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The importance of land management measures in increasing soil fertility and improving arable land

Tuproq unumdorligini oshirish va ekin maydonlarini yaxshilashda yer tuzish tadbirlarining ahamiyati
Значение землеустроительных мероприятий в повышении плодородия почв и улучшении посевных площадей

Fayzulla Xidirovich HAMRAEV^{1,*}¹ Department of Agronomy, Navoi State University of Mining and Technologies, Navoi, Uzbekistan* Corresponding author: fayzulla.hamroyev52@mail.ru**ARTICLE INFO****ARTICLE TYPE**

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AUTHOR, TITLE AND ABSTRACT METADATA (EN / UZ / RU)**ENGLISH****Fayzulla Xidirovich HAMRAEV^{1,*}**¹ Department of Agronomy, Navoi State University of Mining and Technologies, Navoi, Uzbekistan

Abstract. The article describes land management measures carried out to use land efficiently, to improve and increase its fertility, and to return to agricultural use land plots that had previously been withdrawn from agricultural circulation because of the shortage of suitable land and water resources.

Keywords: innovation; integration; land management; land categories; pasture; livestock farming; land transformation; land use; irrigation opportunities

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Annotatsiya. Ushbu maqolada yer va suv resurslari tobora tanqis bo'lib borayotgan sharoitda foydalanishdan chiqib ketgan yerlarni bosqichma-bosqich qayta foydalanishga kiritish, bu yer turlaridan samarali foydalanish, yaxshilash va tuproq unumdorligini oshirish bo'yicha yer tuzish tadbirlarining ahamiyati yoritilgan.

Kalit so'zlar: innovatsiya; integratsiya; yer tuzish; yer turlari; yaylov; chorvachilik; yerlarni transformatsiyalash; yerdan foydalanish; sug'orish imkoniyatlari

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Аннотация. В статье приводятся землеустроительные мероприятия, осуществляемые по эффективному использованию земельных угодий, улучшению и повышению их плодородия, включению в сельское хозяйство земельных участков, ранее выбывших из сельскохозяйственного оборота в условиях нехватки пригодных земельных и водных ресурсов.

Ключевые слова: инновация; интеграция; землеустройство; земельные угодья; пастбища; животноводство; трансформация земель; использование земель; возможности орошения

