

**KICHIK EKIN MAYDONLARI UCHUN KO'CHMA  
TOMCHILATIB SUG'ORISH AGREGATI**

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Mamlakatimizda 2020-2030 yillarda aholini va iqtisodiyotning barcha tarmoqlarini suv bilan barqaror ta'minlash, sug'oriladigan yerlarning meliorativ holatini yaxshilash, suv xo'jaligiea tamoyillari va mexanizmlarini hamda raqamli texnologiyalarni keng joriy etish, suv xo'jaligi obyektlarining ishonchli ishlashini ta'minlash hamda yer va suv resurslaridan foydalanish samaradorligini oshirish maqsadida O'zbekiston Respublikasi Prezidentining 2020-yil 10-iyul dagi PF-6024-son "O'zbekiston Respublikasi suv xo'jaligini rivojlantirishning 2020-2030-yillarga mo'ljallangan konsepsiyasini tasdiqlash to'g'risida" gi Farmoni imzolangan. Shunga muvofiq yerlarni tekislash ishlarini to'g'ri amalga oshirish, shu bilan birgalikda mavjud texnikalarni takomillashtirish va resurstejamkor texnikalarni yaratish maqsad qilib olingan [1,2,3,4].

Dunyoda aholi sonining oshishi, oziq-ovqatga bo'lgan ehtiyojning ortganligi, sanoat ishlab chiqarishning kengayishi, iqlim o'zgarishi kabi omillar tufayli suv resurslariga bo'lgan talab yildan-yilga oshib bormoqda. Oqibatda, jahonning ko'p mintaqalarida suv resurslari tanqisligining tendensiyasi kuzatilyapti.

Ma'lumki, butun jahonda qishloq xo'jaligi sohasi suvni eng ko'p ishlatuvchi sanaladi. Shuning uchun, butun jahon ilm ommasi qishloq xo'jaligida, xususan sug'oriladigan dehqonchilik ekin maydonlarida suvdan tejamlil foydalanish, shu jumladan, suvni tejaydigan texnologiyalarni keng joriy etishni suv tanqisligini yumshatishning eng ustuvor yo'li sifatida ta'kidlashadi.

Iste'mol qiladigan suv resurslarining 80 foizi qo'shni davlatlar hududida shakllanadigan O'zbekiston suv resurslaridan samarali foydalanish, ayniqsa oxirgi yillarda kuchayib borayotgan suv taqchilligini yumshatish maqsadida ekinlarni sug'orishning suvi tejoyvchi tizimlarini keng joriy qilish va suv resurslarini boshqarishda zamonaviy texnologiyalardan foydalanish imkoniyatlarini kengaytirish yo'nalishida mintaqa davlatlari orasida tashabbuskor bo'layotganini e'tirof etish joiz [5,6,7].

Ma'lumki, qishloq xo'jalik ekinlarini sug'orishni ikki ko'rinishda amalga oshirish mumkin. Bularning birinchisi suvning o'z og'irligi tufayli yer yuzasi bo'ylab harakatlanishi yordamida amalga oshiriladigan o'zi oqar (gravitatsion) sug'orish bo'lsa, ikkinchisi suvni yuqori bosimda yetkazib berishga asoslangan bosimli sug'orishdir.

Tomchilatib sug'orish usuli - ekinning ehtiyojiga mos miqdordagi suvni shlanglar yordamida bevosita uning ildiz qatlamiga yetkazib berishga mo'ljallangan muhandislik sug'orish usulidir [8,9,10,11,12].

Ekinlarni yer ustidan sug'orishning qariyb barcha usullarida (egatlar, yomg'irlatib, cheklar, polosalar) sug'orish paytida tuproqda suvga bo'kish va sug'orishdan keyin qurib ketish hodisalari yuz beradi. Sug'orish paytida tuproqda namlikni haddan ziyod ortishi ekinni suvga bo'ktirsa, sug'orishlar orasidagi vaqtning uzoqligi tuproq qurib ketishiga sabab bo'ladi va o'simlikni suvsiz qoldiradi.

