

Sector	Agriculture
Sub-sector	
Technology name	Optimizing of location and structure of agricultural lands with introduction of crop species resistant to expected climate changes
Option name	Introduction of plant varieties resistant to climate change
Scale	Large-scale
Availability	Available
Technology to be included in prioritization?	Yes
Background/notes Agriculture is of great importance to Azerbaijan, accounting for a large portion of employment, rural livelihoods, food security, and rural growth. However, the sector is highly climate sensitive and there exist potential adverse changes in temperature, precipitation, and frequency of extreme events (e.g. droughts, heat waves, floods) with climate change. New plant varieties more resistant to high temperatures and droughts will enable farmers to sustain or increase productivity. The introduction of new cultivated species and improved crop varieties is a technology aimed at enhancing plant productivity, quality, health and nutritional value and/or building crop resilience to diseases, pest organisms and environmental stresses. Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm, taking into account the different returns from value-added crops with complementary marketing opportunities. New and improved crop species can be introduced through farmer experimentation with new varieties. Agricultural researchers and extension agents can help farmers identify new varieties that may be better adapted to changing climatic conditions, and facilitate farmers to compare these new varieties with those they already produce. In some cases farmers may participate in crossing select seeds from plant varieties that demonstrate the qualities they seek to propagate, in order to develop new varieties with the characteristics they desire. Breeding new and improved crop varieties enhances the resistance of plants to a variety of stresses that could result from climate change. These potential stresses include water and heat stress, water salinity, water stress and the emergence of new pests. Varieties that are developed to resist these conditions will help to ensure that agricultural production can continue and even improve despite uncertainties about future impacts of climate change. Varieties with improved nutritional content can provide benefits for animals and humans alike, reducing vulnerability to illness and improving overall health. Advantages of the technology: By introducing new crop species farmers will be able to cover production losses made by climate change impact with increased yield and quality. Crop diversification provides better conditions for food security and enables farmers to grow surplus products for sale at market and thus obtain increased income to meet other needs related to household well-being. The process of farmer experimentation and the subsequent introduction of adapted and accepted varieties can potentially strengthen the farmers cropping systems by increasing yields, improving drought resilience, boosting resistance to pests and diseases, as well as by capturing new market opportunities. Disadvantages of the technology: The costs of new species, as well as costs for cultivation can be higher than others. Farmers may need to be provided with necessary capacity building and awareness raising activities in order to adapt new technology. Farmers may also face risk from poor economic returns if crops are not selected based on a market assessment.	
Implementation assumptions (How the technology will be implemented and diffused across the	Such technology will be applied mainly in arid and semi-arid zones of the country. Assessment of vulnerability should be provided in the areas with most risk to negative

subsector)	impacts of climate change. Agricultural research institutions must be involved in the process in order to provide analyses and experiments with new species.
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
Countries economic development priorities	• Leads to improvement of economic condition of rural population • Contributes to the diversification strategy of countries economy by increasing weight of agricultural sector within economic system
Countries environmental development priorities	• Reduces negative impact of forecasted climate change
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
Costs	
Capital costs over 10 years	Financial requirements of diversification revolve around the costs involved in researching the species to be planted and training in the management of diversified systems. These activities could be provided by existing Agricultural Research Institutions in the regions. Approximate costs for researching would be around 20-30 million USD. Preliminary feasibility study and assessment of vulnerability of currently used species in different regions with different ecosystems are also to be considered in the financial requirements. There would be a need for assessment of currently used species in countries with relatively hot climate (e.g. species currently applied in Egypt or southern part of Turkey) as the forecasted temperature increase would be similar. This may be done through a pilot project covering all agricultural regions of the country. The approximate cost of such a project will be around 8-10 million USD. Infrastructure and marketing costs should also be considered. Costs of farmer experimentation are generally low, but results may only have local applicability. Capital investment will relate to the purchase of new seed varieties (if not available 'wild' locally) and labor time. In total, capital costs over 10 years will be around 60-70 million USD.
Operational & maintenance costs over 10 years	There might be a need for operational and maintenance costs for purchased equipment, but it will not be a significant amount and could be provided using local resources.
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 2 million USD to organize necessary capacity building activities, including awareness raising activities, publication of different information materials and training activities.