International Journal of Academic and Applied Research (IJAAR)
ISSN: 2643-9603
Vol. 6 Issue 3, March - 2022, Pages:25-29

Ways To Create And Efficiently Use Wells On Pastures In The Republic Of Uzbekistan

[1] A.J.Musagaliev, [2] B.T.Shodiev

[1] Doctor of Economics, Head of the "Laboratory Modeling of Socio-Economic Processes" of the Karakalpak Scientific Research Institute of Natural Sciences of the Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan.
[2] Doctor of Philosophy in Economic Sciences, Associate Professor of the Karshi Engineering and Economic Institute.

Abstract: *The article discusses the priorities of sustainable and efficient use of pasture lands in the Republic of Uzbekistan. In particular, on the example of astrakhan breeding, ideas were expressed about the preservation of clean ecological conditions of desert pastures, the restoration and development of biodiversity. As a result of the study, the author's scientific proposals and practical recommendations for the placement of wells on pastures and their effective use were substantiated by mathematical methods.*

Keywords: pastures, animal husbandry, astrakhan breeding, ecosystem, resource-saving development, degradation, biodiversity, mathematical methods, economic efficiency.

Introduction. In recent years, agricultural reform in the Republic of Uzbekistan, in particular, improving the system of public administration in the sector, the widespread introduction of market relations, strengthening the legal framework of relations between producers, processors and sellers of agricultural products, attracting investment, introduction of resource-saving technologies and agriculture. Extensive work is being done to provide manufacturers with modern technologies.

In the regions of Uzbekistan, especially in the desert, one of the main factors that have a negative impact on biodiversity is inefficient and unsystematic use of pastures, reduced pasture productivity, lack of resource-saving technologies in animal husbandry, underdevelopment of livestock services and supply systems.

Additional measures to implement economic reforms in agriculture, further deepening of reforms in animal husbandry, protection of the interests of personal assistants, farmers and farms engaged in animal husbandry, measures to stimulate the development of animal husbandry in the field of veterinary medicine and animal husbandry Decree No. PF-5696 "On measures to radically improve the system of public administration" [1], Resolution No. PQ-3603 of March 14, 2018 "On measures to accelerate the development of the karakul industry" [2], March 18, 2019 Resolution No. PQ-4243 "On measures to further develop and support the livestock sector" [3], Resolution No. PQ-4420 "On measures to comprehensively develop the livestock sector" dated August 16, 2019 [4], 2021 February 9, 2006 “Additional measures for further development of the karakul industry t PQ-4984 [5] and also PQ-5178 of July 8, 2021 "On additional measures to support the efficient use of existing pastures in the country, the processing of silk and wool" [6] found the opposite.

Analysis of the relevant literature. It should be noted that M.A. Vinogradova, Sh.R.Kherremov [7], O.Annageldyev, O.A.Annamuhammedov [8], H.Ukibaev [9], T.J.Nurumbetov [10], N.Z.Shamsutdinov [11] and also from Uzbek scientists T.S.Mallaboev [12], R.H.Khusanov [13], FK Kayumov [14], F.J.Juraev [15], T.H.Farmanov [16] and others.

Research methodology. On the basis of theoretical analysis and monographic observations, a number of government decrees and resolutions on agricultural development in Uzbekistan and the "Strategy of Agricultural Development of the Republic of Uzbekistan for 2020-2030" adopted on the basis of Presidential Decree No. PF-5853 of October 23, 2019 [17] highlights the importance of sectoral programs developed to increase agricultural efficiency and intensify the production of socially important products in the Roadmap for the implementation of the identified tasks.

Analysis and results. In our opinion, farms on Karakol farms and their herds should be distributed according to certain rules for pastures. That is, pastures should be distributed according to the seasons according to the herds, so that the fodder is sufficient according to the seasons and the biodiversity in the desert-pasture lands should be maintained to the maximum.

In addition to the above issues, especially in karakul farming, wells should be located on pastures so that the distance for watering sheep in the herds is not long and during the irrigation period the grass in the minimum area of the pasture is damaged by hooves.

If one herd of sheep passes from one place to another, then the grass in that part of the pasture is almost twice as damaged. In this case, the biodiversity of plants decreases and the productivity of pastures gradually decreases. Restoration of plants in such pastures (in the conditions of steppe and desert zones) is much more difficult and requires considerable costs. Therefore, when placing wells, we require that the herds that come to irrigate damage the plants in the least area (watering is carried out two to three times a day).

