



Contaminated the Lands in Karabakh and Ways to Bail Out

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Abstract

The thesis contains information on the condition of organic agriculture in the Republic of Azerbaijan, as well as proposals for the establishment of an integrated plant protection system. The Report states, among other things, that in order to improve the agro-ecology approach in agriculture in Azerbaijan, relevant legislative and regulatory acts must be prepared and adopted; a regulatory mechanism aimed at increasing the efficiency of farmers' environmental activities based on the "polluter pays" principle must be developed and implemented; and scientific innovations, energy and resource saving technologies, waste-free and environmentally safe technological processes must be promoted. It also casts light to measures in regional environmental plans and socioeconomic development programs targeted at supporting and growing organic agriculture; agricultural landowners and land users should implement steps to conserve and improve soil fertility, as well as other environmental activities.

Keywords: Pesticides; Harm of Chemical to Environment; Pollution; Cultivation; Contamination of River Basins; Soil

Introduction

All countries' existence and capacity for development are seen to be largely dependent on their access to land resources. For this reason, there has always been competition for land ownership among people, administrative divisions within nations, and governments throughout history.

All facets of political and socioeconomic life underwent qualitative changes as a result of the fall of the USSR and the independence of our republic. Laws also established private and municipal ownership rights in addition to the one type of state ownership of property [1].

The top fertile layer of the earth is called soil, and it is the primary source of production in the agricultural sector. In addition to safeguarding the population's living standards and health, maintaining and improving the land's fertility

gives fantastic chances for the next generation. In order to efficiently use the land, the water, food, air, and heat regimes must be carefully controlled. An ideal agricultural vibes must be developed based on biological development features of agricultural plants. But if the soil isn't properly cared for, its advantageous qualities gradually vanish and it loses its suitability for growing crops. Any improper use of the land results in inadequacies such as a long-term loss of fertility, a breach of the ecological balance, and a decline in productivity and quality indices [2].

To use land resources favorably to meet landowners' needs, Azerbaijan's President signed a Decree titled "On new division of economic regions in the Republic of Azerbaijan" on July 7, 2021, number 1386.

This Decree aims to reorganize the country's economic regions in order to improve the effectiveness of economic

administration following the liberation of the Republic of Azerbaijan's occupied areas [3].

The following division of economic regions was authorized by the decree:

Baku economic region (Baku);
 Nakhchivan economic region;
 Absheron-Khizi economic region;
 Mountainous Shirvan economic region;
 Ganja-Dashkesan economic region;
 Karabakh economic region;
 Gazakh-Tovuz economic region;
 Guba-Khachmaz economic region;
 Lankaran-Astara economic region;
 Central Aran economic region;
 Mil-Mughan economic region;
 Sheki-Zagatala economic region;
 East Zangazur economic region;
 Shirvan-Salyan economic region.

Among these zones, the least developed lands are those falling on Karabakh economic region, due to circa 30 years of occupation of the lion's share of the land by Armenia and lands careless usage by separatists stationed there. The non-relevant usage, as well as contamination of the soil with chemicals, weaponry odds and ends have worsened the lands to zero efficiency. The processes of soil degradation have rapidly grown as a result of an increase in anthropogenic impact on the soil, including incorrect human economic activity, some shortcomings in the management of soil resources, and the effects of climate change [4].

Another degradation factor has been connected with overgrazing (overstocking) of cattle, deforestation, flora loss, poor land use, and the effects of industrial production that have been the main causes of land degradation. Additionally, it's critical to address chemical contamination of irrigation and soil water, as well as chemical pollution brought on by improper use of pesticides and agrochemicals on agricultural plants.

The lands in Karabakh have undergone the following degradations:

Physical (violation of the soil's hydro physical properties, layer disintegration), Chemical (violation of the soil's chemical properties, nutrient depletion, repeated salinization, pollution with toxic substances), and Biological (reduction in the species composition of living things, disruption of the balance between the soil's micro flora and micro fauna) effects are just a few examples.