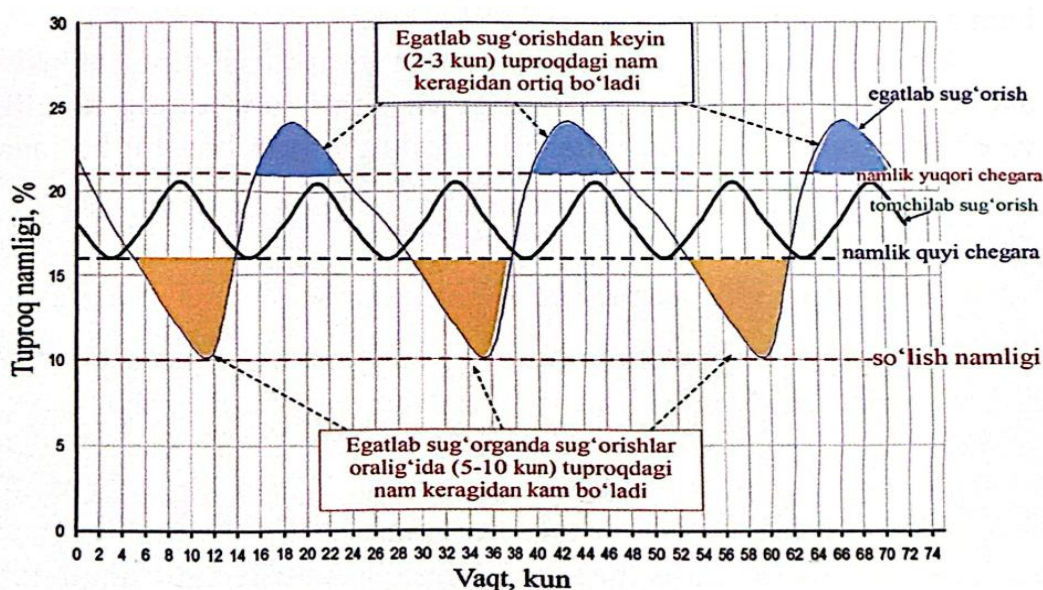
Navbatdagi sug'orishda ekin yana suvga bo'kadi, undan keyin esa yana suvsiz qoladi, ya'ni ekin bir stress holatdan chiqib boshqasiga tushaveradi.

Bunday sharoitda ekin hosil yaratish o'rniga stress holatlardan chiqishga harakat qilaveradi va o'z energiyasini ana shu stress holatlardan chiqib ketish uchun sarflayveradi.

Tomchilatib sug'orilganda esa suv ekinning ehtiyojiga mos ravishda dalaning barcha nuqtalariga bir xilda beriladi, ekinlarning ildizlari joylashgan qatlam bir xilda namlanadi. Ekinning ildiz qatlamida doimiy bir xil namlik sharoiti yaratiladi va ekin stress holatga tushishining sabablari bartaraf qilinadi.

Ekinlarni bosimli sug'orish usullari suvni quvur va shlanglar yordamida bevosita ekinlarning joylashgan nuqtalariga yetkazib berishga mo'ljallangan muhandislik sug'orish usullari sanaladlar. Bosimli sug'orish usullari safiga tomchilatib, yomg'irlatib va yer ostidan sug'orish usullari kiradi.

Demak, tomchilatib sug'orilganda sug'orishdan avval ham, keyin ham tuproqdagi namlik ekin ehtiyojiga mos bo'ladi, ekin stress holatga tushmaydi va o'zining energiyasini to'liq ravishda faqat hosil yaratish va uni ko'paytirishga sarflaydi [13,14,15].



