

## THE CHALLENGES OF RESEARCHING CONSERVATION AGRICULTURE

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Adapting agriculture to climate change is a task that must be addressed in the coming years. The adaptation of agriculture to climate change should be seen as a challenge, and for survival, we need new agricultural systems. Old, intensive systems, which have also contributed to climate change, will be replaced by new agricultural systems with a high potential for adaptation and mitigation of climate change. This transformation is not easy; new agricultural systems must first be researched and evaluated.

Conservation agriculture, a farming system based on three principles - keeping the soil permanently covered with residues or cover crops, minimal mechanical disturbance of the soil (i.e., no-tillage), and crop diversity with at least three crops through associations and rotations - is slowly making its way into Moldovan agriculture, but at a very slow pace. The main problem is the lack of local knowledge and advanced experience. In 2022, at the “Porumbeni” Institute of Plant Breeding, short-term experiments were established to better understand the challenges of conservation agriculture research.

The experiments were set up in the field after harvesting winter wheat by drilling cover crops. In the conventional agriculture variant, soil was tilled according to recommended practices, while in the conservation agriculture variants, cover crops were drilled in mixtures and monocultures. In total, there were 7 experimental variants. In spring 2023, a hybrid corn (Porumbeni 391) was planted across all variants, with a planting density of 62,000 viable seeds per hectare. Planting was performed directly into crop residues and cover crops. During the growing season, observations and studies were conducted.

The highest water retention in the soil was observed in the conservation agriculture variant, where the soil was permanently covered with plant residues, and no cover crops were grown. Corn yield obtained in the tested variants can be considered the main indicator. The highest grain yield per hectare was obtained in the traditional agriculture variant, where the soil was tilled with a plow and disk harrows. The grain yield reached 5.41 t/ha. The lowest yield was recorded in the conservation agriculture variant, where winter vetch was used as a cover crop and

terminated after corn planting, with a yield of 2.50 t/ha. At first glance, the results seem clear, but we must note that in the variant where 2.5 t/ha of corn was harvested, an additional 10.5 t/ha of dry biomass of winter vetch was also produced.

Several issues have been identified that need to be addressed in the research of conservation agriculture. The most important are: cover crop management, selection of adapted hybrids, soil surface leveling, uniform distribution of plant residues, fertilizer application, and, not least, weed control.

**Keywords:** conservation agriculture, climate change adaptation, corn, cover crops

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