In the scientific study of this issue, we will consider the placement of 4 wells and 1 well for this purpose. Suppose that conditionally the 1st, 2nd, 3rd and 4th herds have separate pastures. The centers of the pastures belonging to these herds are denoted by O_1, O_2, O_3, O_4, respectively, and the point where the well is located by B. The distance from the center of the pasture to the well is denoted by P_1, P_2, P_3 and P_4. Also the coordinates of the center of the pastures and the points where the wells are located (we consider the whole pasture as a coordinate system). In particular, we define it as $O_1 (X_1, Y_1)$, $O_2 (X_2, Y_2)$, $O_3 (X_3, Y_3)$, $O_4 (X_4, Y_4)$ and $B (X^*, Y^*)$ (see Figure 1).

Let a *B* well be placed in the middle of the pasture belonging to the four herds. The sheep in the 1st herd that came for irrigation go through area A_1. (For simplicity, these fields were taken as squares).

Also when the sheep in the 2nd herd come to irrigate through area A_2, the sheep in the 1st herd pass through the area A_1; Passes section A_2 again. So the sheep in the other two herds will again cross the same area as the neighboring sheep. As a result A_1, A_2; A_2, A_3; Two herds pass through areas A_3, A_4 and A_1, A_4, in which case the biodiversity in these areas is almost doubled. This means that in order to reduce the damage, it is necessary to move the spreading herd from a distance closer to the well. In terms of sets, $A_1,A_2=A_1\wedge A_2$; $A_2,A_3=A_2\wedge A_3$; $A_1,A_4=A_1\wedge A_4$ and $A_3,A_4=A_3\wedge A_4$, where for example $A_1\wedge A_2$ represents the intersection of areas A_1 and A_2, ie in our case the sheep in the first and second herds represent the pasture area repeated.

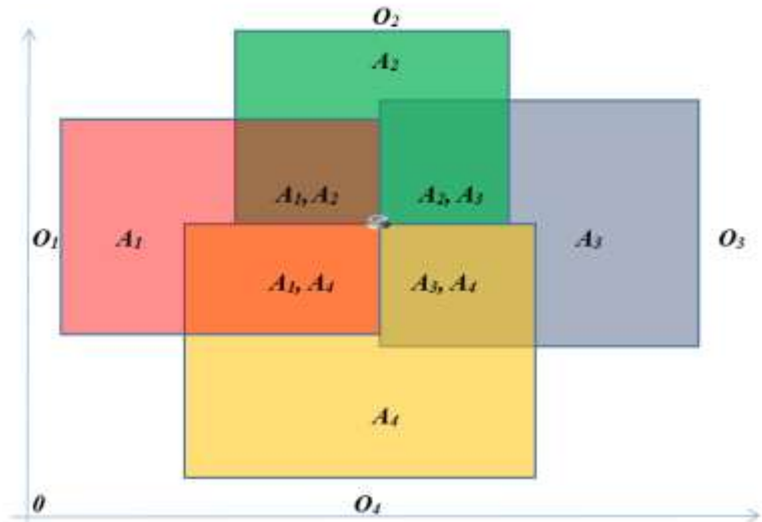

Figure 1. Placement of wells in pastures[1]

However, in practice, the average number of karakul sheep in each herd and the area of pastures covered with them differ little from each other. In this case, fields A_1,A_2,A_3,A_4 are equal to P_1^2,P_2^2,P_3^2,P_4^2. Similar damaged pasture parts A_1,A_2; A_2,A_3; A_3,A_4; We can evaluate areas A_1,A_4 as part of areas A_1,A_2,A_3,A_4.

For example, the area A_1, A_2 was taken $\left(\frac{P_1}{2}\right)^2$. Depending on the nature of the pastures, the damage caused to irrigated pastures by pasture biodiversity will vary. Now we define the damage caused by 1 and 2 herds to 1 square unit of repeated area (the weight of plants in the study area, which can be obtained as a percentage or coefficient) by δ_1, the damage caused by 2 and 3 herds to 1 square unit of repeated area by δ_2, etc.

As a result, the total damage (F) of the affected areas is calculated as follows:

$$F = \delta_1 \cdot \left(\frac{P_1}{2}\right)^2 + \delta_2 \cdot \left(\frac{P_2}{2}\right)^2 + \delta_3 \cdot \left(\frac{P_3}{2}\right)^2 + \delta_4 \cdot \left(\frac{P_4}{2}\right)^2;$$

Now, if we organize the process of bringing karakul sheep to the pastures for irrigation on the basis of the criterion of "minimum amount of weed loss", the resulting damaged areas may be reduced to $\left(\frac{P_j}{m}\right)^2$ instead of $\left(\frac{P_j}{2}\right)^2$, where $j = 1,2,3,4$; m - is an arbitrary positive integer.