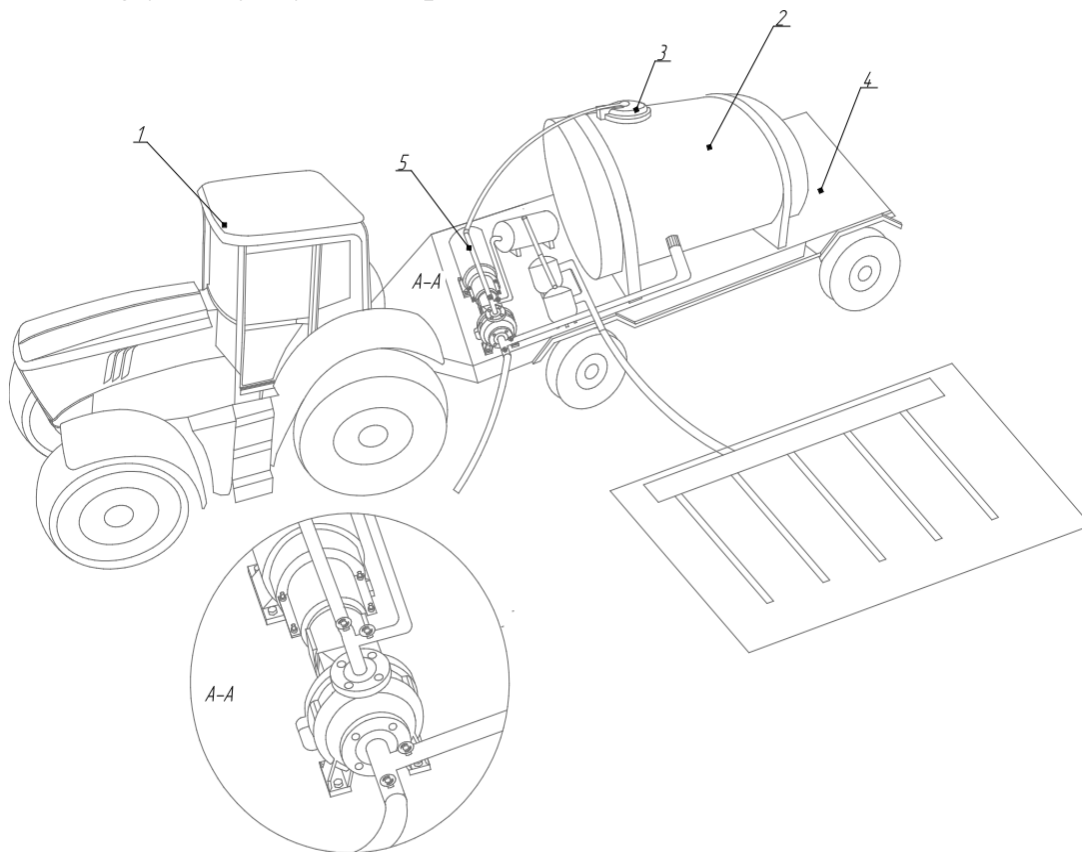
1 – rasm. Ekinni tomchilatib va egatlab sug'orilganda tuproq namligi o'zgarishlarining o'zaro farqlanishi

Tomchilatib sug'orilganda suv bilan birga oziq moddalar ham eritilgan holatda ekinning ildiz tizimi joylashgan qatlamga yetkazib beriladi, ular behudaga isrof bo'lmay, ekinga to'liq yetib boradi.

Dalaning barcha qismidagi ekinlar bir xil suv va bir xil ozuqa oladilar. Natijada dalaning barcha qismlarida ekin bir xilda rivojlanadi va barqaror yuqori hosil beradi.

Xullas, ekinlarni tomchilatib sug'orilganda mavsum davomida tuproq namligi keskin o'zgarmaydi, ya'ni tuproq o'ta qurib ham ketmaydi, ortiqcha namlanib ham ketmaydi, ya'ni tuproqning namligi kichik oraliqda o'zgaradi. Tomchilatib sug'orilganda tuproqdagi namlik har doim ekin ehtiyojiga mos bo'ladi.