The experts working in unoccupied from Armenian separatists' lands have analyzed the soil and have decided

that deforestation, desertification, salinization, and soil erosion have been the main types of degradation. Failure to ensure stable agricultural development, inefficient irrigation and other agro technical measures organized improperly, cultivation of land on slopes and other inclined areas, spontaneous production of forest materials, and overcrowding of pastures all contribute to the emergence of various degradation processes. The occurrence of surface water flows and the impact of the wind both foster the growth of the erosion process by fostering the mechanical disintegration of the soil [5].

As an example of land degradation, we can show soil disaster around the river called Okhchuchay. Okhchuchay River is a left tributary of the Araz River that flows through the territory of the Syunik region of Armenia and the Zangelan region of Azerbaijan in the south of the Lesser Caucasus. The alarm is coming from the Azerbaijani Ministry of Ecology and Natural Resources who has announced the river basin's pollution in December 2022. The government claims that the amount of contaminants, especially heavy metals, is significantly higher than what is allowed.

As a short background, Okhchuchay's entire length is 40 kilometers, 40 of which are on Armenian soil. Large mining and industrial operations, as well as a number of Armenian cities and villages, are situated here. As a result, domestic garbage, heavy metals, and other hazardous chemicals frequently contaminate the river's water. The riverbed in the Azerbaijani portion has a lot of household trash with Armenian writing on it. The mining and industrial waste is the worst ecological catastrophe. These wastes are more harmful to living things and get worse at specific times. The color of the river water has altered, and there have been more fish deaths as a result of the effect of these contaminated fluids dumped into Okhchuchay in recent days. In regions close to the river, tree branches have dried out [6]. The investigation led to the discovery that the occupation had major landscape-ecological consequences on the river basin's ecosystems. Araz oak, walnut, cypress, and other industrially significant trees were broken, while other kinds of trees and plants were burned as firewood. Forests were ruthlessly pillaged. Currently, these forests that appear green are made up of ball-shaped trees that are sprouting up on the roots of trees that the Armenians cut down. The transfer to future generations of the extraordinarily valuable natural gene pool of the Okhchuchay basin depends on the regeneration and conservation of such forests [7].

Another disaster in unoccupied lands has been cultivating narcotics in vast hectares. To increase productivity, the separatists have exceeded land use with chemicals and pesticides which has impacted the soil nearly to death [8].

There are several factors that can contribute to soil degradation or ruin:

- ❖ **Erosion:** Soil erosion occurs when the top layer of soil is removed or displaced by wind, water, or human activities. It can be caused by factors such as improper land management practices, deforestation, overgrazing, and construction activities. Erosion leads to loss of fertile soil, decreased water-holding capacity, and reduced nutrient content.
- ❖ **Deforestation:** Clearing forests for agriculture, logging, or urbanization destroys the natural vegetation cover that protects the soil. Without trees and plants, the soil becomes exposed to erosion, and the nutrient cycling process is disrupted, leading to soil degradation.
- ❖ **Overgrazing:** When animals graze excessively on vegetation, they remove the protective cover of plants, leading to soil compaction, erosion, and reduced plant growth. Overgrazing can also result in the loss of desirable plant species and the invasion of less desirable ones, further degrading the soil.
- ❖ **Agricultural practices:** Unsustainable agricultural practices such as excessive use of chemical fertilizers, pesticides, and herbicides, as well as improper irrigation and tillage techniques, can degrade the soil. These practices can lead to nutrient imbalances, soil acidification, reduced organic matter content, and pollution of groundwater.
- ❖ **Pollution:** Soil can be contaminated by industrial activities, improper waste disposal, and the use of chemicals. Heavy metals, pesticides, and other pollutants can accumulate in the soil, making it toxic for plants and microorganisms, and affecting soil fertility and ecosystem health.
- ❖ **Climate change:** Changes in temperature and precipitation patterns associated with climate change can impact soil health. Increased temperatures can lead to accelerated decomposition of organic matter, while altered rainfall patterns can cause soil erosion and waterlogging. These changes can disrupt the balance of nutrients and microorganisms in the soil.

