Sector	Agriculture
Sub-sector	Crop production
Technology name	Conservative agriculture
Option name	Conservative tillage
Scale	Small-scale
Availability	Available
Technology to be included in prioritization?	Yes

Background/notes

Conservation tillage refers to a number of strategies and techniques for establishing crops in a previous crop's residues, which are purposely left on the soil surface. Conservation tillage practices typically leave about one-third of crop residue on the soil surface. This slows water movement, which reduces the amount of soil erosion. Conservation tillage is suitable for a range of crops including grains, vegetables, root crops, fruits and wines.

Unpredictability of rainfall and an increase in the mean temperature may affect soil moisture levels leading to damages to, and failures in, crop yields. Conservation tillage practices reduce risk from drought by reducing soil erosion, enhancing moisture retention and minimizing soil impaction. In combination, these factors improve resilience to climatic effects of drought and floods. Improved soil nutrient recycling may also help combat crop pests and diseases.

Advantages of the technology:

Conservation tillage benefits farming by minimizing erosion, increasing soil fertility and improving yield. Plowing loosens and aerates the soil, which can facilitate some deeper penetration of roots. Tillage is believed to help in the growth of microorganisms present in the soil and help mix in the residue from the harvest, organic matter and nutrients evenly in the soil. Conservation tillage systems also benefit farmers by reducing fuel consumption and soil compaction. By reducing the number of times the farmer travels over the field, farmers make significant savings in fuel and labor. Labor inputs for land preparation and weeding are also reduced once the system becomes established. In turn, this can increase time available for additional farm work or off-farm activities for livelihood diversification. Additionally, once the system is established, requirement for herbicides and fertilizers can be reduced.

Disadvantages of the technology*:*

Conservation tillage may require the application of herbicides in the case of heavy weed infestation, particularly in the transition phase, until the new balance of weed population is established (FAO, no date). The practice of conservation may also lead to soil compaction over time; however this can be prevented with chisel plows or subsoilers. Initial investment of time and money, along with purchases of equipment and herbicides, will be necessary for establishing the system. Higher levels of surface residue may result in increased plant diseases and pest infestations, if not managed properly. There is a strong relationship between this technology and appropriate soil characteristics. This is detrimental in high clay content and compact soils.

Implementation assumptions (How the technology will be implemented and diffused across the subsector)	Such technology will be applied at agricultural cultivated lands with low fertility.

Impact statements

(How the options impact countries development priorities)

Countries social development priorities	• Contributes to food security priority by increasing productivity • Leads to increase in income of rural population • Reduces migration to urban areas from rural

	communities
Countries economic development priorities	• Contributes to diversification of economic activities priority of the country • Leads to improvement of economic condition of rural population • Leads to increase in agricultural productivity
Countries environmental development priorities	• Reduces greenhouse emission • Increases land fertility
Other considerations and priorities such as market potential	• Agricultural production will increase leading to decrease in the dependence of imported agricultural products at local markets • There will be a need for wide range capacity building activities to increase knowledge of farmers on applied technology • Technology application will create demand for specific agricultural machinery
Costs	
Capital costs over 10 years	It is impossible to immediately shift from traditional cultivation methods to conservative tillage, as this process will take decades. Therefore, the process could be launched by pilot initiatives in all agricultural regions in order to initiate application of technology among local farmers. The most important cost for farmers will be machinery and fuel. There will be a need for specific agricultural machinery. Such machineries may be purchased by the government and provided to Agro-leasing Service Centers that currently provide services in all regions of the country. Farmers may use services of the Center or buy the machinery on leasing terms. Approximate costs for such machineries are about 130,000-150,000 USD. Considering that pilot initiatives should be launched in all agricultural regions (there are about 50 regions in the country), overall capital costs for 10 years will be 7,500,000 USD.
Operational & maintenance costs over 10 years	There will be a need for maintenance costs for purchased machinery. It will add 10% per year to the overall price of the machinery.
Other costs over 10 years	Additional costs will be needed to provide necessary capacity building activities for local farmers. Consulting services could be provided by the 10 existing Regional Agricultural Advisory Centers. There will be need for an additional 3,500,000 USD to organize necessary capacity building activities, including awareness raising activities, publication of different information materials and training activities.