Bugungi kunda respublikamiz nafaqat butun dunyoda so'nggi yillarda kuzatilayotgan suv tanqisligi mavjud. Suv resurslaridan tejab-tergab foydalanish, bunda ilg'or texnologiyalarni joriy etish zaruratini yuzaga keltirmoqda. Ayniqsa, Amudaryoning eng quyi qismida joylashgan Qoraqalpog'iston Respublikasi Buxoro, Navoiyning ayrim hududlari va Qashqadaryoning ayrim hududlarida keyingi yillardagi suv tanqisligi qishloq xo'jaligi ekinlarini yetishtiriga jiddiy ta'sir ko'rsatmoqda. Bunda suv tejavchi sug'orish texnologiyalaridan keng foydalangan holda suvni tejash orqali mo'l hosil olishga intilishmoqda va shu kabi suv tejamkor sug'orish texnologiyalari joriy etilmoqda.

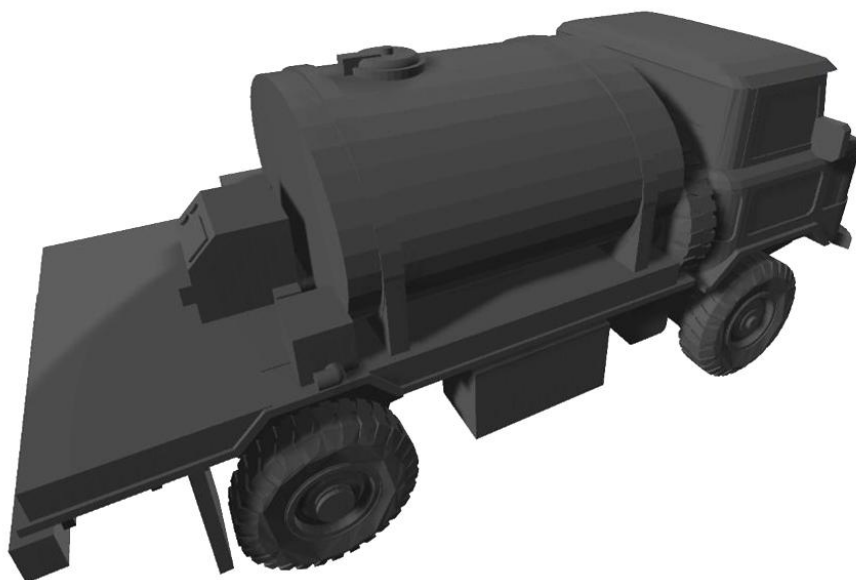


1 – traktor, 2 – suv idishi, 3 – suv idishi qopqog'i, 4 – telejka, 5 – suv nasosi  
**2-rasm. Ko'chma tomchilatib sug'orish agregatining umumiy ko'rinishi**

Bizga ma'lumki bugungi kunda kichik hajmli va qurg'oqchil hududlarda yerlardan unumli foydalanish va yuqori hosil olish maqsadida yangi suv tejovchi texnika va texnologiyalarni ishlab chiqish va mavjudlarini takomillashtirish maqsad qilib olingan. Ammo kichik hajmli va qurg'oqchil hududlarda foydalanish uchun bu kabi tizim yoki mashinalar bugungi kunda mavjud emas. Biz ushbu muammoni yechish maqsadida quyidagi konstruksiyani ishlab chiqdik (2-rasm).

