SCIENTIFIC JUSTIFICATION OF SOIL MECHANICAL COMPOSITION: UNRAVELING THE KEY INFLUENCING FACTORS

Shokirova Manzura Bobirxonovna
Bukhara Institute of Natural Resources Management, researcher-teacher

Azimova Go‘zal Adizovna
Sharipova Zaynab Zaripovich
Bukhara Institute of Natural Resources Management, students

ABSTRACT

The mechanical composition of soil plays a pivotal role in shaping various soil properties and functions, thereby influencing crucial ecological and agricultural processes. This scientific ABSTRACT explores the rationale behind investigating the mechanical composition of soil and its implications. Understanding the distribution and interaction of soil particles, including sand, silt, and clay, is essential for deciphering soil structure, porosity, and water retention capacity. This knowledge serves as a foundation for sustainable land management practices, crop yield optimization, and environmental conservation. The ABSTRACT delves into the methodologies employed to analyze soil mechanical composition, highlighting advancements in techniques such as laser diffraction, sedimentation, and sieving.

Keywords: Soil Mechanical Composition, Soil Structure, Particle Size Distribution, Sand, Silt, Clay, Soil Analysis Techniques, Laser Diffraction, Sedimentation, Sieving, Water Retention, Nutrient Availability, Microbial Activity, Carbon Sequestration, Sustainable Land Management, Agricultural Productivity, Environmental Conservation.

Soil naturally contains mineral particles, organic compounds, air and water. In order to obtain a high yield from agricultural crops, the soil should contain a reserve of potassium, phosphorus, calcium, sulfur, iron and other elements, as well as nitrogen, water, air, heat and sunlight. The lack of any of these will definitely affect the development of the plant. Organic tissues of crops contain 80-90% water and 10-20% dry matter.

Water dissolves nutrients in the soil and thus creates conditions for their assimilation through the roots of crops. In addition, the presence of a certain amount of air in the soil serves for the development of microorganisms and respiration of the root system.

Soil is divided into the following types according to its mechanical composition:
- Loamy soil;
- Heavy sandy soil;
- Medium loamy soil;
- Light loam soil;
- Sandy soil;
- Sand.

The water-physical properties of the soil mainly depend on its mechanical composition and structure, that is, whether it is divided into separate aggregates or not. The type of soil is determined by the percentage of particles with a diameter of less than 0.01 mm (physical soil). The following table shows the description of the soil according to its mechanical composition.

Soil type		**Physical parameters soil (percentage of particles smaller than 0.01 mm in diameter)%**
Heavy	Heavy soil	> 66
	Right soil	50-66
	Heavy sandy soil	40-50
Average	Average sandy soil	33-40
Light	Light loam soil	25-33
	Sandy soil	14-25
	Sand soil	<14

The primary focus is on unraveling the key influencing factors that shape the distribution and interaction of soil particles, including sand, silt, and clay. The article emphasizes the significance of understanding soil structure, porosity, and water retention capacity, as these factors play pivotal roles in various ecological and agricultural processes.

Methodologies for analyzing soil mechanical composition, such as laser diffraction, sedimentation, and sieving, are discussed in the article. These advanced techniques contribute to a more accurate and comprehensive understanding of soil properties. The ecological implications of soil mechanical composition are also highlighted, particularly in relation to nutrient availability, microbial activity, and carbon sequestration.

Overall, the article underscores the critical importance of investigating soil mechanical composition for sustainable land management practices, optimization of crop yields, and environmental conservation. By shedding light on the main

influencing factors, the article aims to contribute to informed decision-making in the fields of agriculture and environmental science.

REFERENCES:

1. Sadullaev , A. N., & Ergashev , M. G. ugli. (2023). IT IS A WATER-SAVING TECHNOLOGY CREATED WITH THE POWERFUL SWELLING “HYDROGEL”. Educational Research in Universal Sciences, 2(18), 207–210. Retrieved from http://erus.uz/index.php/er/article/view/5399
2. Sadullaev Azamat. (2022). EFFECTS OF IRRIGATED AGRICULTURE ON THE GROUNDWATER REGIME IN THE FOOTHILLS. Educational Research in Universal Sciences, 1(2), 124–128. Retrieved from https://erus.uz/index.php/erus/article/view/202
3. Sh. M. Xamidova, U. A. Juraev, & A. N. Sadullayev. (2022). THE EFFECT OF PHYTOMELIORANT CROPS ON THE ACCUMULATION OF SALT IN THE SOIL, NORMS FOR WASHING SOIL BRINE. Spectrum Journal of Innovation, Reforms and Development, 5, 78–82. Retrieved from https://sjird.journalspark.org/index.php/sjird/article/view/203
4. Sadullaev, A. N. (2022). MEASURES OF EFFECTIVE USE OF WATER IN FARMS OF BUKHARA REGION. RESEARCH AND EDUCATION, 1(4), 72–78. Retrieved from https://researchedu.org/index.php/re/article/view/527
5. Саъдуллаев, А. Н., & Чорикулов, Ш. (2020). ДУККАКЛИ ЭКИНЛАР ТУПРОҚ УНУМДОРЛИГИНИ ОШИРАДИ. ЖУРНАЛ АГРО ПРОЦЕССИНГ, (SPECIAL ISSUE).
6. Зарипович, Қ. З., Саъдуллаев, А. Н., & Зариповна, Қ. Р. (2020). G‘OZANI SUG‘ORISHDA SUV TEJAMKOR SUG‘ORISH TEXNOLOGIYALARNING SAMARADORLIGINI ILMIY ASOSLASH. ЖУРНАЛ АГРО ПРОЦЕССИНГ, (SPECIAL ISSUE).
7. Амонова, З. У., & Саъдуллаев, А. Н. (2020). КУЧЛИ ШИШУВЧАН “ГИДРОГЕЛЬ” НИ ҚЎЛЛАБ ЯРАТИЛГАН СУВ ТЕЖАМКОР ТЕХНОЛОГИЯСИ. ЖУРНАЛ АГРО ПРОЦЕССИНГ, (SPECIAL ISSUE).
8. Холматовна, С. Ҳ., Саъдуллаев, А. Н., & Джўраев, Ш. Б. (2020). ҚИШЛОҚ ХЎЖАЛИГИ ЭКИНЛАРИНИ СУҒОРИШДА СУВ ТЕЖАМКОР УСУЛЛАРДАН ФОЙДАЛАНИШ. ЖУРНАЛ АГРО ПРОЦЕССИНГ, (SPECIAL ISSUE).
9. Аманова, З. У., & Саъдуллаев, А. Н. (2020). WATER-SAVING TECHNOLOGY DEVELOPED BY “GIDROGEL” FOR IRRIGATION OF WINTER CEREALS. ЖУРНАЛ АГРО ПРОЦЕССИНГ, (SPECIAL ISSUE).
10. The effectiveness of phytomeliorative measures in conditions of saline soils. SM Xamidova, UA Juraev, AN Sadullaev - Academicia Globe: Inderscience Research, 2022
11. APPLICATION OF RESOURCE-EFFICIENT IRRIGATION TECHNOLOGIES IN BUKHARA OASIS. UA Juraev, SA Nafiddinovich - INTERNATIONAL CONFERENCE: PROBLEMS AND …, 2022