It is important to implement sustainable land management practices, such as conservation agriculture, afforestation, and proper soil conservation techniques, to prevent soil degradation and maintain soil health.

Why pesticides?

The use of pesticides in soil can have detrimental impacts on lands that have been recently liberated from separatist control. Pesticides are chemicals that are used to control pests and weeds, but they can also harm the soil and its surrounding environment. These lands, which were once under the control of separatist groups, may have already

faced years of conflict and destruction, causing the soil to become depleted and fragile.

The introduction of pesticides can further exacerbate these issues by killing beneficial microorganisms in the soil, leading to decreased fertility and biodiversity. This not only affects the health of the soil but also poses a threat to the overall ecosystem. Additionally, the use of pesticides can contaminate water sources, which are essential for both human and animal consumption. This can have long-lasting effects on the health and well-being of the local communities who rely on these lands for their livelihoods [9]. Therefore, it is crucial for proper regulations and guidelines to be implemented when using pesticides in these areas to mitigate any potential negative impacts on the soil and its inhabitants.

Pesticides can be harmful for several reasons:

- **Health risks:** Pesticides are designed to kill or control pests, but they can also harm humans and other non-target organisms. Prolonged exposure to pesticides can lead to various health problems, such as respiratory issues, skin irritations, neurological disorders, and even cancer.
- **Environmental impact:** Pesticides can contaminate soil, water bodies, and air. They can leach into groundwater, leading to water pollution. They can also harm beneficial insects, birds, and other wildlife, disrupting ecosystems and reducing biodiversity.
- **Resistance and pest resurgence:** Repeated use of pesticides can lead to the development of resistance in pests. This means that over time, pests become less susceptible to the effects of pesticides, requiring higher doses or more toxic chemicals to control them. Additionally, when pesticides kill off beneficial insects and organisms that naturally control pests, it can lead to a resurgence of pest populations.
- **Non-target effects:** Pesticides can harm beneficial insects like bees, butterflies, and other pollinators, which are crucial for the pollination of crops and the maintenance of healthy ecosystems. They can also impact other non-target organisms, such as birds, aquatic life, and soil microorganisms.
- **Persistence and bioaccumulation:** Some pesticides can persist in the environment for a long time, leading to their accumulation in the food chain. This bioaccumulation can result in higher concentrations of pesticides in animals at the top of the food chain, including humans, posing potential health risks.

Due to these reasons, it is important to use pesticides judiciously and explore alternative methods of pest control, such as integrated pest management, organic farming practices, and biological control.

As known, pesticides have been linked to cancer, Alzheimer's, and Parkinson's disorders. One of the causes of the planet's ecological equilibrium being upset is due to them. In particular, neonicotinoid pesticide use kills bees, which are directly responsible for agricultural production. Desertification has occurred in those lands due to the fact that fertile soils lose nutrients and become less suitable for growing crops. Active exploitation of land resources has accelerated climate change, increasing the destruction of soil cover. As a result of water and wind erosion, the topsoil has turned into an infertile mixture of sand and dust. The risk posed by soil erosion also stemmed from the fact that it was both the origin and the end result of numerous harmful processes. Crop yields have been decreased as field condition deteriorated.

One of the major issues for which modern society needs solutions is pesticide poisoning of the soil. The widespread use of different kinds of pesticides and pesticides in agriculture is the root cause of pollution. These chemicals protect cultivated plants from pests, help kill weeds that obstruct the growth of the root system, prevent plant diseases, increase crop safety, and boost yields by 30%.

