

Technology Fact Sheet

Sector	Agricultural Soils
Technology name	Mini-Till soil cultivation system with application of preponderantly mineral fertilizer. ⁱ Budoï G., Penescu A. Agrotehnica. Sistemul minim de lucrare a solului. București: Cereș, 1996, p. 330-332.
CO ₂ Emissions in „Agricultural Soils” sector, tons CO ₂	In 2010 – 3 000 787 t or 2.07 t/ha (sown areas – 1 451 500 ha, fallow land = 1 820 510-1 451 500 = 369 010 ha; on fallow lands the emissions were well balanced or slightly positive)
General description of the technology	The classical soil cultivation system generated the phenomena of soil features degradation. Excessive plowing favored dehumification, damage of the soil structure, increased compaction, danger of erosion. It became necessary to develop new tillage systems known as "soil conservation works systems, SCWS". Mini-till and No-Till systems turned out to be the most effective.
How the technology will be implemented and disseminated across the sector?	This technology can be successfully implemented by all farm businesses on cca 20-25 percent of agricultural lands (cca 200 000 ha), primarily for cultivation of grain crops. Implementation of this technology will require a combined drill tillage with light discs and a common sowing machine, or combined tillage and sowing machine (Annex 10).
Implementation barriers	There are no barriers to technology implementation. Compared with the basic soil cultivation technology with heavy discs harrows, the proposed technology is less expensive as it excludes stubble plowing and leveling, however, it has its negative moments. Being used without application of organic fertilizers this technology leads to: strong compaction of the post-arable layer 10-35 cm and decreasing of the physiologically active soil layer thickness, increasing the danger of pedological drought in 0-30cm layer, increasing the risk of temporary excess of humidity in soil in years with abundant rainfall. The compact layer can be periodically loosened by using a chisel type loosener or Pinocchio type aggregate (Annex 9).
CO ₂ reduction as a result of technology implementation , tons CO ₂	According to the research Institute "Selectia" in Balti (Annex 5), over the 20 years period of use of minimum soil cultivation techniques, the soil carbon losses from 0-40cm soil layer decreased by 6.7 t / ha / year or 0. 34t/ha/year compared to traditional tillage (Annex 5). This small amount of carbon (0.34 t / ha / year) is equivalent to annual reduction of CO ₂ emissions by 1.19 t / ha / year (0.34 t / ha / year x 3.5), or 238 000 tons from recently cultivated areas according to this technology.
Impact – Impact of the technology on the country development priorities	
Impact of the technology on the country social priorities	The technology ensures yield equal or 5-10 percent lower than those obtained under classical tillage system. The welfare of population remains at subsistence level.
Impact of the technology on the country economic priorities	Compared to classic tillage, the cost of mechanized work is reduced by cca 70\$/ha/year . At present, given the poverty of rural population, this less costly technology, is the one being used in farmlands cultivation. However, the way it is used now (without application of organic fertilizers) this technology is not very efficient as it leads to soils degradation.
Impact of the technology on the country environmental priorities	Contributes to partial reduction of CO ₂ emissions from agricultural soils.
Other impact	The advantages of this technology are: Reduction of amount of fuel used for field works by practically 2 times; Reduction of humidity losses from the topsoil occurring during tillage with harrow with heavy disks; Reduction by cca 50 percent of humus and soil carbon

	losses.
Costs	
Investment costs	Machinery wearing cost is by 2 dollars smaller than in case of traditional tillage with harrow with heavy disks and amounts to \$192 /ha in 10 years or \$19.2 /ha/year. For an area of 200 000ha the investment costs amount to\$ 38.4 mln once in 10 years.
Operation and maintenance costs	Operation and maintenance costs are by 28\$/ha/year smaller than in case of traditional tillage with harrow with heavy disks and amounts to \$320 /ha/year.
CO2 reduction cost	CO2 emissions reduction - 238 thousand tons from 200000 ha recently cultivated according to this technology. CO2 reduction cost - 238 000 t x \$30 = \$7.14 mln per year.
Technology lifetime	Gradually this technology will be improved by employment of methods allowing to increase the inflow of organic matter in soil.
Other	The yields of grain ensured by this technology amounts to cca 3t/ha/year. Cost of grain production from 1 ha = 2.7 t/ha/year. \$250 = \$675 /ha/year. Total annual costs amount to - \$339 /ha/year. Total benefit = 675 -339 = \$336 /ha/year or \$6.72 mln /year on 200 000 ha.

ⁱ This fact sheet has been extracted from TNA Report - Technology Needs Assessment for climate change mitigation - Republic of Moldova. You can access the complete report from the TNA project website <http://tech-action.org/>