ECONOMIC LOSSES RESULTING FROM THE IMPACT OF ENVIRONMENTAL PROBLEMS ON THE AGRICULTURE OF UZBEKISTAN. SUITABLE METHODS FOR UZBEKISTAN USED BY DEVELOPED COUNTRIES TO OVERCOME INSTABILITY IN AGRICULTURE

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Abstract: The objective of this article is to focus on current environmental problems, which are harmful for Uzbekistan's agriculture and future economy, discussion on methods of developed countries to address environmental problems and prevent agricultural system from instability.

Keywords: Drought, pollution, forecasted economic losses, drip irrigation, soil erosion, innovative agricultural ideas.

Agriculture is the bridge between environment and economy. People started farming 12000 years ago during the Neolithic era. In Uzbekistan, first founded farming tools belonged to 7000 -8000 year's history and still agriculture has the biggest influence in people's life. Moreover, agriculture is accepted as one of the main contributor in the economy of Uzbekistan, occupying 26% of labor force and 25% of GDP in economy sector. Unfortunately, ecological issues influencing in the productivity of agricultural areas and it can bring Uzbekistan to the problematic outcomes. Nowadays, global warming, drought, erosions, water and air pollutions are the most dangerous disasters of agriculture. In consequence, experts researching and creating different methods of preventing agricultural activities from environmental issues. This global problem covering plethora of countries every year and influencing in the world economy.

Environmental problems such as drought, climate changes, erosion, air pollution, water pollution etc. could be the biggest threat for Uzbekistan. Except environmental problems, it is vital to mention "agricultural shocks"[1] including dam collapse in 2020 in Sardoba[2] water reservoir, which resulted in damage of irrigation system or severe dust storm in 2021. After dust storms, agriculture faces problems such as the loss of plant tissue and reduced photosynthetic activity because of sandblasting, increased soil erosion.

Main environmental problems:

[1] Weather shocks affect agricultural production through frequent floods, droughts, and storm surges with subsequent impacts on rural livelihoods (*Birthal, Roy, & Negi, 2015*).

[2] **Sardoba** is a district of Sirdaryo Region in Uzbekistan. The capital lies at the town Paxtaobod.

- **Drought:** Uzbekistan considered as a landlocked country meaning that it has not any access to the oceans or seas. Consequently, the country has few internal freshwater resources. Uzbekistan was ranked at 152nd out of 180 listed nations, having 531.25 cubic meters of renewable internal freshwater resources per capita. This statistics shows that the annual yield may decrease for 45% in regions such as Karakalpakstan, Kashkadarya and Surkhandarya. Karakalpakstan provides half of Uzbekistan's total rice harvest. However, in 2005, Deputy Economics Minister Abad Zarekeyev predicted it could lose half its crop. His prediction was near to reality as in 2021, Uzbekistan imported 28,000 tons of rice worth 7.5 million US dollars from 14 foreign countries. These figures are expected to rise because of drought and overpopulation. As a result, annual budget spent on rice importing calculated as 12 million US dollars annually.
- **Soil erosion:** More than 50 % of farmlands in Uzbekistan are estimated to be affected, to different degrees, by wind erosion. About 19 % of the irrigated area of Uzbekistan is affected by water erosion (*Becknell et al. 2003*). Erosion of soil caused because of strong wind activity, ploughing of sloping lands; inappropriate irrigation and livestock grazing practices. Common cropping practices: usually leaving open the soil between rows of cotton or wheat and involving intensive tillage expose the soil to significant erosion. Furrow irrigation may result in soil erosion in areas with inadequate land leveling (*World Bank 2003*).Uzbekistan exported 180 types of agricultural products to 80 world countries. Now, the portfolio of projects in the agricultural sector of Uzbekistan is being implemented with the participation of the World Bank ($659.3 million), the International Fund for Agricultural Development (FIDA) ($153.5 million), and the Food and Agriculture Organization of the United Nations (FAO) ($8.69 million) (*East fruit website*). These numbers may fall because of degradation of land in Uzbekistan as soil erosion reduces productivity of agricultural lands for 3.4%. Other economic impacts of soil erosion in Uzbekistan can include loss of productivity of land, infrastructure and property.
- **Air and Water pollution:** Usually, power stations, chemical factories and other polluting industries are located in suburban places into areas surrounded by agriculture where emissions are closer to crops and therefore have an immediate impact on yields. For instance, Chirchik-Bozsu cascade hydroelectric power station located near to Chirchik River in Chirchik suburban area where also located 914 hectares of crops field. This kind of stations produces large amount of Ozone (O_3). Ozone has a damaging impact on plants. When O_3 is absorbed via the pores on the leaf surface, it forms free radicals that attack cell membranes. Crops near the stations could be damaged and sometimes even poisoned.

In order to have the sustainable agricultural growth Uzbekistan should be able to provide farmers with water-saving irrigation technologies. The best way to overcome drought can be method of drip irrigation introduced by **Israel**. According to experts, all crops can be grown by drip irrigation with 95-100% of efficiency when traditional water use provides only 85%.

In Israel, farmers get 7 tons of cotton from 1 hectare but in Uzbekistan, this indicator is 2.5 tons from 1 hectare. If government of Uzbekistan launches the drip irrigation system of Israel, cotton production of Uzbekistan can rise for approximately 36% and with the minimum usage of water. In 2017, Soil Health Institute in the **USA** introduced the breakthrough in bioscience-soil DNA testing. "When you look to improve soil health, it's beneficial for farmers and the environment. When you can increase that soil organic carbon by 1%, you increase capacity to hold water from 2500 to 12000 gallons per acre. That means a lot for farmers' and ranchers' ability to withstand drought and stay in business"- explained Dr. Wayne Honeycutt of the Soil Institute. This invention can be the best way of avoiding soil erosion in Uzbekistan. Because, when farmers know about the health of soil, they can measure how much fertilizer to use. Fertilizers are another reason for soil erosion in Uzbekistan. Importing soil DNA testing laboratories are the best solution for both economy and agriculture of Uzbekistan. **India's government** and private crop insurer have been able to organize necessary insurance framework, which will help the farmers if they are to face the brunt of a natural or a human-made disaster, floods, hurricanes, chemical fogs and disasters. This insurance system should be developed in Uzbekistan, as climate change influences in crops' growth and organic properties and impacts on farmers' budget.

In conclusion, it is vital to highlight again that agriculture is the important sector in the economy of Uzbekistan. There were implemented a lot of researches and scientific innovations in Uzbekistan. However, this country still needs modern and innovative imports in this field to prevent agriculture from ecological issues and provide economic growth. Developing green economy is one of the most discussed topic in different conferences. We need to invent the way of contributing in economy by agriculture and not harming the environment.

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