Another factor deteriorating the soil in the liberated territories of Karabakh from separatists is the use of ammunitions of different kinds and all types of military equipment given that weaponry can harm soil in several ways. Here are some ways in which weaponry can negatively impact soil:

- **Explosions:** The use of explosive weapons such as bombs, missiles, and landmines can cause significant damage to soil. Explosions can disrupt the soil structure, leading to compaction and the destruction of soil aggregates. This can make the soil less fertile and hinder its ability to hold water and nutrients.
- **Contamination:** Weaponry can release hazardous substances into the soil, such as heavy metals, chemicals, and radioactive materials. These contaminants can seep into the soil, polluting groundwater and affecting the health of plants, animals, and humans. Contaminated soil may become unsuitable for agriculture or other productive uses.
- **Landscaping and infrastructure destruction:** During armed conflicts or military operations, infrastructure like buildings, roads, and bridges may be destroyed. This destruction can lead to soil erosion, as the protective vegetation cover is removed, leaving the soil exposed to wind and water erosion. Erosion can result in the loss of topsoil, which is rich in nutrients and essential for plant growth.
- **Displacement of soil:** The movement of heavy military equipment, tanks, and vehicles over soil can cause compaction and soil displacement. Compacted soil

becomes denser, reducing pore spaces necessary for air and water movement. This can inhibit root growth and nutrient uptake by plants, affecting their productivity.

- **Unexploded ordnance:** Unexploded ordnance (UXO) refers to explosive weapons that did not detonate upon impact. UXOs left behind in conflict areas pose a significant threat to soil and human safety. They can contaminate the soil and remain hazardous for long periods, making the land unusable until cleared.

It is important to note that the extent of soil harm caused by weaponry depends on factors such as the type and scale of the weaponry used the duration of conflict, and the subsequent efforts to remediate and restore the affected areas.

Ways of Elimination and Reuse of Lands

Pesticides are used extensively in agriculture to protect crops from pests, but their continued use has led to contamination of the soil and water bodies. This can have detrimental effects on human health and the environment. Therefore, it is important to purify lands from pesticides to reduce their harmful impact. The first step in purifying land from pesticides is to identify the affected areas through soil and water testing. Once the contaminated areas are identified, the next step is to stop using pesticides in those areas and switch to organic farming methods. The contaminated soil can be treated by using microbes that can break down the pesticides into harmless compounds. Another method is phytoremediation, where specific plants are grown in the contaminated land that can absorb and break down the pesticides. Additionally, manual removal of contaminated topsoil and replacing it with clean soil can also be an effective method. It is also important to monitor the purified land regularly to ensure that the pesticide levels have decreased and do not pose a threat to human health or the environment. Proper disposal of pesticide containers and following safe handling practices can help prevent future contamination of the land. By following these steps, we can successfully purify lands from pesticides and create a healthier and safer environment for ourselves and future generations [10].

As a result, we may conclude that in order to overcome the problem of pesticide-polluted soil, we must first take care of the soil and then use pesticides in a sensible and balanced manner. For this, competent soil management and the upgrading of environmentally friendly agricultural technologies are required on the one hand, while attentive state-level pollution control is required on the other. All of this will assist to protect the soil and other interconnected aspects of the environment, assure the production of high-quality and safe agricultural goods, and avoid the loss of useful living species like bacteria, plants, and animals.

The main ways to solve the problem of soil pollution

- Proper farming using mainly natural fertilizers, rational use of artificial fertilizers and plant protection products;
- Prevention of erosion - reclamation work, mid-field plantings, afforestation of wastelands;
- Prevention of soil pollution from municipal sources - waste reduction and proper management (waste segregation, composting, hazardous waste collection), wastewater treatment;
- Limiting industrial sources of soil pollution - the use of modern environmentally friendly technologies and proper handling of industrial waste;
- Cleaning the soil from toxic substances and deacidifying acidified soil;
- To restore contaminated soils, complex, multi-stage measures are taken to restore their usefulness - soil remediation.

Finally, each environmental cleanup project is unique and requires multiple levels of decision-making. A soil remediation project can take months or years to complete from the period of study, planning, and approval to the time of actual implementation in the field. Early involvement of qualified partners and suppliers in the planning phase is crucial to overall success. Early conversations with reagent suppliers are also critical. Logistics, supply, project timeline, and other technical issues all necessitate advance preparation and coordination. Bench scale treatability can demonstrate the efficacy of a technique, but these studies frequently

overlook the supply side of deploying the technology in the field. Proper planning and communication with all of the components of a remediation project will save time and money in the end.

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