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Petroleum hydrocarbon contamination of cultivated soils and environmental impacts

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Abstract In this article, oil and oil hydrocarbon pollution in saline areas and the effect of oil hydrocarbons on the environment were conducted in irrigated gray-meadow and light-colored gray soils around an oil field and oil storage. Soils are subjected to 2 stress effects at the same time, their physical, chemical, biological properties, water, food, and air regimes are severely damaged, resulting in a sharp drop in productivity. It is intended to study the secret, to reveal the mechanism of changes in properties and regimes, and to analyze suitable recultivation technology.
Key words: Oil field, oil storage storage , level of pollution, level of salinity.

Аннотация В данной статье проведены исследования загрязнения нефтью и нефтяными углеводородами засоленных территорий и влияние нефтяных углеводородов на окружающую среду на орошаемых серолуговых и светлоцветных сероземах вокруг нефтяного месторождения и нефтехранилища. Почвы подвергаются одновременно 2-м стрессовым воздействиям, сильно нарушаются их физические, химические, биологические свойства, водный, пищевой и воздушный режимы, что приводит к резкому падению продуктивности. Целью является изучение тайны, раскрытие. механизм изменения свойств и режимов, а также проанализировать подходящую технологию рекультивации.
Ключевые слова: Нефтяное месторождение, нефтехранилище, уровень загрязнения, уровень минерализации.

Abstract. In this article, oil and oil hydrocarbon pollution in saline areas and the effect of oil hydrocarbons on the environment were conducted in the irrigated gray-meadow and light-colored gray soils around the oil field and oil storage. Soils are subjected to 2 stress effects at the same time, their physical, chemical, biological properties, water, food, and air regimes are severely damaged, resulting in a sharp drop in productivity. It is intended to study the secret, to reveal the mechanism of changes in properties and regimes, and to analyze suitable recultivation technology.
Key words: Oil field, oil storage, level of pollution, level of salinity.

Sign in . The area of soil degradation around the world and their types are expanding year by year, including soil salinity is the main problem of Uzbekistan's soils, more than 50% of the existing irrigated lands are saline to varying degrees, and their a certain part is contaminated with oil hydrocarbons. In a number of countries of the world with a low level of production, there are great opportunities to increase the world's food supply by rehabilitating chemically contaminated land with organic amendments [1; 1-8-b]. Due to their high toxicity, petroleum hydrocarbons are evaluated as pollutants of the environment and soil cover [2; 107-123-p, 3; 1-6-b]. However, raw materials obtained from oil and oil products are very important for energy, domestic and industrial use [4; 1-8-b]. In oil-rich countries, oil products directly and indirectly lead to unprecedented economic growth and development, but during the activity, pollution of the environment and soil cover also occurs [5; 25-49-b, 6; 1-17 p].

In the southern regions of Uzbekistan, that is, in Kashkadarya and Surkhandarya regions, the main sources of pollution with oil and oil products are oil fields, industries, and oil and gas enterprises. 1-12 p].

Currently, one of the environmental problems is pollution with hydrocarbons caused by production related to the petrochemical industry [8; 1-10-b]. The toxic properties of oil and oil products that have fallen into the soil affect the plant world and living organisms, the longer the storage period of oil, the lower the survival rate of plants and living organisms [9; p. 66-73].

The level of soil pollution with oil and oil products depends on the power of the oil production industry and the conditions of use. Even if the industry produces a lot of oil, if the techniques and technologies are not up-to-date, the amount of pollution will increase [10; 12-17 p]. The process of oil extraction has a negative impact on the environment and soil cover, including man-made salinization, which depends on the salts in the water released along with oil products during the oil extraction process [11; 337-339-b].

Pollution with oil and oil products has been found to increase soil salinity. In some areas, as a result of oil hydrocarbon pollution, the amount of organic matter in the soil increases due to oil hydrocarbons, the soil solution environment changes to alkaline and the soil becomes highly salinized [12; 15-21 p].

If perisulfate in situ chemical technique is continued in the recultivation of soils contaminated with oil hydrocarbons, the problem of sulfate salinity in the soil after recultivation will be encountered [13; p. 65-75]. In situ biological reclamation methods are cheap and stable, can be combined with other physico-chemical reclamation methods to achieve better results, and serve to increase the level of high purification [14; 606-615-b]. The level of soil pollution with petroleum hydrocarbons is increasing year by year. It's own in turn oil hydrocarbons In the anthropogenic way, it is produced a lot, and the impact of its occurrence in the environment and soil to the body coming [15; 755-767-b]. One of the environmental problems is pollution of the soil and the environment with the waste left after the processing of oil and oil products [16; 10-16 p].

