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# Ecological Aspects , Challenges and Environmental Effect

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**Abstract:**

The world's natural resource base for food production has already been weakened, and the potential for sustainable development in many countries is threatened by population growth and the potential additional stress of agricultural activities to feed it. The definition of sustainable agricultural development is consistent at this stage: "Sustainable agriculture is the management and conservation of natural resource base, and thus ensuring the realization and sustainability of human needs towards technological and institutional changes. Present and future generations: in agriculture, forestry and fisheries "Sustainable development protects soil, water, plant and animal genetic resources, degrades the environment, is technically viable, is economically viable and is socially acceptable." Environmental stress is often caused by excessive demand and over-development of natural resources and related pollution of soil and water created by poverty. Later, when the poor use excess soil for agriculture and dispose of waste without a normal water supply, their situation deteriorates and their environment is quickly destroyed. So the goal of soil and water conservation is to create an economic base that will make it more beneficial to conserve and protect resources rather than destroy them.

**Introduction:**

There are a lot of potential unwanted adverse effects on the environment as well as the economic and social factors in the society, which means that due to improper irrigation, agricultural production should be maintained, but it should be expanded and the use of salt water should be expanded. This could potentially have far-reaching effects on future generations as well and therefore on the very sustainability of irrigated agriculture. This chapter discusses some of the environmental concerns, environmental conditions and the long-term viability of irrigation beyond and beyond agriculture.

One of the most important and challenging features of the modern world is its rapid change. Change is a pervasive feature of human civilization, but the utilization of resources and habitat has become a growing global concern. As the human population grows and expands, ecosystems are affected more often, more commonly, and more severely. The ever-increasing pressure of particularly fast mankind has a profound effect on the planet's resources, profoundly altering the soilscape, changing habitats and affecting the ecological network, biodiversity and ecological activities.

**Soil Degradation:**

Soil degradation is a process in which the value of the geophysical environment is affected by a combination of human-induced processes operating on the ground. This is seen as any change or disturbance on the soil which is considered to be harmful or undesirable. Natural hazards have been omitted as a cause; however human activities can indirectly affect events such as floods and bush fires. This is considered to be an important issue in the 21st century as soil degradation affects the agricultural productivity, environment and food security. It is estimated that 40% of the world's soil is severely degraded. According to the Intergovernmental Panel on Climate Change's Special Report on Climate Change and Soil, "About a quarter of the Earth's ice-free terrain is subject to human degradation. Soil erosion from agriculture is currently estimated at 10 to 10 times.

Soil is the delicate skin of the earth that merges all life on earth. It consists of numerous species that form dynamic and complex ecosystems and are the most valuable resources for humans. The increasing demand for agricultural commodities encourages the conversion of forests and grass soils into farms and pastures. Transitions from natural plants to agriculture often do not hold soil, and many of these plants, such as coffee, cotton, palm oil, soybeans, and wheat, can actually increase soil erosion beyond their ability to sustain themselves. Half the topsoil on this planet has been lost in the last 150 years. In addition to incense, soil quality is also affected by other agricultural factors. These effects include compaction, soil erosion, nutrient depletion, and soil salinity. These are very real and sometimes serious problems. The effects of soil erosion go beyond the loss of fertile soil. As a result, pollution and siltation in streams and rivers have increased, waterways have been dug, and fish and other species are declining. And degraded soils are also less likely to be dependent on water, which can make floods even more severe. Sustainable soil use will help reduce the impact on agriculture and livestock, prevent soil erosion and erosion, and save valuable soil for desolation. Soil health is a primary concern for farmers and the global community whose livelihoods depend on the agriculture of their management that begins with the dirt under their feet. While there are many challenges to maintaining a healthy soil, there is also a dedicated group of people with the WWF working to fix and maintain delicate skin that creates a delicate skin biodiversity.