Tizimning suv saqlovchi qismi suv idishi, tindirgich yoki sisternalardan, suv tozalovchi qismi qumli, diskli yoki to'rli filtrlardan, suv yetkazib beruvchi qismi nasos qurilmalari, bosh va tarqatuvchi quvurlardan, suv rostlovchi qismi turli zadvijsalar, ventillar va fittinglardan, sug'oruvchi qismi tomizgichli shlanglar yoki lentlardan iborat bo'ladi. Bundan tashqari tomchilatib sug'orish tizimlari tarkibiga o'g'itlovchi moslamalar hamda avtomatik boshqaruv uskunalari ham kiritilishi mumkin. O'g'itlovchi moslamalar o'g'it eritmalarini tayyorlash va suvga qo'shish qurilmalaridan, avtomatik boshqaruv uskunalari esa boshqaruv kompyuteri va turli datchiklardan iborat bo'ladi.

Tomchilatib sug'orish tizimining suv manbasi sifatida yer usti suvlari ishlatilganda tizimning tarkibi uncha o'zgarmaydi, tarkibga faqat suv idishi - tindirgich qo'shiladi, boshqa qismlar esa odatdagidek nasos qurilmasi, filtr, o'g'itlovchi moslama, bosh va tarqatuvchi quvurlar, ulovchilar (kran va fittinglar), tomizgichli shlang tomizgichlar kabi qismlardan iborat bo'ladi. Tomchilatib sug'orish tizimining suv manbasi sifatida yer usti suvlari ishlatilganda tizimning tarkibi uncha o'zgarmaydi, tarkibga faqat suv idishi - tindirgich qo'shiladi, boshqa qismlar esa odatdagidek nasos qurilmasi, filtr, o'g'itlovchi moslama, bosh va tarqatuvchi quvurlar, ulovchilar (kran va fittinglar), tomizgichli shlang va tomizgichlar kabi qismlardan iborat bo'ladi [16,17,18,19,20].



**3 – rasm. Kichik ekin maydonlari uchun ko'chma tomchilatib sug'orish agregatining umumiy ko'rinishi**



Sugʻoriladigan ekin maydonlarining joylashgan oʻrni va ishlatadigan suvining sifatiga koʻra tizimning tarkibiga kiruvchi qismlarining boshqa turlari ham boʻlishi mumkin. Biz tomondan taklif etilayotgan kichik ekin maydonlari uchun koʻchma tomchilatib sugʻorish agregati ish sifatining yuqoriligi va mehnat sarfining kamayishi bilan yuqori ish unumdorligiga egadir.

### **FOYDALANILGAN ADABIYOTLAR**

1. Imomov Sh., Jurayev A., Ruziqulov J., Kurbonboyev S., Ruziqulova D., Xusinov S., Madadxonov T. (2022). THEORETICAL STUDIES ON THE DESIGN OF TRENCHER WORK EQUIPMENT. Eurasian Journal of Academic Research, 2(12), 989–996. <https://www.in-academy.uz/index.php/ejar/article/view/6504>

2. Sh.J.Imomov, J.U.Ruzikulov, S.S.Kurbanbayev, H.S.Safarov, K.S.Sobirov, and Z.Sh.Isakov "Technological process of provisional dig a ditch", Proc. SPIE 12296, International Conference on Remote Sensing of the Earth: Geoinformatics, Cartography, Ecology, and Agriculture (RSE 2022), 122960O (6 July 2022); <https://doi.org/10.1117/12.2642980>

3. Sh. J. Imomov, J. U. Ruzikulov, S. S. Kurbanbayev, H. S. Safarov, K. S. Sobirov, and Z. Sh. Isakov "Technological process of provisional dig a ditch", Proc. SPIE 12296, International Conference on Remote Sensing of the Earth: Geoinformatics, Cartography, Ecology, and Agriculture (RSE 2022), 122960O (6 July 2022); <https://doi.org/10.1117/12.2642980>