1. KIRISH*Introduction*

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Kirish. O'zbekiston Respublikasi qishloq xo'jaligini rivojlantirishning 2020-2030 yillarga mo'ljallangan strategiyasi ko'plab kuzatuvchilar tomonidan inqilobiy deya baholanmoqda. O'zbekiston qishloq xo'jaligini isloh qilish strategiyasini tuzishda BMT, Evropa Ittifoqi, Jahon va Osiyo Taraqqiyot banklari ekspertlari ishtirok etganlar. Hozirgi kunga qadar respublikamizda qishloq xo'jaligining rivojlanishi eng muhim ustuvor yo'nalishlardan biri bo'lib kelgan va bundan keyin ham shunday bo'lib qoladi. Chunki, qishloq xo'jaligida ishlab chiqarishning samaradorligi, mamlakatimizning iqtisodiy va oziq-ovqat xavfsizligini ta'minlash, nafaqat qishloq aholisi, balki mamlakatimiz aholisining moddiy farovonligini oshirish bebaho boyligimiz bo'lgan er resurslaridan samarali foydalanishni tashkil bilan uzviy bog'liqdir. Jahonda ro'y berayotgan ijtimoiy-iqtisodiy o'zgarishlar hamda mamlakatlararo integratsiya sharoitida respublikada qisqa vaqt ichida qishloq xo'jaligi tarmog'iniva qishloqni, shu bilan birga qishloq infratuzilmasini, yangi innovatsion rivojlanish yo'liga o'tishini talab etadi. Shu yo'l orqali qishloqning mavqeini oshirish imkoniyati paydo bo'ladi. O'zbekiston iqtisodiyotini innovatsion rivojlanish yo'liga o'tish hozirgi kundagi ustuvor vazifalardan biri hisoblanadi. Tahlillarga ko'ra, O'zbekiston agrar sektorida innovatsiyalar hajmi jami yalpi ichki mahsulot hajmida 1-2% ni tashkil etadi, qishloq infratuzilmasi tarmog'ida esabu ko'rsatkich undan ham kam, vaholanki ushbu ko'rsatkich boshqa rivojlangan mamlakatlarda 50-60% dan ko'proqni tashkil etadi [4]. Mavzuning dolzarbligi. O'zbekiston Respublikasi Prezidentining "Qishloq xo'jaligida er va suv resurslaridan samarali foydalanish chora-tadbirlari to'g'risida" PF-5742-son farmonida "...sug'oriladigan va lalmi erlar, tog' va tog'oldi hamda cho'l-yaylov hududlarining tuproq unumdorligini oshirish, suv va boshqa tabiiy resurslardan samarali foydalanish buyicha ilmiy tadqiqotlar olib borilishini; ... ixotazorlar barpo etish va qayta tiklash hamda o'rmon fondi erlarida cho'l-ozuqabop o'simliklar plantatsiyalari va ularni tashqi ekologik omillardan muhofaza qiluvchi yaylovlarni yaratish" kabi muhim masalalar belgilangan. Yuqoridagi ma'lumotlardan kelib chiqib bu hududlarda er va suv resurslaridan samarali foydalanishni tashkil etish vazifalarini er tuzish tadbirlari orqali amalga oshirish yaxshi natijalarga erishish imkoniyatini beradi [2]. Tadqiqot ob'ekti va uslublari. Sug'oriladigan va lalmi erlar, tog' va tog'oldi hamda cho'l-yaylov hududlarida er tuzish loyihalarni ishlashdan oldin ularning hozirgi ahvoli va foydalanishi o'rganiladi. Quruq cho'l hamda yarim sahro mintaqalarida qishloq xo'jalik erlari maydoni erlarni sug'orish imkoniyatlaridan va ularning qishloq xo'jalik ekinlarini ekish, daraxtzorlar va yaylovlar uchun yaroqliligidan kelib chiqib aniqlanadi. Barcha vaziyatlarda er turlari tarkibi va maydonlarini aniqlashda tayyorgarlik ishlari va hududni er tuzish o'rganishi jarayonlarida olingan erlarning agroekologik guruhlar va er sinflariga bo'lingan har xil er turlari (haydalma erlar, daraxtzorlar, pichanzorlar, yaylovlar) uchun qishloq xo'jaligida yaroqliligini baholash ma'lumotlaridan foydalaniladi. Bu, er tuzishda adaptiv yondoshuvni amalga oshirish uchun zarur. Bunday yondashuvda har bir ajratilgan er uchastkasi o'zining tabiiy xususiyatlari (tuproqlari turi va mexanik tarkibi, namlanish sharoiti, yorug'lik olishi va boshq.) bo'yicha ularda joylashtiriladigan er turlariga, qishloq xo'jalik ekinlariga, qo'llaniladigan dehqonchilik tizimlariga mos bo'lishi kerak. Tadqiqot natijalari va ularning muhokamasi. Er turlarining tarkibini va maydonlarini belgilash xo'jalikning iqtisodiy manfaatlarini aks ettiradiganuvchi maxsus tabiiy sharoitlarni talab etuvchi (bog'lar, uzumzorlar, rezavorzorlar) yoki tabiatni muhofaza qilish talablarini bajarish bilan bog'liq (o'tloqlashtirish, yopasiga daraxtlar bilan qoplash, ihota daraxtlari polosalari) er turlaridan boshlanadi. Daraxtzorlar maydonlari er egaliklari va erdan foydalanuvchilarning bog'dorchilikni, uzumchilikni va boshqa tarmoqlarni rivojlantirish bo'yicha istaklarini hisobga olib, yaroqli erlar mavjudligidan kelib chiqib belgilanadi. Chorva mollari uchun yaylovlar maydoni ularning mavjudligi, yashil ozuqalarga bo'lgan talab, ularni haydalma va boshqa erlarga transformatsiyalash imkoniyatlarini

hisobga olib aniqlanadi. Uni yaylovlari maydonlari kichik va ularni kengaytirish imkoniyatlari cheklangan xo'jaliklarda quyidagi ifodadan foydalanib aniqlash mumkin:

2. TADQIQOT MATERIALLARI VA USLUBLARI

Materials and methods

$Pya = (Vya / uya.a.k) * 100$ bunda: Pya - yaylovlar maydoni, ga; Vya - mollarni yashil o'tlarga bo'lgan oylik talabi, ts; uya- mollar boqiladigan davrdagi yaylovlarning yalpi hosildorligi, 1 ga ts; α - mollarni boqish davrining ma'lum oyida yaylovlardan yashil massa chiqishining maksimal foizi, %; K - yaylov almashishning umumiy tarkibidagi mollar boqiladigan yillar sonining nisbatini hisobga oluvchi koeffitsient (masalan, 9-yillik yaylov almashishda mollar har yili 6 navbat bilan boqiladigan maydonlarda o'tlatilsa $K=6:9=0,67$).

