STRUCTURAL STATE OF IRRIGATED MEADOW-ALLUVIAL SOILS

Xurramov Sa'dulla Allanazarovich
Qodirova Dilrabo Abdukarimovna
Tashkent State Agrarian University
https://doi.org/10.5281/zenodo.22629328

Abstract

This study analyzes the structural condition and vertical distribution of agronomically valuable aggregates in irrigated meadow-alluvial soils across the Romitan and Bukhara districts of Bukhara region. Aggregate size distribution was examined across profile horizons to determine the proportions of large clods (>10 mm) and agronomically valuable aggregates (10-0,25 mm).

Keywords: *soil structure, soil aggregates, meadow-alluvial soil, dry sieving, bulk density.*

The Main Part

An analysis of the structural state of irrigated meadow-alluvial soils revealed that the size distribution of aggregate fractions varies noticeably across soil horizons. The content of agronomically valuable aggregates (10-0,25 mm), large clods (>10 mm), and fine silty fractions (<0,25 mm) served as the primary criteria for evaluating soil structure.

In the irrigated meadow-alluvial soils of Romitan district (Profile 2), the plowed layer (0-30 cm) consisted of 41,98 % large aggregates (>10 mm) and 50,05 % agronomically valuable aggregates (10-0,25 mm). In the 30-48 cm layer, large aggregates accounted for 49,47 %, while agronomically valuable aggregates constituted 44,38 %. Within the 48-82 cm layer, large aggregates reached 41,93 % and agronomically valuable aggregates reached 51,71 %. Finally, the 82-112 cm layer contained 47,93 % large aggregates and 46,42 % agronomically valuable aggregates (Table 1).

Table 1

Structural State of Irrigated Meadow-Alluvial Soils (Based on Dry Sieving by Savvinov's Method), %

Layer, cm	>10	10-7	7-5	5-3	3-2	2-1	1-0,5	0,5-0,25	<0,25	>10	10-0,25	<0,25
Profile 2. Meadow-alluvial soils of the "Zarafshon" farm in the Khalqabad massif, Romitan district												
0-30	41,98	7,02	6,33	10,54	9,62	10,16	2,64	3,74	7,97	41,98	50,05	7,97
30-48	49,47	8,91	6,8	8,01	7,14	7,78	2,94	2,8	6,15	49,47	44,38	6,15
48-82	41,93	12,95	10,95	8,68	5,37	7,35	2,66	3,15	6,96	41,93	51,71	6,96
82-112	47,93	10,18	7,45	11,57	4,53	6,5	2,09	4,1	5,65	47,93	46,42	5,65
Profile 5. Meadow-alluvial soils of the "Zarafshon" farm in the Khalqabad massif, Romitan district												
0-30	43,46	7,14	7,09	11,19	9,1	10,35	3,24	3,78	4,65	43,46	51,89	4,65
30-48	45,82	9,17	9,34	12,07	6,55	6,23	2,52	3,55	4,75	45,82	49,43	4,75
48-82	32,08	10,09	8,73	14,26	8,49	9,77	2,6	4,01	9,97	32,08	57,95	9,97

82-114	44,66	11,45	6,74	6,87	6,49	6,02	2,03	3,62	12,12	44,66	43,22	12,12
Profile 24. Meadow-alluvial soils of the "Zarifota" farm in the Uzbekistan massif, Bukhara district												
0-32	44,66	6,9	6,64	9,52	9,15	9,67	3,17	3,86	6,43	44,66	48,91	6,43
32-57	50,38	8,69	6,64	10,79	5,41	5,09	3,43	3,86	5,71	50,38	43,91	5,71
57-87	37,63	7,96	5,03	12,22	8,29	9,93	2,32	4,65	11,97	37,63	50,4	11,97
87-103	40,73	12,23	10,8	8,72	9,21	6,23	2,6	2,44	7,54	40,73	52,23	7,54
Profile 53. Meadow-alluvial soils of the "Zarifota" farm in the Uzbekistan massif, Bukhara district												
0-33	45,67	6,37	7,19	13,45	8,87	6,84	2,21	3,41	5,99	45,67	48,34	5,99
33-48	43,25	8,85	8,22	8,75	8,65	8,52	3,13	3,5	7,13	43,25	49,62	7,13
48-85	33,24	9,45	10,32	12,36	9,52	10,2	2,91	4,69	7,31	33,24	59,45	7,31
85-117	39,74	9,81	9,87	12,84	9,59	6,89	2,71	2,25	6,7	39,74	53,56	6,7

Further evaluation of Profile 5 in Romitan district showed that the topsoil layer (0-30 cm) comprised 43,46% large aggregates and 51,89 % agronomically valuable aggregates. In the 30-48 cm horizon, agronomically valuable aggregates stood at 49,43 % and large aggregates at 45,82%. The 48-82 cm layer exhibited 57,95 % agronomically valuable aggregates and 32,08 % large aggregates, whereas the 82-114 cm layer recorded 43,22 % agronomically valuable aggregates and 44,66 % large aggregates.

