JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 10, October 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

EFFECTIVE USE OF LAND PREPARATION TECHNIQUES FOR PLANTING

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Abstract: In the article, the working body of the current leveling of crop fields, the base leveling scoop front disc softener working bodies were used. In order to form a plane, which is required when leveling the fields of the crop with such working bodies, the leveler aggregate is formed in the transition from one to two. This will prevent further condensation of the soil, resulting in providing the plain with the required level of agrotechnics of the crop areas. This requires additional softening of the crop areas before planting after such leveling. In this experiments were conducted on average sandy areas of the irrigated mechanical composition of the Bukhara region. As a function of conducting experiments, issues such as the technological process of working with a drive mounted on a ground leveler, the structure of the soil pile before the junction, the bulk weight of the field drive layer, the hardness, the aggregate composition of the soil, the plane of the field surface and the measurement of the resistance of the aggregate to gravity The change in the cross-profile of the soil pile at different speeds of leveling aggregate was studied during the experiment and as a result observed a decrease in the high speeds of the cross-sectional profile, changing in relation to the speed of the cross-sectional surface of the soil pile.This situation is scientifically illuminated by such issues as the fact that at high speeds of the aggregate the soil in front of the junction occurs on account of intensive loading, at small speeds the above process occurs relatively slowly, there is no blockage of the incisions to the disc softeners.

1. Introduction

Irrigated lands are fertile lands in the Republic, the amount of which is more than 3.8 million hectares. 98% of agricultural products in the country are grown on irrigated lands. Irrigated lands in cotton and grain-growing areas are divided into three zones according to their specific characteristics: natural and soil-climatic conditions, mechanical composition of the soil, technology of its cultivation, types of machines, and agro-technical requirements. Of these, the Bukhara region is included in the third climatic zone. This area includes difficult-to-cultivate and variously saline lands, which make up a large part of the total cotton area of the Republic. In order for the seeds to germinate normally in natural humidity, autumn saline washing is carried out in this area. The soil composition of the area consists of gray soil, mineral saline meadow, and meadow-swamp soils located at an unstable depth of mineral groundwater.

The salinity and depth of groundwater will vary. Along with the Bukhara region, this region includes lands in Central Fergana and below the second zone, as well as arable lands in Tashkent, Jizzakh, Samarkand, Syrdarya, Khorezm, Kashkadarya, and Surkhandarya regions [4.5.6.7].

Quality leveling of irrigated lands in all the agricultural product-growing districts of the Republic is of primary and urgent importance. On the leveled land, agricultural machines work with high yields; the land is used efficiently, the quality of agricultural work is improved; during irrigation, the soil is moistened evenly; as a result of the improvement of the working conditions of

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irrigation workers and mexanizators, labor productivity is increased; all this contributes to the increase in the efficiency of agricultural production and the high yields Quality leveling of irrigated lands in all the agricultural product-growing districts of the Republic is of primary and urgent importance. On the leveled land, agricultural machines work with high yields. The land is used efficiently, the quality of agricultural work is improved, and during irrigation, the soil is moistened evenly. As a result of the improvement in the working conditions of irrigation workers and mexanizators, labor productivity is increased; all this contributes to the increase in the efficiency of agricultural production and the high yield.

2. Materials and methods

Irrigated crop fields have mainly three of the following unevennesses. We can say that the low-elevations formed by the soil Chuck, the washing of the Earth's Shure, the ungulates formed as a result of irrigation during the period of growth of plants, the hares and lowlands arising from the overthrowing of the earth, as well as the low-elevations, dongles formed during the plowing of the turning areas of the field, and the In the current conditions, it has been achieved that the yield of agricultural crops can be increased by leveling the uneven parts of the irrigated lands. In order to enrich the humus layer at the soil level, to save water spent on irrigation, to wash the saline lands qualitatively, to increase labor productivity in irrigation, to reduce the cost of products, and to solve the problem of preventing water and irrigation erosion processes in the soil, our mature scientists conducted their scientific research work.

They didn’t stop at it and are going to developed countries to practice and give their results in this sphere.

Taking into consideration the above-given ideas and opinions, we shall emphasize the following:

-To improve the experience of skillful personnel to manage modern foreign agricultural and irrigated techniques and technologies.

-To organize the work and program system of foreign techniques correctly.

-To use modern techniques and technologies to improve the ameliorative condition of lands and the quality of fertility.