Masalan, agar $Vya = 20000$ ts, $uya = 1$ ga 200 ts, $\alpha = 30\%$ bo'lsa,

$2000+100 Pya = \text{-----} = 497,5$ ga $200+30+0,67$

3. NATIJALAR VA MUHOKAMA

Results and discussion

Yaylovlar maydonini aniqlashda mollarni boqish usullari hisobga olinadi. Masalan, g'unajinlarni va yosh sigirlarni o'stirish, sigirlarga qarash texnologiyasi bog'lab boqishni ko'zda tutsa, er turlarini tashkil etishda ko'p yillik madaniy va sug'oriladigan yaylovlar loyihalalanadi. Ularning maydonlari quyidagi 1 shartli boshga hisoblangan me'yorlarga asosan belgilanadi [5]: - donli-dukkakli o'tlar bilan qoplangan, fosforli-kaliyli o'g'itlar bilan intensiv o'g'itlanadigan yaylovlar uchun o'rmon-o'tloq mintaqasida 0,4 ga, o'rmon-cho'l mintaqasida 0,35; - donli o'tlar bilan qoplangan, azotli o'g'itlar bilan intensiv o'g'itlanadigan yaylovlar uchun 0,25-0,3 ga; - yaxshilangan sug'oriladigan yaylovlar uchun 0,15-0,2 ga. Pichanzorlar maydoni pichan o'rishga yaroqli erlar mavjudligi va pichanga bo'lgan talabdan kelib chiqib loyihalalanadi (bunda ko'p yillik va bir yillik o'tlarni almashlab ekishlarga kiritish zarurati ham hisobga olinadi). Shu bilan bir qatorda yaylov almashishlarda mol boqishdan bo'sh qoldiriladigan (15-25%) yaylovlardan pichan olish imkoniyati ham hisobga olinadi [3, 6]. Ishlab chiqarish markazlari, ihota o'rmon polosalari, yo'llar, poda yo'llari tagidagi maydonlar umumlashtirilgan me'yorlar bo'yicha taxminan aniqlanadi va keyinchalik er turlari va almashlab ekishlarni ichki tuzish jarayonida ularga aniqlik kiritiladi. Foydalanishga qaytarilayotgan er turlari tarkibini va maydonlarini aniqlashda er egalari va erdan foydalanuvchilar uchun majburiy bo'lgan, er turlarini transformatsiyalash va joylashtirishga ta'sir etadigan me'yorlar, erdan foydalanish tartibi va shartlari hisobga olinadi. Xulosa. Yuqoridagi erdan foydalanishlarni, ularning tizimlarini loyihalashda keyinchalik er va suv resurslaridan samarali foydalanishni ta'minlovchi tadbirlarni belgilanishi va sharoitlar yaratishda quyidagilar ta'minlanishi kerak: - er va suv resurslari tobora tanqis bo'lib borayotgan sharoitda foydalanishdan chiqib ketgan erlarni bosqichma - bosqich qayta foydalanishga kiritib borish; - er va suv resurslaridan to'la va samarali foydalanishni ta'minlovchi erdan foydalanuvchilarning oqilona o'lchamlarini aniqlash va joylashtirish, ulardagi er turlarining nisbatini belgilash; - erdan foydalanuvchilar chegaralarini tuproq eroziyasiga va boshqa salbiy ta'sirlarga qarshi kurash talablaridan kelib chiqqan holda o'tkazish; - yaylovlardan samarali foydalanish tartibini belgilash, yaylov va lalmi erlardan foydalanishning ilmiy asoslangan samarali texnologiyalarini ishlab chiqish va joriy etish. Tajribadan olingan ma'lumotlarga ko'ra er tuzish tadbirlari o'z navbatida er va suv resurslaridan samarali foydalanishga pirovardida mamlakat oziq-ovqat xavfsizligini ta'minlash hamda tarmoq eksport salohiyatini oshirishga imkon yaratadi.