**Table 1.1 Top five counties of Damaged Area**

| Sr. No. | Country | Damaged Area (mh) | % of Irrigated and land Damaged |
|---|---|---|---|
| 1. | India | 22.0 | 38 |
| 2. | China | 8.1 | 16 |
| 3. | USA | 5.6 | 28 |
| 4. | Pakistan | 3.5 | 21 |
| 5. | Soviet Union | 2.7 | 13 |
| 6. | Total | 41.9 | 25 |
| 7. | World | 58.1 | 28 |

Source: Science Directory

The above table 1.1 describes about the top five countries of damaged area and it was observed that India is the top country 22.0 million hector area damaged with 38% of irrigated and damaged land, china is at the second top country of 8.1 million hector area damaged with 16% of irrigated and damaged land, USA is at the third top country of 5.6 million hector damaged area with 28% of irrigated and damaged land, Pakistan is at fourth country of 3.5 million hector damaged area with 21% of irrigated and damaged land and Soviet union is at the fifth country of 2.7 million hector of damaged area with 13% of irrigated and damaged land, whereas the total damaged area is 41.9 million hector with 25% of irrigated and damaged land and the world is at 58.1 million hector damaged area with 28% of irrigated and damaged land.

Salt-infested soils occur to a large extent under natural conditions, but the salinity problem, which is of paramount importance to agriculture, arose when saline became saline as a result of irrigation in earlier production. Redistribution of water through irrigation improves the proportion of salt-affected areas in human activity. The development of large-scale irrigation projects, including the diversion of rivers, the construction of large reservoirs, and the irrigation of large landscapes, results in large-scale changes in the natural water and salt balance of the entire hydrological system. The effect of irrigation is often good beyond the immediate horticultural area; It can even affect neighbouring nations. Maximum amount of water has infiltrated into the soil used by agricultural crops. This water dissolves the salts of geological origin in the soil and the underlying substrate, and in the lower part where it accumulates, there is a reservoir. When this happens, the dissolved salts are collected in the ground and taken to the lower areas where they are stored, and over time the groundwater and soil salts in the areas where the water table goes to the groundwater level. The problem of water storage and secondary salinity in most of the irrigated lands is due to inefficient and improper drainage management, inadequate irrigation system, poor distribution system and weak methods of agro-farm management due to excessive use and discharge of water for irrigation. "Expenditure" drainage water is supplied in a good-quality water supply that is used elsewhere for crop production. It is not surprising to find that less than 60 per cent of the water diverted for irrigation is used in crop respiration. It is important to note that these problems also occur where less salt water has been used for irrigation. Thus it can be argued that the use of saline water for irrigation can only aggravate these problems as more salt will be mixed with such water and more leaching is required in this case to control salinity on the root zone. However, this should not be the case.

It should also be understood that some soil and water salinity is inevitable with irrigation. Typical irrigation water can contain 0.1 to 4 kg of salt per m3 and is usually planted at an annual rate of 1.5 to 1.5 m. Thus, 1 to 60 metric tons of salt per hectare can be mixed in irrigated soils. As discussed earlier, pure water returns to the atmosphere through the process of evaporation and contamination of plants as the salt in the irrigation water is released into the soil. Therefore, to achieve evaporation and to prevent excessive salt accumulation in the root zone, the evaporator should be watered with excessive irrigation. This water should be removed from the root zone. Accumulation occurs from the delivery canal in many irrigation projects. This drainage and seepage water typically passes through the underlying layer, to low-lying land or water, and there are frequent water logging and salt-loading problems. Saline soils are formed in such areas by the process of evaporation. This amount of groundwater and surface-water drainage and seepage water is usually increased in salt concentration. Thus problems of water logging and secondary salinity are associated with improper irrigation and / or inadequate drainage. The main sources of sewage in the irrigation project are bypass water, canal sewers, deep seepage and surface drainage. Bypass water is often required to maintain a hydraulic head and adequate flow through a gravity-controlled canal system. It usually returns directly to the surface water supply and some contaminants (if any) are selected on this route. The loss of evaporation in canals is usually in very small amounts of diverted water. However, gutters in non-canals are often critical. Such seepages generally make a significant contribution to high water table, increasing groundwater salinity and for a top growth by increasing the amount of drainage (and its salinity) usually required from the irrigated area.