In Bukhara district, Profile 24 demonstrated that the plowed layer (0-32 cm) contained 48,91 % agronomically valuable aggregates and 44,66 % large aggregates. The 32-57 cm layer comprised 50,38 % large aggregates and 43,91% agronomically valuable aggregates. Moving deeper, the 57-87 cm layer recorded 50,40 % agronomically valuable aggregates and 37,63 % large aggregates, while the 87-103 cm layer yielded 52,23% agronomically valuable aggregates and 40,73 % large aggregates.

Similarly, Profile 53 in Bukhara district showed that the topsoil layer (0-33 cm) possessed 48,34 % agronomically valuable aggregates and 45,67 % large aggregates. The 33-48 cm layer recorded 49,62 % agronomically valuable aggregates and 43,25 % large aggregates. The 48-85 cm layer contained 59,45 % agronomically valuable aggregates and 33,24 % large aggregates, while the underlying 85-117 cm layer exhibited 53,56 % agronomically valuable aggregates and 39,74 % large aggregates.

Conclusion

Overall, in the irrigated meadow-alluvial soils, agronomically valuable aggregates range from 43.22% to 59.45%, indicating a satisfactory level of soil structure formation. However, an increase in large aggregates (>10 mm) up to 50% and fine fractions (<0.25 mm) up to 10–12% in certain horizons reveals a partial degradation of soil structure under the influence of irrigation, mechanical tillage, and natural compaction. This emphasizes the necessity of applying agrotechnologies aimed at structure restoration.

Reference:

1. Курвантаев Р. Состояние агрофизических свойств почв и пути их улучшения при интенсивной системе земледелия // Материалы IV съезда почвоведов и агрохимиков Узбекистана. 9-10 сентябрь-Ташкент, 2005-С.61-74.
2. Kurvantayev R., Geldiyev O.A., Soliyeva N.A. Lalmikor maydonlarda almashlab ekish tizimida tuproqqa ishlov berish tex nologiyasining agrofizikaviy xossalariga ta`siri. // Lalmikor dehqonchilikning ahamiyati, ilmiy asoslari va uni rivojlantirishning innovatsion agrotexnologiyalari mavzusidagi xalqaro ilmiy-amaliy konferensiya materiallar to‘plami. -Jizzax, 2023. -B. 171-176.
3. Курвантаев Р. Оптимизация и регулирование агрофизического состояния орошаемых почв пустынной зоны Узбекистана: Автореф.дисс.док.с.х.наук. - Ташкент. 2000. 45 с.
4. Рамазанов А., Курвантаев Р., Аликулов Б., Холматов Б., Шербекова З. Физические свойства новоорошаемых сероземно-луговых почв Голодностепского оазиса // Почвоведение и агрохимия в XXI веке. Сборник материалов международной научно-практической конференции (9-10 октября 2003г.). -Ташкент, 2004, -С. 130-139.
5. Kurvantaev R., Dadamukhamedova M. R. Changes in the structural composition of typical seriozems when applying mineral and organic fertilizers // agrarian science for agriculture. - 2016. - P. 142-145.
6. Zafarjonzoda, R. Z. (2022). ANTROPOGEN OMILLAR TA'SIRIDA TUPROQ BIOLOGIK FAOLLIGINING O'ZGARISHI. In E Conference Zone (pp. 80-82).
7. Turdimetov, S., & Rakhimov, Z. (2021). EVOLUTION OF PROPERTIES OF IRRIGATED GRASSLAND SOILS. In International Scientific and Current Research Conferences (pp. 65-69).
8. Allayarov, X. N., D. A. Qodirova, and G. Q. Nabijonova. "IQLIM O‘ZGARISHI SHAROITIDA YERLARDAN SAMARALI FOYDALANISHDA TUPROQLARNING FIZIKAVIY XOSSALARINING AHAMIYATI." Science and innovation 3.Special Issue 39 (2024): 47-51.