Also, in the soil climate of Bukhara, there is no possibility to improve water conservation and land reclamation without quality leveling. In this area, the selection of leveling machines is based on the relative flatness of the field and the timely and effective organization of leveling work is required [13.14.15.16.17.18]. Given that the area's relative flatness averages around 60–90%, we can list the following benefits of widespread use of the following basic land levelers before planting and during repeated sowing.

- Water consumption is reduced by 2... 2.5 times.
- Irrigation productivity increases by 4 times.
- Irrigated lands drink flat water, and the soil is irrigated at the same time.
- Soil salinization is prevented because the rise of groundwater slows down, and as a result, the release of salts into the surface layer is reduced.
- Quality processing between rows is provided.
- With high quality and speed, it will be possible to carry out all agro-technical measures;
- As crop yields increase,
- The mechanic's working conditions will be improved.

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In order to ensure that the sown areas are at the specified level of demand, it is necessary to carry out current or major (capital) leveling in a timely manner. If the methods of "stacking" and "planting" are used in leveling, it is possible to maintain a fertile layer of soil. Studies have shown that cotton yields are 4-5 percent higher in areas planted by the "plantation" method than in areas planted by the normal method [20.21.22.23.24]. It should be noted that more than 90% of agricultural output is produced by irrigated farming. This situation shows that water resources are extremely important in agriculture, and their scarcity has a negative impact not only on agricultural production, but also on the entire economy of the country. One such energy-saving technique is the technology of leveling agricultural lands using improved disc softener base levelers. As we can see, using disc leveling base levelers to level the land allows us to perform simultaneous softening and leveling operations while saving up to 20% of irrigation water.In disc-smoothing base levelers, the surface area of flattened fields is uniform, characterized by the absence of high-lows and good quality of the plane. As a result, the water is evenly and evenly distributed, and the soil of the crop area is completely and evenly moistened. A flat, even distribution of water helps to save it. [1.2.3] FormalizedIt is known that the current and operational leveling of lands in irrigated areas annually in the short term covers 25–30% of the total land area of farms before planting in autumn and spring with long base P-2,8A, P-4, PA-3, PPA-3,1 and operational levelers with other brands of earth levelers. Although these land graders are simple in appearance, their performance is technologically very complex, and their work efficiency depends on the size of the area and irregularities, among many other factors. In addition, their maneuverability is very low, their metal capacity is large, they are not adapted to supply other agricultural machinery, and they consume a lot of power during operation.

One of the main factors in improving the ameliorative condition of arable land in agriculture is leveling. In the leveled areas, the productivity of all agricultural crops will increase, water consumption for irrigation will decrease, and the productivity of the next agricultural machinery will increase, and working conditions will improve [10.11.12.19]. The main problem of agriculture today is low energy consumption and high yields. The growing demand for energy means that the problem needs to be addressed sooner. Therefore, it is advisable to use the power of the equipment efficiently, improve the quality of work and minimize the negative effects of the work performed.

In the agricultural sector, the Head of State has focused on improving the reclamation of irrigated lands and the development of agricultural production, which is an honorable and responsible task. Because, this is the direction of the economy of the Republic, which ensures the cultivation of basic food stuffs of our people, the production of necessary products and their export to the international market.

Recognizing the importance of this task, it should be noted that the development of modern agro-industry in the Republic of Uzbekistan is based on all sectors of agriculture: leasing, farming, farmers' and peasant associations. The current development of agricultural production is planned on the basis of general mechanization, as well as the use of intensive and industrial methods of cultivation. The issues of production of low-capacity energy and mechanization of working

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machines for farms and lease contracts, import from abroad are being addressed [19].

3. Procedure of research.

The process of technological processing of the working body of the soft disk with a softener mounted on a base leveler.

Observations of the working technology of the working body of the softening disc show that the soil pile formed in front of the shovel moves by rotating along the axis of the disc, softening it to a certain depth using the discs. During the movement of the aggregate, the discs in front of the leveling shovel are placed in half opposite each other inside the shell, ensuring that the soil pile is evenly distributed across the width of the shovel. This has a positive effect on the leveling of the leveled area. As a result of the friction of the lumps of soil rotating around the discs against each other, the large lumps are crushed and the aggregate composition of the soil planting layer is improved. The variation of the leveling unit speed from 0.69 to 2.08 m / s increases the improvement of working processes of the above device and ensures the compliance of the physical and mechanical composition of the soil with the agro-technical requirements of pre-planting irrigated lands. The change in the cross-sectional profile of the soil aggregate at different speeds of the leveling aggregate was studied during the experiment and it appears that the cross-sectional surface of the soil aggregate changes with velocity and the cross-sectional profile decreases at high velocities. This situation occurs due to the intensive loading of the soil in front of the bucket at high speeds of the unit. At low speeds, the above process is relatively slow, the softening of the soil discs is improved, and clogging of the lumps is almost never observed. The top of the pile formed by filling the top of the loosened soil shovel is relatively wide, and the soil pile is wider compared to the large speeds of the leveling aggregate at low speeds. It was also observed that at high speeds of the aggregate, when the humidity between the soil discs is not at the required level, the rotation intensity of the discs is disturbed and the smooth movement of the soil pile does not occur. This situation requires a separate study of the position of the disks relative to each other and the diameter of the disks in relation to this position [25-29].