**Water Pollution:**

The role of irrigated agriculture in soil salinity has been well known for hundreds of years. However, it has only recently been realized that depletion of water resources from agricultural activities is a larger and more widespread phenomenon of concern than the sustainability of irrigation, accordingly, per soil alkalinity. Indeed, in the last few years it has become clear that the discovery of toxic elements in agricultural drainage water such as Se, Mo and Aas can lead to pollution problems that led to fears of continuing irrigation in some projects. As described above, most of the soil used by agricultural crops is waterlogged. This water, along with the deep seepage of the canal seepage, often dissolves excess salts (more than those present in irrigation water) from the soil and underlying substrate. Such dynamic salts, when absorbed by water, are a source of contamination, as well as salts mixed with irrigation water concentrated in drainage water through evaporation. When this alkaline water is mixed it pollutes the good quality water obtained. Additional sources of pollutants from irrigation are agrochemicals (fertilizers and pesticides) applied to the soil that can be collected to some extent (by drainage) and released into drainage water.

**Disturbance of Ecosystem:**

There is some information on the degree of degradation of the relevant ecosystems that can be caused by irrigation, especially salt water. This lack is due to both the lack of efforts to obtain such information for the wider part of the world and the incomplete understanding of how much ecosystems are affected by waterlogging and salinity. This task has become more difficult in the absence of practical ways to monitor large irrigation landscapes systems and related climate changes in response to development factors. The imaginary example used to present this chapter illustrates some of the ways in which irrigation and drainage affect wildlife habitat, biodiversity, and surface aquifer flow. Its real example works even better to illustrate the adverse effects of irrigation and drainage, especially the disposal of saline drainage water on ecosystems and on the entire irrigation projects of the area. An example of such a dilemma is the San Joaquin Valley in California and the Westside area of the Western Life Shelter, summarized by the San Joaquin Valley Drainage Program. Prior to development, the area was a native of San Joaquin Valley. The wet million-acre land was a rich piece of wetland, riparian foreign and valley savannah, and the abundance and diversity of fish and wildlife was nowhere to be found, America, Grizzly bears, elk, deer, deer, wolves, quail, geese A community of species of species and migratory birds, especially waterfowl and coastal, Valley. Waterfalls, salmon yellow and streams and rivers with steelheads abound. Now, after nearly one and a half centuries of settlement and development of irrigation agriculture in the Valley, significant changes have taken place in the quantity and quality of the environment. The dams now block the mainstream leading to the Anadromas fish. Most of the streams and their streams for irrigation reduce the flow of streams, while the rest of the streams are salted due to non-recharge and non-discharge of water. The change in habitat is immense. California's Central Valley has lost most of its farmland, more than 4 million acres of native land. The two major inland lakes that were once the largest freshwater lakes in the USA are now farmland. In San Francisco Bay, which is the outlet of the San Joaquin River and most of the Valley's rivers, the water level has dropped by 41 percent. The riparian wetlands have been reduced to less than 2% across their state of origin.

Decreased river and nala flows have destroyed much of the land, contaminated surface water supplies with salts and agro-chemicals, depleted groundwater aquifers, and depleted land at excessive speeds, and poisoned fish and birds. Toxic salts released by irrigation and drainage. The Sea in the Central Asian republics of the former Soviet Union is another good example. The region accounts for 95 percent of the former Soviet Union's cotton harvest, as well as a third of the country's fruit, a quarter of vegetables, and 40 percent of rice. Ninety percent of these crops are under irrigation. By 50 By 0, the rivers that fill the Sea had receded, the sea level had dropped by two-thirds, and its salinity had tripled. All species of fish have disappeared. Vasa picks up salt from the shores of the dry sea and dumps 43 million tons on the surrounding crop every year. Attitudes towards the Sea and its associated environment are unclear. The visible damage caused by large-scale irrigation has led to strong opposition to new dams and diversion projects, even in developing countries where irrigation development is a high priority.

