Technology Fact Sheet

Sector	**Agriculture**
Adaptation needs	Adaptation to increasing desertification by dehumification, dissolution and secondary compaction of the soil arable layer Climate aridization along with classic cultivation lead to dehumification of agricultural soils, soil structure damage and strong secondary compaction of the arable layer (fig.3). Currently the arable layer of agricultural soils lost its natural ability to compaction resistance. Dehumification, dissolution and secondary arable soil compaction is a global problem, but particularly acute in Moldova where 80 percent of soils are characterized by fine texture. These soils have a high production capacity only if their structure is agronomically favorable and contributes positively to regulate air-fluid and nutrients regimes, ensuring optimal conditions for plant growth and development. In a compacted layer of soil moisture reserves are almost by 2 times less accessible than in the same loose layer with agronomically favorable structure. Therefore, soils with high content of humus, agronomically favorable structure and loose arable layer are more adapted to climate change. To adapt to increasing desertification due to dehumification, dissolution and secondary compaction of the arable layer of soil generated by climate change, 6 technologies described below are recommended.
Name of technologies	**Vetch field as green fertilizer into 5 year crop rotation**[i]
How this technology contributes to adaptation	Vetch can yield two crops of air mass (about 12 t / ha dry air mass containing 4% nitrogen) and roots (dry root mass of about 8t/ha containing 2 % of nitrogen) per year. It provides for accumulation of about 20 tons of organic matter in soil which ensures synthesis of almost 5 t / ha of humus which contains about 400 kg of nitrogen. This amount of humus is sufficient to create a positive carbon and nitrogen balance in soil during 5 years. The arable layer will become structured, loose, will contribute to a favorable air-fluid and nutrients regime and will increase the plants resistance to drought. Technology entails environmental friendliness of agriculture, more effective use of water and nutrients from soil.
Short description of the technology option sourced from ClimateTechWiki.	The technology is based on the fact that green mass of vetch is very rich in nitrogen, which leads to fertilization of soil on account of symbiotic nitrogen. A good quality green mass contributes to rapid synthesis of organic matter in soil. The root system of vetch is well developed and contributes to the structuring of the arable soil layer. Given the two harvests of vetch per year, the arable layer of the soil becomes biogenic, structured,

	loose, and permeable for water and roots. Technology (small scale/long term implementation)
How this technology will be implemented and spread across the sector?	This technology can be successfully implemented on all agricultural lands of farmers. It can be implemented under any land cultivation system. In order to implement this technology, it is necessary to create the autumn and spring vetch seeds production operation. The autumn vetch shall be planted, as appropriate, in late August or early September and spring vetch – in early May of the next year after incorporation of autumn vetch mass into soil.
Country social development priorities	This technology ensures a long-term preservation of soil fertility - the main means of production of the country, protects the land from desertification processes, creates economic prerequisites for replacing the existing system of subsistence agriculture with sustainable agriculture based primarily on employment of natural processes, biological and renewable resources and only secondarily - purchased resources. Preserved internal resources, the soil with its characteristics, water, biodiversity, etc., are a prominent feature of sustainable agriculture and subsequently, of combating desertification and land degradation caused by climate aridization.
Country economic development priorities (economic benefits)	The total crop growth over the whole period of vetch green mass action (5 years) is 4t/ha cereal units or 800 € / ha / year in monetary terms. The net benefit is € 191 / ha / year. If applied regularly, this technology contributes to a positive balance of soil carbon, excludes CO2 emissions, reduces the need to purchase and apply nitrogen fertilizers by 80-90 percent.
Country environmental development priorities (environmental benefits)	It stops soil degradation, makes the humus and soil carbon balance positive or well-balanced, cardinally improves the soil biota status, increases resistance of soil to pollution and of plants to drought.
Social benefits	The social - economic effect of this technology implementation will be the following: it will increase the turnover and quality of agricultural production on arable soils, wellbeing of rural population, decrease migration, create the economic prerequisites for projects to improve the ecological status of villages.
Other considerations and priorities (ex. market potential)	This technology will be employed in colder parts of Moldova, where vetch can not be used as an intermediate crop for green fertilizer
Capital (investment) costs	Investment costs are the same as the cost in conventional agriculture (150 euro once in 10 years or 15 euro / ha/year. For areas of 200 000 ha –

	30,000,000 euro once in 10 years or 3,000,000 euro /year (for purchasing of the necessary equipment).
Operational and maintenance costs	Organization of the seed production process or purchasing of vetch seeds is worth 85 € / ha / year. These expenses are included in the cost of technology. Expenses for seedbed preparation, sowing and incorporation of vetch green mass into soil are € 170 / ha / year, given two harvests per year for 5 years - 34 € / ha / year. Implementation area is 200 000 ha. The operational costs of technology is: €34 x 200 000=€6 800 000 Total cost: €9 800 000
Growth potential	The weight of this technology on the market will grow along with environmental friendliness of agriculture

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