4. Energy-saving device for temporary ditch digging I S Hasanov<sup>1</sup>, J U Ruzikulov<sup>1</sup>, F A Ergashov<sup>1</sup>, M J Toshmurodova<sup>1</sup> and M R Sotlikova<sup>1</sup> Published under licence by IOP Publishing Ltd IOP Conference Series: Earth and Environmental Science, Volume 868, International Conference on Agricultural Engineering and Green Infrastructure Solutions (AEGIS 2021) 12th-14th May 2021, Tashkent, Uzbekistan Citation I S Hasanov et al 2021 IOP Conf. Ser.: Earth Environ. Sci. 868 012091 DOI 10.1088/1755-1315/868/1/012091

5. Ruzikulov Jasur Uktam ugli, Kurbanbayev Sindorbek Sarvarbek ugli, Nasrullayev Alpomish Anvarjon ugli, Safarov Khusniddin Sirojiddin ugli, Research on the establishment of an improved temporary ditch production device, Galaxy international interdisciplinary research journal (GIIRJ), Volume 9, Issue 11, November, 2021

6. Ruziqulov Jasur Uktam ugli, Isakov Zafarjon Shuxrat ugli, Qurbonboyev Sindorbek Sarvarbek ugli, Ruziqulova Dilnoza Uktamovna, Xusinov Sarvarbek Nodirbek ugli. (2022). INCREASING THE WORKING PRODUCTIVITY OF THE CASE 1150 L BULLDOZER BY IMPROVING THE WORKING EQUIPMENT. Neo Science Peer Reviewed Journal, 4, 87–90. Retrieved from <https://www.neo-journals.com/index.php/nsprj/article-/view/83> .

7. Imomov Shavkat Jakhonovich, Murodov Tohir Faxriddin ugli, Isakov Zafarjon Shuxrat ugli, Ochilov Nuriddinjon zokirovich, Iskandarov Johongir Ochil ugli, & Ruziqulova Dilnoza Uktamovna. (2022). LOCAL FERTILIZER MACHINE WITH AUGER. Neo Science Peer Reviewed Journal, 4, 91–93. Retrieved from <https://www.neojournals.com/index.php/nsprj/article/view/84>

8. Ruziqulov , J. ., Kurbonboyev, S. ., Xusinov, S., & Ruziqulova , D. . (2023). IMPROVEMENT OF THE SCRAPER WORK EQUIPMENT AND IMPROVING ITS EFFICIENCY. Eurasian Journal of Academic Research,3(1 Part 4), 12–16. извлечено от <https://in-academy.uz/index.php/ejar/article/view/8935>

9. P.G.Hikmatov, J.U.Ruzikulov, O.S.Sayidov, Ruziqulova Dilnoza Uktamovna , IMPROVED MACHINE FOR SPREADING AND COMPACTING ROAD CONSTRUCTION MATERIALS., International Bulletin of Applied Science and Technology: Vol. 3 No. 6 (2023): International Bulletin of Applied Science and Technology <https://researchcitations.com/index.php/ibast/article/-view/2020>

10. P.G.Hikmatov, J.U.Ruzikulov , O.S.Sayidov, Ruzikulova Dilnoza Uktamovna , SELECTION OF AN AUGER DEVICE FOR A MACHINE FOR SPREADING AND COMPACTING IMPROVED ROAD CONSTRUCTION MATERIALS , International Bulletin of Applied Science and Technology: Vol. 3 No. 6 (2023): International Bulletin of Applied Science and Technology <https://researchcitations.com/index.php/ibast/article/view/2009>

11. U.I.Khasanov, A.A.Jurayev, J.U.Ruziqulov, X.Marатов, & D.U.Ro'ziqulova. (2023). PORTABLE DRIP IRRIGATION SYSTEM. Multidisciplinary Journal of Science and Technology, 3(4), 184–188. <https://doi.org/10.5281/zenodo.10184611>

12. A.A.Jo'rayev, J.O'.Ro'ziqulov, Sh.Ergashov, & D.O'.Ro'ziqulova. (2023). Improvement of single-bucket hydraulic excavator working equipment to prevent violation of their design parameters when cleaning concrete channels. technical science research in uzbekistan, 1(4), 251–254. <https://doi.org/10.5281/zenodo.10195687>