If the irrigated lands are leveled at the required level, the water given to the soil is moistened evenly, and the irrigation norm changes to the positive side. As a result, the volume of work associated with the construction of irrigation facilities is reduced, agricultural work is allowed to be improved, less labor is spent on irrigation, and productivity is increased.

Leveling of the Earth's surface is also important in the field of combating soil salinity, since the flatter the field is, the better the soil's gravel is washed and the water consumption is reduced by 2–5 times compared to uneven terrain. Leveling the field prevents the surface of the groundwater from rising, the salinity of the soil, and finally allows the aggregates to work qualitatively with high yields. The working yield of the watering can also increase.

It should be noted that the surface (relief) of the dive is considered an important economic asset since it affects the speed of walking of agricultural machines and aggregates and, consequently,

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the effect of their use. Uneven swings in the field cause the tractor to shake out of place, resulting in rapid absorption of walking parts and excessive consumption of engine power. In addition, the working conditions of the tractor deteriorate and the quality of work decreases, which leads to an increase in the cost of use.

Based on the research work carried out by mature scientists and scientific results, that is, it was noted that the following requirements for irrigated areas would lead to an improvement in the land reclamation situation:

1. 36-45 presenting the physical soil forming process, in terms of mechanical composition of the average and heavy slope of the soil in the direction of the longitudinal slope, 0,002-0,007 divided, irrigation ditches in the direction of the transverse slope, not more than 0,003-0,004;
2. Irrigated areas should have a surface leveling accuracy of no more than 5 cm.
3. Allow the soil to become denser by pressing when leveling the field; begin leveling work after the soil moisture has fallen to 15-16 percent, and level the field in one pass, or in some cases (where there is complex relief), level in two passes.
4. Depending on the type of lowlands during the field leveling, the machine must first be walked in the direction of the slope or cross each other, and the second time be walked in the direction of the irrigation. In the event that the slope is less than 100 meters, the machine must be walked in the direction of the height of the
5. soil at the turning places of the dive, not allowing dust to fall out.

The result of the research analysis showed that the yield of agricultural crops on land with clippings in the form of a layer of soil thicker than 10 cm is reduced. But the reduction in the yield of crops is even greater as a result of the fact that the soil is not evenly moistened on uneven lands.

Timely and qualitative implementation of the following measures to improve the efficiency of irrigated lands creates the opportunity to obtain a high yield from agricultural crops:

-Full provision of irrigated land with trench networks;
-Increase the efficiency of using trenches;
-Repair of open and closed trenches; timely organization of cleaning work;
Use of modern irrigation technologies;
-Timely and qualitative conduct of salt washing works;
strict irrigation requirements;
-Perform land leveling works qualitatively;
- Consistent implementation of measures against wind and water erosion.

In conclusion, it can be said that in order to reduce the cost of using techniques in the cultivation of technical crops and agricultural products grown in the Republic, it is recommended to widely use the above information in the process of qualitative leveling of lands.

4. Conclusion.

If a disk device mounted on a long ground leveler is used in practice, the ecological significance and physical properties of the natural structure of the soil will be improved, and soil fertility will be increased. It allows reducing the cost of agricultural work and leveling processes and the cost of production by a certain percentage. In mechanized and improved agriculture, the quality of work performed on leveling irrigated lands will be improved, and the cost of irrigation will be

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reduced. Soil composition improves for plant development and increases productivity. It can be concluded that this is the result of the positive impact of the leveler on the soil ecology.
The soft disk drive device mounted on the base leveler, prepared using the above theoretical research and analysis, shows that high leveling efficiency and low energy consumption are achieved. Based on the results of the research, it should be noted that the improvement of land reclamation is directly related to the quality of leveling, which leads to water savings in the process of self-irrigation.

