Water erosion, which is a very unfavorable phenomenon from the point of view of agriculture and soil protection, has been the subject of research for many years. The first stage of water erosion is the splash caused by raindrops impacting the soil surface. The effects of this process may be ejection and dislocation of soil material and its loss during surface runoff, breaking down of soil aggregates, change in the surface microstructure causing soil crusting, or transfer of bacteria, fungi, and pollutions with the splashed material (soil and water). The objective of the proposed project is a quantitative description of the splash phenomenon occurring on inclined soil surfaces (different slope angles) caused by the impact of a single water drop for water erosion-susceptible soils representative for the area of Poland. The presented research will allow determining the dynamics of the phenomenon and the characteristics of ejected particles as well as the mass and, in consequence, the proportions of the splashed material (taking into account its division into splashed soil and splashed water).

Using a set of high-speed cameras for observation of fast-changing phenomena, the registration of the splash will be carried out. The analysis of the recorded images will allow determination of the number of particles ejected and their characteristic features such as ejection velocity and angle, the distance to which the particles have been displaced, or the maximal altitudes of particle flight. The use of a container that gives a possibility of measuring the mass of the splashed material in which the internal trough will be used will allow determining its proportions, where the mass of the solid phase (soil) and the liquid phase (water) will be taken into account. The measurements will give the possibility to determine the influence of the degree of inclination and differences in the specified parameters for several types of soils and different measurement conditions.

A review of the literature showed that the available studies related to the soil splash on slopes (or inclined soil samples) were mainly focused on mass measurements, in which the amount of soil transported under the rainfall was determined. The development of a quantitative description of this phenomenon based on the analysis of physical processes will provide better understanding and profound knowledge of the splash mechanisms. The prospective results will give an opportunity to model the splash phenomenon and erosion processes based on physical models.