13. J.U.Ruzikulov, D.U.Ruzikulova, U.F.Khusenov. ENERGY-SAVING DEVICE FOR TEMPORARY DITCH PRODUCTION FRANCE international scientific-online conference: “SCIENTIFIC APPROACH TO THE MODERN EDUCATION SYSTEM” PART 18, 5thOCTOBER <https://interonconf.org/index.-php/fra/article/view/7258/6260>

14. Рузикулов Жасур Уктам угли, Хусенов Ўлмас Файзулло угли, Рузикулова Дилноза Уктамовна. Теоритические предпосылки определения тяглого сопротивления канавокопателя с дисковыми ножами. Finland, Helsinki international scientific online conference “Sustainability of education socio-economic science theory” <http://www.interonconf.net>

15. U.I.Khasanov, A.A.Jurayev, J.U.Ruziqulov, X.Marатов, & D.U.Ro'ziqulova. (2023). PORTABLE DRIP IRRIGATION

SYSTEM. Multidisciplinary Journal of Science and Technology, 3(4), 184–188. Retrieved from <http://mjstjournal.com/index.php/mjst/article/view/336>

16. A.A.Jo'rayev, J.O'.Ro'ziqulov, Sh.Ergashov, & D.O'.Ro'ziqulova. (2023). IMPROVEMENT OF SINGLE-BUCKET HYDRAULIC EXCAVATOR WORKING EQUIPMENT TO PREVENT VIOLATION OF THEIR DESIGN PARAMETERS WHEN CLEANING CONCRETE CHANNELS. TECHNICAL SCIENCE RESEARCH IN UZBEKISTAN, 1(4), 251–254. Retrieved from <https://universalpublishings.com/~nivertal/index.php/tsru/article/view/2768>

17. Jurayev Akram, Ruziqulov Jasur Uktam ugli, Kurbanov Mukhammad, Ruziqulova Dilnoza Uktamovna, Xusinov Sarvarbek Norbek ugli “The law of change of the angle forming the horizontal when digging a temporary ditch” Vol. 2 No. 24 (2023): INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023 THE LAW OF CHANGE OF THE ANGLE FORMING THE HORIZONTAL WHEN DIGGING A TEMPORARY DITCH | INNOVATIVE ACHIEVEMENTS IN SCIENCE 2022 (interonconf.org)

18. Jurayev Akram, Ruziqulov Jasur Uktam ugli, Kurbanov Mukhammad, Ruziqulova Dilnoza Uktamovna, Khusenov Ulmas, “Determination of gravity resistance of the pawl structure device between cotton rows in one pass of the aggregate” Vol. 2 No. 24 (2023): INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023 DETERMINATION OF GRAVITY RESISTANCE OF THE PAWL STRUCTURE DEVICE BETWEEN COTTON ROWS IN ONE PASS OF THE AGGREGATE | INNOVATIVE ACHIEVEMENTS IN SCIENCE 2022 (interonconf.org)

19. Jasur Uktam ugli, Kurbanov Mukhammad, Ruziqulova Dilnoza Uktamovna, Xusinov Sarvarbek Norbek ugli, “Increasing the efficiency of temporary ditch excavator”, Vol. 2 No. 24 (2023): INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023 INCREASING THE EFFICIENCY OF TEMPORARY DITCH EXCAVATOR | INNOVATIVE ACHIEVEMENTS IN SCIENCE 2022 (interonconf.org)

20. Ruziqulov Jasur, Yusupov Yusufjon, Khusenov Ulmasbek, Ruziqulova Dilnoza, & Mamedov Dilshodbek. (2024). ANALYSIS OF MACHINES FOR LAYING DRIP IRRIGATION PIPES. IMRAS, 7(6), 452–456. Retrieved from <https://journal.imras.org/index.php/sps/article/view/1577>