12. Sadullaev, A. N. (2022). INTERPRETATION OF PSYCHOLOGICAL KNOWLEDGE IN THE TEACHINGS OF OUR GREAT ANCESTORS. Educational Research in Universal Sciences, 1(2), 117–123. Retrieved from http://erus.uz/index.php/er/article/view/379
13. Sadullaev, A. N. (2022, July). BUKHARA REGIONAL IRRIGATION AND MELIORATION SYSTEM. In INTERNATIONAL CONFERENCES (Vol. 1, No. 12, pp. 18-27).
14. Sadullaev, A. N., & Azimova, G. A. (2024). SCIENTIFIC JUSTIFICATION OF SOIL DENSITY AND MOISTURE CAPACITY: AN INTEGRATED APPROACH FOR SUSTAINABLE AGRICULTURE. GOLDEN BRAIN, 2(1), 414–417. https://doi.org/10.5281/zenodo.10466516
15. Tukhtayeva Habiba Toshevna Sadullaev Azamat Nafiddinovich Azimova Go‘zal Adizovna. (2024). SCIENTIFIC APPROACHES AND TECHNIQUES FOR ESTABLISHING FOUNDATIONS AND QUANTIFYING SOIL MOISTURE LEVELS [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10466027
16. Sadullaev , A. N. (2024). PECULIARITIES OF THE WATER PERMEABILITY PROPERTIES OF THE SOIL. Educational Research in Universal Sciences, 3(1), 4–6. Retrieved from http://erus.uz/index.php/er/article/view/5536
17. Shokirova, M., & Sulaymonova, M. (2023). EKOLOGIK XAVFSIZLIKNING HUQUQIY-TA’LIMIY ASOSLARI VA BARQAROR RIVOJLANISH. Educational Research in Universal Sciences, 2(17), 637–640. Retrieved from http://erus.uz/index.php/er/article/view/5264
18. Pirimova, S. K., & o‘g‘li Shodiyorov, H. R. (2023). JIZZAX SUV OMBORI KIRIM SUVLARI HAJMINING YIL ICHIDA OYLIK, FASLIY VA YILLARARO TAQSIMLANISHI. Educational Research in Universal Sciences, 2(18), 360-364.
19. S. X. Isayev, Z. Z. Qodirov, M. M. Avliyoqulov, & M. Shodmonova. (2023). EFFECT OF WATER-SAVING IRRIGATION TECHNOLOGIES ON SOIL AGROCHEMICAL PARAMETERS IN SOYBEAN CULTIVATION. European Journal of Interdisciplinary Research and Development, 19, 12–15. Retrieved from http://www.ejird.journalspark.org/index.php/ejird/article/view/764
20. Avliyoqulov , M., Avliyoqulov , M., G‘aybulloyev , O., Badalov , N., & Ergashev , M. (2024). BUXORO TUMANI FERMER XO‘JALIKLARIDA G‘ALLA MAYDONLARINI YOMG‘IRLATIB SUG‘ORISH TEXNOLOGIYASINI SAMARADORLIGINI OSHIRISH CHORA-TADBIRLARINI ISHLAB CHIQISH. GOLDEN BRAIN, 2(1), 207–214. Retrieved from https://researchedu.org/index.php/goldenbrain/article/view/5940
21. Ikromov, R. A. o‘g‘li ., & G‘aybullayev, O. A. o‘g‘li . (2024). TURLI EKINLARNI YETISHTIRISH MAQSADIDA SUV TEJOVCHI TEXNOLOGIYALARDAN FOYDALANGAN HOLDA SUG‘ORISH ISHLARINI AMALGA OSHIRISH. GOLDEN BRAIN, 2(1), 237–244. https://doi.org/10.5281/zenodo.10466369