According to the results of the research, many scientists say that oil-rich countries are economically rich countries, but the levels of pollution of the environment and soil cover are also high. irrigated land areas used will suffer. As a result years during those areas diseases increased leaving food - food shortage take will come These are the results prevention get for of the area climate from the conditions come out suitable reclamation types work exit or pollution in advance prophecy by doing to him against measures apply to the goal agreed to this for example

work release industry technique and technologies contemporary new devices with equipment around coming out harmful substances prevention get , spilled oil products in place mechanic method with neutralizations enters

Research area

Research on irrigated gray soils in the irrigated region of Surkhandarya region, scattered around the South Mirshodi oil field (Kjm) and irrigated light gray soils around the Kumkurgan oil storage depot (Kqno) works were carried out. Soil Sections Background soil sections were excavated and sampled at 0.2, 0.8, 1.5, 3.0, 5.0, 8.0 km from the oil field and oil storage facility, and from 15.0 km for both areas.

Chemical analysis and applied methods .

soil samples, storage, laboratory, conducting lysimeter experiments GOST: 17.4.3.01-83 based on the Interstate standard [17; 1-6-b] , collection and storage of soil samples for chemical and bacteriological analysis GOST: 17.4.4.02.-84 Based on the international standard [18 ; 1-8-b] , description of soil pollution level by pollution regions, recommendation of Dzhuvelikyan XA et al. [19; 1-22-b] , field experiments based on the Dospekhov method [2 0 ; 1-351-b] , the study of the properties of soil with disturbed fertile layer GOST: 17.4.2.02-83 Based on the international standard [21 ; 1-8-b] research of properties related to soil fertility and recultivation GOST: 17.5.1.01-83 ; GOST: 17.5.3.04-83 Based on international standards [22; 1-15 p,] determining the germination and development of plant seeds GOST: 12038-84 Based on the international standard [23 ; 1-47-b] , determining the amount of oil and oil products in the soil RD.118.3897485.13–92 Methodological instruction on determining the composition of petroleum products in soil based on the fluorimetric method [24; 1-15-b] , Mineral, organic, inorganic properties of the soil based on Pansyu method [2 5; 1-800-b].

Results and their analysis

It is important to develop an algorithm of activities for the implementation of biological method-based recultivation technology of the soils of saline areas contaminated with oil and oil products. The following algorithm was developed based on the conducted research and recultivation activities (see Figure 1).

