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Methods of Backfilling and Leveling of Ravines in the Radical Reclamation of Ravine Lands

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Abstract*: Backfill, layout, methods of development of contaminated areas. On the ravine-hazardous territories of the Namangan adyrs, from organizational and economic measures into the practice of the agro-industrial complex, we have introduced a complex of soil conservation farming systems: The development of ravines and the creation of a cultural background on them require a scientifically grounded approach to the technological stages of soil conservation agriculture.*

Keywords: Backfilling of infected areas, leveling of infected areas, development of ravines, soil conservation agriculture, ravine parameters, bottom measurement, ravine depth.

Introduction

For the development of backfill and leveling of contaminated lands in radical reclamation, it is necessary to study the patterns of manifestation, growth and development of linear forms of erosion, with the identification of their morphological and morphometric characteristics [1, p. 5].

Backfill, layout, methods of development of contaminated areas. On the ravine-hazardous territories of the Namangan adyrs, from organizational and economic measures into the practice of the agro-industrial complex, we introduced a complex of soil conservation agriculture systems: two-time annual registration and assessment of eroded lands by farms [2, p. 16].

The development of ravines and the creation of a cultural background on them requires a scientifically grounded approach to the technological stages of soils in water protection agriculture.

The calculation of the volume of earthwork is concluded in the next. The volume of earthworks is directly proportional to the parameter (morphometry) of the ravine and the planned slope of the flattened slopes.

To determine the parameters of the ravine, data on length, width and depth are collected. Its length is determined by measuring the bottom with a measuring tape. The average width $(B_{cp.})$ is calculated as the half-sum of the width of the ravine at the top and the width of the bottom. The depth of the ravines (H) in the initial stages of development can be determined by measuring the height of the cliff, and then the length (l), of the slope steepness $(tg\alpha)$ according to the formula (1).

The width and depth of the ravines are variable along the profile. Therefore, measurements should be carried out in places where there is a clear difference between these indicators or through conventionally accepted equal segments 10,20,30 ... ... n, m. The fewer segments, the more accurate the calculations of their parameters will be. Then the weighted average of the depth and width of the ravine is calculated using the formula (2).

$$H_{ср.взв.} = \frac{H_1 + H_2 + H_3 + ... + H_n}{n}, \quad м$$

$$B_{ср.взв.} = \frac{B_1 + B_2 + B_3 + ... + B_n}{n}, \quad м \qquad (2)$$

Where n is the number of measurement points.

Using formula (2), the total volume of soil removed from the ravine (V) is calculated.

$$V = 0{,}5 \cdot B_{ср.взв.} \cdot H_{ср.взв.} \cdot l \qquad (3)$$

In the case when the ravine is completely filled up, the required volume of soil to fill it will be equal to the volume of material carried out during its formation.

If a partial flattening of the slopes of the ravine is carried out, then the volume of the cut off soil will always be less than the volume taken out. In case of partial flattening, it is necessary to clarify the optimal projected slope of the reclaimed surface. The choice of the design slope depends on a number of factors: the properties of the soil, the underlying rock, the size of the ravine, the methods of development and agricultural purposes.

Development projects can be drawn up for individual ravines or for their systems with a coverage of no more than 5-7 hectares. For each site (development block), reclamation methods of soils of water protection agriculture are outlined separately.

For example, to fill a ravine with a total length of 105 m, a weighted average depth of 4.5 and a width of 3.4 m, it is necessary to demolish the soil in a volume of 1600 m^3. If the steepness of the adjacent section is $1.8\text{-}2.0^0$, and its area is 1.8 hectares, then the projected slope of the backfilled section will not exceed 5^0 . This means that this reclaimed surface can be developed for narrow-row crops.

Backfilling and planning of ravines. In the process of full or partial backfilling of ravines, the soil profile is transformed, and new technogenic soils are formed on the planned surface. Technogenic soils of the loess zone will predominantly have a low degree of salinity, silt fractions will prevail in the granulometric composition, the content of humus and water-resistant aggregates will decrease 2-3 times and, accordingly, will be characterized by low anti-erosion resistance. Therefore, before starting work on backfilling the ravines, it is necessary to selectively remove and store the fertile layer of demolished adjacent soils. This can be done in the following cases:

1. If the underlying soil is unerroded or slightly eroded. The humus content in the arable horizon exceeds 1%.
2. If the number of gully peaks does not exceed 3-4 pcs / ha, and their occupied area is less than 20% of the territory of the infested area.
3. If the steepness of the side-slope is not more than 10^0 and allows free movement of mechanisms.

If the conditions do not correspond to at least one of these indicators, then it is impractical to land on land. The depth of the surface layer carried by the soil of the transplant depends on the thickness of the humus horizon, for light gray soils it is usually 10-15, typical gray soils 17-20, dark gray soils 20-25, meadow soils 25-30 cm, weakly washed varieties 20-35 cm and heavily washed more 35 cm. Therefore, prior to reclamation work, a detailed soil survey of the surrounding adjacent areas is required in order to establish the fashionability of the transplant.

Cutting off the fertile layer of near-ravine soils and storing it at a distance of up to 50 m should be done with bulldozers, and more than 50 m with a scraper. Then the ravine is filled up with the exposed soil up to the projected slope and the surface is carefully planned. After mechanical ramming, the stored humus layer of soil is evenly applied to the planned surface.

In the contaminated areas of the republic, the soil cover is predominantly (over 80%) represented by moderately and strongly washed off soils. Therefore, the removal, transportation and application of the fertile soil layer on the planned ravine lands can be carried out from other sites. In this case, the transplant (applied layer) should have, along with an increased content of the organic part of the soil, favorable physicochemical properties. For example, in earth-growing, where the base consists of clayey rocks, soils of lighter texture are recommended as a transplant, and to achieve greater cohesion of sandy soils, it is advisable to use heavy soils. The highest quality transplant can be reclaimed varieties of soils or floodplain soils.

Methods for the development of contaminated areas: after calculating the technique and the days of backfilling of contaminated lands, specify the close quarry, the distance of the object and the volume of masses m3. In the vicinity of the ravine, on infected areas, a fertile soil 30-40 cm deep is cut, and falls down near the ravine. The morphometric data of the ravine is measured, the upper part of the plant is covered with soil 60 cm 30 cm of the layer is filled with waste or compost from animal livestock farms. It is soaked by the sprinkler method to a moisture content of 70% of the soil, after which it is compacted with a bulldozer. Up to 30 cm of soil cover is covered with a fertile layer located near the ravine. Sealed with a bulldozer and is equal to the irrigation bias.

The best period for the development of ravines by filling for the conditions of Uzbekistan is October-November. During this period of the year, the fields are freed from agricultural crops, the surface is naturally moistened and the entire area is evenly compacted.

The use of reclamation anti-ravine methods in the medium and heavily ravine territories of the Namangan adyrs are not very effective due to their erosional dissection. Therefore, one of the alternative methods of agricultural use of contaminated lands is the radical reclamation of ravines. It provides for a set of reclamation techniques for the reconstruction of eroded lands in order to create a cultural background on them [3, p. 6-7].

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