**Diseases of Water Borne:**

Irrigation creates an environment conducive to the reproduction of many infectious diseases. Vectors are organisms that carry pathogens from one person to another and provide an environment for themselves to complete parts of the pathogen's life cycle. The long and unfortunate record of an increase in water development and especially in diseases related to irrigation indicates the vulnerability of the disease to occur in a region after the establishment of irrigation schemes. The potential risks of waterborne diseases related to irrigation development have been agreed upon, but the complementarity of health and irrigation development needs to be identified. Improved nutrition, better and more adequate water supply for household use, supply of rural infrastructure and housing and health facilities, which many irrigation projects bring to the rural community, make a significant contribution to good health. Many health risks associated with irrigation development can be eliminated if this development is done in a planned and integrated manner and environmental management measures are included in the design and management of irrigation projects to protect people from health hazards.

Malaria is by far the most important. More than two thousand million people are estimated to be at risk globally; Approximately 240 million of those parasites are estimated to be carried at any given time, and an estimated 100 million clinical illnesses are transmitted each year. The vectors of malaria are mosquitoes of the genus Anopheles that commonly say that their larvae need stable or slow flowing, clean fresh water for growth. Exceptionally some species predominate in organically polluted or insane water.

Schistosomiasis is endemic in 76 countries, where about 200 million people are infected with schistosomiasis parasites. Rather than malaria, which has a meager distribution in time and space, schistosomiasis is generally considered to be directly related to irrigation schemes and other water resources development projects. The central hosts of schistosome parasites are aquatic or amphibian entanglements that have remarkable tolerance to many environmental parameters, but especially thrive in aquatic weeds and organisms that suffer from organic matter.

Physical, chemical and biological parameters of water quality all affect the suitability of certain reservoirs for breeding of mosquitoes and snails. In theory, possible physical parameters include temperature, clarity, viscosity, conductivity, surface tension, and perhaps not really physical quality, the current velocity of water. Chemical parameters include the concentration of different ions and cations, the overall salt concentration, the pH, and the concentration of synthetic compounds. Biological parameters include algal contamination of organic matter, bacteria / fungal / aquatic weeds. Any element of water quality indirectly affects vector reproduction by adapting to certain aquatic plants.

**Pollution of Water Usability:**

The ultimate goal of water quality protection is to allow maximum practical benefit (use) of the available water supply. Frankly speaking, water supply users can be classified into two groups: those who use water in the process of use and those who use it without admirable use. In the "mixed" philosophy of water quality protection, the first type of users has to suffer. The purpose of this section is to provide evidence - theoretical and conceptual - especially the mixed method used to increase water quality and conservation, which is often lacking in these objectives, and to provide an alternative approach to saline drainage water disposal - providing a more practical benefit than mixing in total water supply. Considering the use of saline water for irrigation and choosing the right drainage management to protect water quality, it is important to understand that the total amount of saline water supply cannot be used profitably for irrigation and crop production; The higher its salinity, the less it can be used before the concentration is limited. For adequate growth the plant must be in water of a quality that allows the product to water without a concentration of salts. In the process of trachea, plants basically separate almost pure water from the salt solutions in the root zone, and these salts are concentrated in the remaining unused soil water. This water eventually becomes drainage water. A plant will not grow properly if it exceeds a certain amount of salt content in the soil water under the given conditions of climate and management. Thus it is obvious that if there is salt in the water then not all the water in the supply can be consumed by the plant. Considering how it affects the amount of water used in combined and separate supply, the practice of mixing or diluting large quantities of saline water with only a quality water supply should be undertaken.

**Conclusion:**

The problem of soil erosion in the world related to irrigated agriculture is due to inefficiency in the distribution and use of irrigation water, resulting in accumulation of excess salts and salts in local areas associated with congestion and hydrological conditions and recharge of saline water. The use of brackish water at the advocate level at the freshwater supply should not result in excessive salinity of the soil or conservation of water under proper management. In fact, the obstruction of aquifer water below the root zone and their reuse for irrigation should reduce the soil degradation process associated with deeper seepage, salt accumulation, aquifers and secondary salinity that normally operate under irrigation. This should also reduce the water pollution problems associated with drainage discharge in good-quality water supply. Integrated irrigation and drainage management system to facilitate the use of saline drainage water for irrigation while reducing soil degradation and water pollution problems related to drainage.

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