References

[1] Following documents which are approved by council of Ministers and regional authorities. The state Resolution on wisely using water resources and improving ameliorative state of irrigating lands during 2013-2017 years
[2] Governmental documents on construction, reconstruction fixing works in the ameliorative systems and buildings, Tashkent-2015, p. 56
[3] Shevnnin Yu A, Burmiysky G G, 1990 Ways to improve the efficiency of land-planning machines in construction and agriculture. Tashkent, **27**
[4] Contemporary scientific and practical conferences on "Modern problems of agriculture and water management" Part I. Tashkent, 1996, p. **96**
[5] Rakhimov N, Muradov R, 2012 Manual on laser leveling and soil softening. Tashkent, p23-26.
[6] Khikmatov P G, 1978 The study of the qualitative and technological indicators of the work of the long-base scheduler in order to substantiate the optimal width and motion speed. Abstract of the PhD. Tashkent,
[7] Vasilenko P M, Elements of the method of mathematical processing of experimental results. Moscow, 1958.
[8] Khasanov I S, Kuchkarov J J, Nuriddinov Kh 2020 *IOP Conference Series: Materials Science and Engineering* **883(1)** 012174
[9] Khasanov I, Muratov A, 2020 *IOP Conf. Series: Materials Science and Engineering* **883** 012217.
[10] The issue of mechanization and electrification of agriculture 1970 VII, Fan Tashkent 106-111.
[11] Olimov Kh Kh and Juraev A A, 2020 *IOP Conference Series: Materials Science and Engineering,* **883(1),** 012171
[12] Olimov Kh Kh, Khasanov I S, Imomov S J, 2021 *E3S Web of Conferences* **264** 04070
[13] Murodov N M, Juraev A A and others. Utility model 2021 "Device for forming a longitudinal pawl between rows of cotton in one pass of the unit". Patent FAP 01645 06.21
[14] Olimov Kh.Kh, Juraev A A, Ochilov M.Z, 2020 *IOP Conference Series: Materials Science and Engineering,* **883(1)** 012170
[15] Kuchqorov J J, Turaev B M, Murodov N M, 2020 *Int, J. of Critical Reviews* **7(12)** 198-201
[16] Ermatova D, Imomov S, Matmurodov F, 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **614** 012132
[17] Vafoev R, Vafoev S, Akhmedov S, Imomov S, 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **614** 012093
[18] Marupov I, Imomov S, Ermatova D, Majitov J, Kholikova N, Tagaev V, Nuritov I, 2020

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
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IOP Conf. Ser.: Earth Environ. Sci. **614** 012153
[19] Sharipov L A, Imomov S J, Majitov J A, Komilov O S, Sharipov M Z, Pulatova F, Abdisamatov O S, 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **614** 012035
[20] Imomov S, Shodiev E, V Tagaev, T Qayumov, 2020 *IOP Conf. Ser.:Mater.Sci.Eng.* **883** 012124
[21] Khasanov I S, Kuchkarov J J, Nuriddinov Kh 2020 *IOP Conference Series: Materials Science and Engineering* **883(1)** 012174
[22] Khasanov I S, Muratov A 2020 *IOP Conference Series: Materials Science and Engineering* **883(1)** 012217
[23] Muratov H, Imomova N, Ergashev Z, Sultonov M 2020 *IOP Conference Series: Materials Science and Engineering* **883(1)** 012130
[24] A N Juraev, S J Imomov, S S Orziev, Application of energy and resource engineering software in cotton fields, IOP Conf. Series: Earth and Environmental Science 868 (2021) 012067
[25] Juraev, F., Karimov, G. Mathematical model of water absorption area in intensive garden irrigation from the ground. E3S Web of Conferencesthis link is disabled, 2021, 264, 01044.
[26] Juraev, F., Rajabov, Y., Farmonov, N., Jo'raev, A. Development of technology and equipment for improving the reclamation state of saline soils. E3S Web of Conferencesthis link is disabled, 2021, 264, 04018
[27] Juraev, F., Khamroyev, G., Khaydarova, Z., Khamroyev, I., Ibodov, I. The usage of a combined machine in the process of preparing the land for planting. E3S Web of Conferencesthis link is disabled, 2021, 264, 04092
[28] Juraev, F., Karimov, G. Water saving technique and technology of subsurface irrigation. IOP Conference Series: Materials Science and Engineeringthis link is disabled, 2020, 883(1), 012095