Technology Fact Sheet for Adaptation

Technologies in the arable farming

A.6.Crop rotation of cereals in Mongolia [i]	
1. Introduction	Crop rotation is the practice of growing a series of dissimilar types of crops in the same area in sequential seasons. Crop rotation confers various benefits to the soil. A traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops. Crop rotation also mitigates the build-up of pathogens and pests that often occurs when one species is continuously cropped, and it can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.
2. Technology characteristics	Growing the same crop in the same place for many years in a row disproportionately depletes the soil of certain nutrients. With rotation, a crop that leaches the soil of one kind of nutrient is followed during the next growing season by a dissimilar crop that returns that nutrient to the soil or draws a different ratio of nutrients. During the period of transition towards a market economy since 1990, previous irrigation systems collapsed and spring wheat was planted without proper rotation, which caused soil erosion, land degradation, and weeds. As a result, wheat yields have decreased and irrigated land has reduced to only 5,000 ha. Therefore, under the national agriculture campaign '*ATAR*-3' initiated in 2010-2011, irrigated land is increasing due to the Government support of investments and policy.
3. Country specific applicability and potential	Research on rotation systems in irrigated planting has only started recently in Mongolia. The choice and sequence of rotation crops depends on the nature of the soil, the climate, and precipitation which together determine the type of plants that may be cultivated. Other important aspects of farming such as crop marketing & economic variables must also be considered when deciding crop rotations. In the 1980s, several rotations were experimented within Mongolia. For example: 2-year rotations of bare fallow and wheat or barley, 3-year rotations of bare or occupied fallow or green manure/wheat/oats for grain or green fodder/barley or wheat, 4-year rotations of bare fallow/potatoes or wheat/wheat/oats for grain or green fodder or barley and a 5-year rotation of bare fallow/wheat/barley/peas + oats/wheat. But it did not continue nor was practiced during the transition period. Today, research and experiments of crop rotations is required. Incorporation of livestock is possible when forage plants are planted. Interaction between animals and land can be beneficial.
4. Status of	Crop rotation is a common practice internationally. But, in Mongolia

technology in country	crop farms do not have the appropriate technology for crop rotation, varieties of cereals which can grow well and produce high yield under the Mongolian soil and climate conditions.
5. Benefits and impact on the country development ✓ Economic (- Job creation; - Investment) ✓ Social (- Income generation; - Education; - Health) ✓ Environmental	A general effect of crop rotation is that there is a geographic mixing of crops, which can slow the spread of pests and diseases during the growing season. The different crops can also reduce the effects of adverse weather for the individual farmer and, by requiring planting and harvest at different times, allowing more land to be farmed with the same amount of machinery and labour. - Nutrients: Rotating crops adds nutrients to the soil. In order to improve soil fertility, different crops such as cereals and legumes would be planted. Technical investment will be required and jobs will be created. - Pest and weed control: Crop rotation is also used to control pests & diseases that can become established in the soil over time. The changing of crops in a sequence tends to decrease the population level of pests. A different crop allows the weeds to be eliminated, breaking the ergot cycle. - Soil erosion: Crop rotation can greatly affect the amount of soil lost from erosion by water. Combining the country's traditional methods with world advanced technology can help develop proper agro-technology to increase production. Income of farmers will increase and national food security will be improved. Also, forage for livestock will be produced. Crop producers and their workers can benefit from the technology.
6. Climate change adaptation benefits	Crop rotation can reduce negative impacts such as decreases in soil organic matters, spread of pests and weeds and soil erosion under dry and warming climate condition.
7. Financial Requirements and Costs	**The total required funding:** About 400,000 USD might be required every year. Research and experiments would require 3-5 years and the technology implementation requires 5 years.
8. Institutional requirements	Some irrigation systems are being constructed through government support and enterprises investments. The main challenge is a lack of financial resources.

[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/**