Technology Fact Sheet for Adaptation

Technologies in the arable farming

A.8. Potato seed production system using aeroponics [i]	
1. Introduction	Potatoes are the second most important crop after wheat in Mongolia. Limited accessibility to high quality potato seeds is a perennial problem amongst many growers and is partly attributable to inefficiencies in various links of the seed production system.
2. Technology characteristics	Aeroponics would appear to have a number of potential attributes to make seed potato production more efficient. The technology has potential to eliminate all but one generation of seed potato multiplication in the field, thus lowering costs and raising the plant health quality of the first field production generation. This technology has 3 steps in order to supply reliable potato seeds. 1. Produce mini tubers using aeroponics (Crop environment such as nutrients, temperature and moisture can be artificially created.) 2. Produce potato seeds using mini tubers at agriculture extension fields of *aimags* or seed producers fields 3. Supply healthy potato seeds to farmers. According to experiments in Mongolia, micro plants grown in laboratories can withstand stress in 7-14 days. After transplanted in aeroponic greenhouse, new tubers come up after 5-6 days and can be harvested after 45-48 days. During a harvesting season, they can be partially harvested 7 to 9 times. This technology has high reproduction coefficient and requires less labor, time and financial resources than potato seed production in soil. Cost per tuber is reduced and would be approximately 98.7 *tugrugs* (0.08 US cents).
3. Country specific applicability and potential	According to the technology, about 20 micro tubers each of 5 grams can be grown from one potato of new variety. When about 5000 new grown tubers are transplanted into greenhouses, 95% can grow successfully, which can provide a good source of high quality potato seeds. Mini-tubers can be initial elite seed materials which can develop to produce potato seeds in order to supply to farms. Activity can be sustainable as long as products can be sold and grown again. This technology can improve the supply of good and healthy potato seeds and increase the potato production per area. This technology should be further piloted and widely applied in all the potato farms in the country. The introduction and application of this technology requires about 5-6 years.

4. Status of technology in country	In order to intensify the production of potato tubers, research on growing potato tubers in airoponic systems with optimal conditions in air has being carried out by the Mongolian National Agriculture Research Institute under the "Mongolian Potato Program" since 2007. Mongolia has become the 5th country in Asia to pilot this technology in potato seeds production. In 2008 and 2009, mini tubers were planted in greenhouses and fields with drip irrigation systems. The success rate of growth was 100 % and 5-8 healthy potato tubers grew from one bush. This confirms the good quality of the seeds. This method can be applied by potato seed farms and greenhouse farms. The technology allows for healthy potato of high quality probably twice a year if all conditions are created properly.
5. Benefits and impact on the country development ✓ Economic (Job creation; Investment) ✓ Social (Income generation; Education; Health) ✓ Environmental	It will be basis of sustainable supply of potato seed of adapted potato varieties and free of virus infections. Establishment of local production systems instead of transporting to farms would save energy, time, and cost. New income will be generated through selling mini- tubers as elite potato seeds. It can be harvested twice a year and in total 200,000 tubers can be produced per year. They can be planted as elite potato seeds in the country in order to supply reliable potato seeds to farms. Capacity of national staff will be improved to use the technology. The technology is environmentally friendly. The potato tubers will absorb 99.8% of their nutrients in the air and 0.02 % in fog types, so photosynthesis is intensified.
6. Climate change adaptation benefits	Since the micro crop is grown in laboratories and mini tubers are grown in greenhouses, so it is less dependent on weather and climate variability and changes. Establishment of local production systems would reduce GHG emissions.
7. Financial Requirements and Costs	Some research expenses can be provided by National Scientific Foundation of Mongolia. Other equipment, materials and substances can be supplied with the support of the Agency of Science and Development and 'Mongolian Potato Program'. Capacity building, training and experience sharing trips need to supported by international organizations. <u>Cost allocation</u>:

	International – 20,000 USD The state budget: - 40,000 USD Enterprises and individuals – 22,000 USD **The total required funding: 82,000 USD.**
8. Institutional requirements	Possible areas of research to improve productivity include optimizing nutrient solutions, plant density, number of harvests and harvesting intervals. Resources such as greenhouses and capacity building are required.

[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/**