification for intensifying agricultural production will be determined, taking into account the role of small and large agricultural holdings in the economic and social structure of the rural areas (taking into account the assumptions of the European Model of Agriculture). As part of the project, the following research hypotheses will be verified:

H1. Sustainable Intensification of agricultural production at the farm level results in increased sustainability in economic and social dimensions without deteriorating environmental dimension, leading to overall eco-efficiency improvement.

H2. Optimal allocation of resources in conjunction with the implementation of the Sustainable Intensification concept improves the eco-efficiency of the sector at the regional and national level.

H3. Optimal allocation of resources supported by Sustainable Intensification allows for increased provision of environmental public goods from the agricultural sector.

The implementation of the project will contribute to better recognition and understanding of the relationship between the economic, social and environmental aspects of sustainable intensification of agriculture, and, above all, will enable the answer to the question about the usefulness of designed agricultural model (in view of existing structural, organizational, environmental constraints) and will indicate the scope of necessary adjustments to enable practical implementation of the SI concept in Polish conditions to increase eco-efficiency of the farming sector.