Based on the results of previous research in the southern and eastern regions of Uzbekistan, Z. Jabbarov developed an algorithm for recultivation, but this developed algorithm is not suitable for saline areas. is focused on recultivation of soils contaminated with
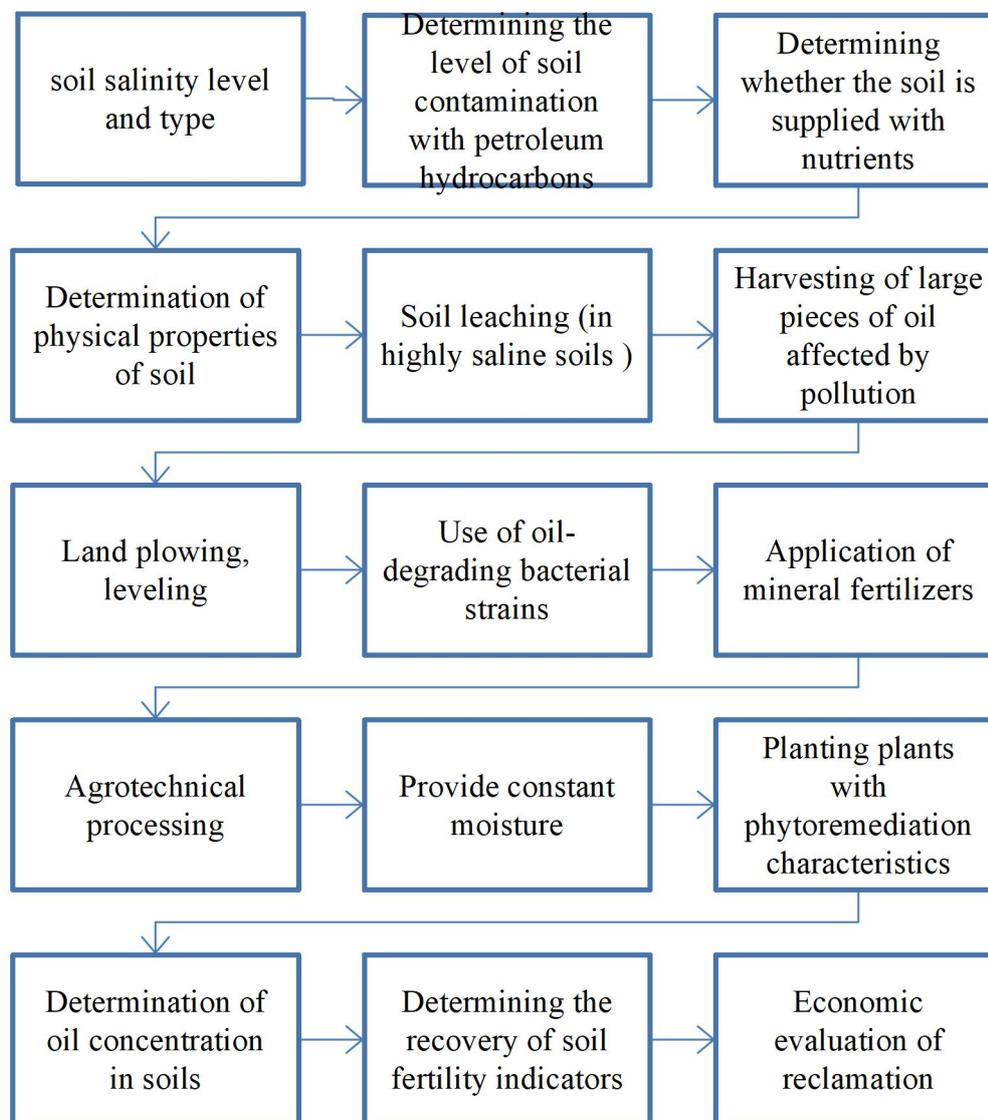
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┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ soil salinity    │→  │ Determining the  │→  │ Determining      │
│ level and type   │   │ level of soil    │   │ whether the soil │
│                  │   │ contamination    │   │ is supplied with │
│                  │   │ with petroleum   │   │ nutrients        │
│                  │   │ hydrocarbons     │   │                  │
└──────────────────┘   └──────────────────┘   └──────────────────┘
                                                        ↓
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Determination of │→  │ Soil leaching    │→  │ Harvesting of    │
│ physical         │   │ (in highly       │   │ large pieces of  │
│ properties of    │   │ saline soils )   │   │ oil affected by  │
│ soil             │   │                  │   │ pollution        │
└──────────────────┘   └──────────────────┘   └──────────────────┘
         ↓
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Land plowing,    │→  │ Use of oil-      │→  │ Application of   │
│ leveling         │   │ degrading        │   │ mineral          │
│                  │   │ bacterial        │   │ fertilizers      │
│                  │   │ strains          │   │                  │
└──────────────────┘   └──────────────────┘   └──────────────────┘
         ↓
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Agrotechnical    │→  │ Provide constant │→  │ Planting plants  │
│ processing       │   │ moisture         │   │ with             │
│                  │   │                  │   │ phytoremediation │
│                  │   │                  │   │ characteristics  │
└──────────────────┘   └──────────────────┘   └──────────────────┘
         ↓
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Determination of │→  │ Determining the  │→  │ Economic         │
│ oil concentration│   │ recovery of soil │   │ evaluation of    │
│ in soils         │   │ fertility        │   │ reclamation      │
│                  │   │ indicators       │   │                  │
└──────────────────┘   └──────────────────┘   └──────────────────┘
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Figure 1 . Algorithm of recultivation of soil contaminated with petroleum hydrocarbons in cultivated areas .

That is, in areas with strong salinity, salt washing measures should be carried out, as well as plants with a stimulating effect on the bioremediation process even in saline soils, which are different from plants with phytoremediation characteristics. selection affects the level of soil purification.

Conclusions and suggestions

During the research work, it was decided to carry out research work based on the 15-step algorithm of recultivation based on a special approach to the salinity level and types of soil contaminated with oil hydrocarbons in the saline areas and the levels and types of pollution. The algorithm of these actions is highly effective in cleaning irrigated marshes and light gray soils contaminated with oil and petroleum products in saline areas. Continuation of these works in the

future will serve to reduce contaminated areas.

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