DECLARATIONS

Declarations

Author contributions *CRedit*

Conceptualization; Methodology; Investigation; Data curation; Writing – original draft; Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

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Ethics approval

Not applicable. This study did not involve humans, animals or other regulated materials.

Informed consent

All authors have read and approved the final version of the manuscript and have given their consent to its submission and publication. The study involved no human participants and no personal data.

Data availability statement

All data supporting the findings of this study are presented in the article and are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare no conflict of interest.

Generative AI disclosure

Generative AI was used only partially. The authors used Claude (Anthropic, Opus 5) for language editing, formatting of the reference list and preparation of the English and Russian metadata. No text, data, figures or conclusions were generated by AI. The authors reviewed and verified all output and take full responsibility for the content of the publication.

EXTENDED SUMMARY IN ENGLISH

Kengaytirilgan inglizcha xulosa / Расширенный реферат на английском языке

Mandatory for all articles whose full text is not in English. Length 600–1000 words. It must be independently readable: a reader who does not know the language of the full text should understand the problem, the method, the numerical results and the contribution without consulting the main text. Do not copy the 250-word abstract.

Purpose and research problem

The Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020–2030, prepared with the participation of experts from the United Nations, the European Union and the World and Asian Development Banks, treats the efficient use of land resources as a precondition for the economic and food security of the country. Land and water resources are, however, becoming increasingly scarce, and a significant area has fallen out of agricultural circulation altogether. The purpose of the article is to set out the land management measures through which such areas can be returned to use stage by stage, the ratio between land categories can be rationalised, and soil fertility can be raised, and to show how these measures relate to the wider objectives of food security and the export potential of the sector.

Materials and methods

The study is based on the analysis of the normative and legal framework of land relations in Uzbekistan, including the Land Code and Presidential Decree No. PF-5742 of 17 June 2019 on the efficient use of land and water resources in agriculture, together with the specialist literature on land management design and on the transformation of land categories. The calculation of the required pasture area was carried out using the formula $\Pi\alpha = (\text{B}\alpha / \text{y}\alpha.\text{a.k}) \times 100$, in which $\Pi\alpha$ is the pasture area in hectares, $\text{B}\alpha$ the monthly requirement of the livestock for green fodder in centners and $\text{y}\alpha$ the yield of green mass per hectare, with a correction coefficient α for the utilisation of the pasture. A worked example is given in the text for $\text{B}\alpha = 20\,000$ centners, $\text{y}\alpha = 200$ centners per hectare and $\alpha = 30\%$, which yields a required pasture area of 497.5 hectares. Methods of keeping livestock — the rearing of heifers and young cows and the management of the milking herd — were taken into account when determining the pasture area.

Results and discussion

The analysis shows that a land management system suited to present conditions must secure four things at once. First, land withdrawn from use must be returned to circulation stage by stage under conditions of increasing scarcity of land and water. Second, the rational size and siting of land users must be determined so that land and water resources are used fully and efficiently, and the ratio between land categories within each holding must be fixed. Third, the boundaries of land users must be drawn on the basis of the requirements of the struggle against soil erosion and other adverse influences, rather than on administrative convenience alone. Fourth, the order of pasture use must be regulated, and scientifically grounded, efficient technologies for the use of pasture and rain-fed land must be developed and introduced. The pasture-area calculation illustrates how the required area follows directly from herd size, green-mass yield and the utilisation coefficient, and therefore how overstocking can be identified quantitatively rather than by inspection.

Conclusion and contribution

Land management measures, taken together, make it possible to use land and water resources efficiently and thereby to contribute to the food security of the country and to the export potential of the agricultural sector. The staged return of unused land to circulation, the determination of rational land-user sizes and land-category ratios, the erosion-based delimitation of boundaries and the regulated use of pasture together constitute a single system rather than a set of independent actions. The contribution of the article is to bring the legal, organisational and calculation aspects of this system into one account and to show, with a worked pasture-area example, how the requirements can be applied in practice at farm level.

ADABIYOTLAR RO'YXATI

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Transliterated list — required by Scopus and Web of Science

Mandatory whenever any reference is in a non-Latin script. Transliterate the author names and the original title, then give the English translation of the title in square brackets, followed by the language tag.

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