Technology Fact Sheet for Adaptation

Technologies in the arable farming

A.4. Forest strip protection of agriculture land [i]	
1. Introduction	A forest strip or windbreak is a plantation usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from the wind and to protect soil from erosion. They are commonly planted around the edges of agriculture land. Windbreaks are also planted to help keep snow from drifting onto roadways and even yards. Other benefits include providing habitat for wildlife and in some regions the trees are harvested for wood products.
2. Technology characteristics	Mongolia is located in the northeast of Central Asia with a dry and windy climate. Rain fed agriculture is subject to higher risks of soil erosion due to stronger wind especially in spring and autumn. In order to reduce negative effects of wind and maintain soil moisture, planting tree and bush strips as protection from wind is recommended. This method is used by Russia, Kazakhstan, and Canada where climate conditions are similar. Due to intensification of dryness and warming, the number of days with strong wind and dust storms has been increasing. Most farms apply bare soil fallow on almost 50% of cereals plantations, which leads to wind erosion and loss of soil fertility. Protection from those losses and climate change impacts is crucial today. Approximately 50 aspen and willow trees should be planted per ha (4 rows with 4 m distance and strip length is 50 m). Forest strips can increase cereals production by 20-30 % and vegetables by 50-70 %.
3. Country specific applicability and potential	It was implemented in 1980s in Mongolia but stopped during 1990s due to social and economic hardships in the transition period. Previous forest strips were cut down and destroyed.
4. Status of technology in country	The technology was successfully implemented in agricultural land in Mongolia during 1975 to 1990 and 1.5% of the total agricultural land or 20,000 ha had forest protection strips. Methods and guides are available. However, today few cereal fields have forest strip protection.
5. Benefits and impact on the country development ✓ Economic (-	Farmers can benefit from stable and higher crop production. The country can benefit from reduced desertification, land degradation and sand movements. Cultivation of 1000 tree seedlings of trees requires 1 person/year and seedling transplantation requires 2 persons/0.5 year for 100 ha. In total,

Job creation; - Investment) ✓ Social (- Income generation; - Education; - Health) ✓ Environmental	1200 persons are required to work at tree nurseries and 260 persons for planting and caring for growth of trees. Applying this technology also needs equipment and land for nurseries, irrigation systems, plastic tunnels, tree bed diggers and tractors. - All costs will be paid by enterprises and farmers. The Government needs to provide support in the form of tax exemptions and loans with low interest and a supportive legal environment. Social benefits are difficult to estimate because the technology does not directly aim at increasing crop production. Instead it intends to protect soil fertility from soil erosion due to wind and rain. There may be indirect benefits of forest strips for human health by improving micro climate condition in terms of air and soil. Forest protection strips can also contribute to the reduction of ecosystem degradation, air pollution and greenhouse gasses.
6. Climate change adaptation benefits	The technology can help reduce soil erosion due to wind and alleviate droughts. It can increase crop production today as well as under future climate change.
7. Financial Requirements and Costs	**The total required funding:** 1.2 million tree seedlings for 26,000 ha cost 2.4 million USD, seedling planting, nursery, and irrigation cost is estimated to be about 3.9 million USD per year. Farmers can pay the cost in cash and credits. At least 68% out of total 650,000 ha agricultural land needs to be protected with forest strips, and 32.5 million tree seedlings will be needed, at a total cost of 70 million USD.
8. Institutional requirements	The main challenge of the technology is that large amount of seedlings need to be nursed. Also caring and irrigation costs are high in the first 1-2 years. International and government assistance is essential. However, some expenses can be paid by farmers. Today a law on “Soil Protection and Fighting against Desertification” has been submitted to the Parliament for approval. In the draft law, plantations bigger than 100 ha are requird to have forest strip protection. Support to tree nursery farms is necessary and agricultural land with forest strips can be exempted from tax.

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment For Climate Change Adaptation– Mongolia. You can access the complete report from the TNA project website http://tech-action.org/**