[1] Compiled by the authors.

Given this, the total damage F is determined as follows: $F=\delta_1\cdot\left(\frac{P_1}{m}\right)^2+\delta_2\left(\frac{P_2}{m}\right)^2+\delta_3\cdot\left(\frac{P_3}{m}\right)^2+\delta_4\cdot\left(\frac{P_4}{m}\right)^2$;

Now, if we determine and replace the "*Rj*"s by the coordinates of the pastures and the wells, then the problem of determining the location of the well with the least damage is written as follows: $F=\frac{1}{m^2}\cdot\sum_{j+1}^{4}\delta_i\cdot\left[\left(X^*-X_j\right)^2+\left(Y^*-Y_j\right)^2\right]\rightarrow \min,$

Here, X^*, Y^* must be defined.

Now, if we consider the problem of P wells and m_p of grazing sheep drinking water from each well mp, then the model of locating the wells with the least damage is expressed as follows:

$$F=\frac{1}{m^2}\cdot\sum_{i=1}^{P}\sum_{j_i=1}^{m_i}\delta_{iji}\cdot\left[\left(X_i^*-X_{iji}\right)^2+\left(Y_i^*-Y_{iji}\right)^2\right]\rightarrow \min,(1)$$

Here, $\left(X_i^*,Y_i^*\right)$ is the coordinates of the well, which are unknown (to be determined), $\left(X_{iji},Y_{iji}\right)-$ is the coordinate of the pasture center of the well irrigated from the well, δ_{iji} is the amount of damage from the well when irrigating the herd (damage to grass, percent or weight), $i=1,2,\ldots,P$; $J_i=1,2,\ldots,m_i$; m -is a given positive integer. The above (1) relation is equally strong as follows:

$$F^*=\sum_{i=1}^{P}\sum_{j_i=1}^{m_i}\delta_{iji}\cdot\left[\left(X_i^*-X_{iji}\right)^2+\left(Y_i^*-Y_{iji}\right)^2\right]\rightarrow \min,(2)$$

It is known that in order for the relation (2) to be fulfilled, conditions $\frac{\partial F^*}{\partial Xi^*}=0$ and $\frac{\partial F^*}{\partial Yi^*}=0$ must be satisfied at the same time. As a result of fulfilling these conditions, we obtain the following.

$$\begin{cases}\sum_{j_i=1}^{m_i}\delta_{iji}\cdot\left(X_i^*-X_{iji}\right)=0, i=\overline{1,P};\\ \sum_{j_i=1}^{m_i}\delta_{iji}\cdot\left(Y_i^*-Y_{iji}\right)=0, i=\overline{1,P};\end{cases}$$

By performing mammographic methods, we solve this system with respect to X_i^* and Y_i^* and determine the following coordinates:

$$X_i^*=\frac{\sum_{j_i=1}^{m_i}\delta_{iji}\cdot X_{iji}}{\sum_{j_i=1}^{m_i}\delta_{iji}},Y_i^*=\frac{\sum_{j_i=1}^{m_i}\delta_{iji}\cdot Y_{iji}}{\sum_{j_i=1}^{m_i}\delta_{iji}},i=1,2,\ldots,P.$$

Thus, coordinates $\left(X_i^*,Y_i^*\right)$ of well P, which supplies water to herds closed to farms on all farms, were determined.

Here, the number of $i=1,2,\ldots,P.$ wells was usually determined on the basis of the number of wells in the herd *(Ni)*, the daily water demand of each sheep (5 liters) and the average water withdrawal capacity of the annual pump *(U, l)*, ie:

$$P=\frac{365\cdot5\cdot\sum_{j=1}^{k}N_j}{U}=\frac{1825\cdot\sum_{j=1}^{k}N_j}{U},$$

Here is the total number of *k*-herds.

As an example, we consider the determination of the coordinates of the *B* - well according to the points O_1,O_2,O_3,O_4, *B* in Figure 1 and taking into account $\delta_1,\delta_2,\ldots,\delta_4$: O_1(2,5;6), O_2(6,5;10), O_3(Let 12,5;6), O_4(6,5;1), and be $\delta_1=0{,}15$, $\delta_2=0{,}2$, $\delta_3=0{,}1$, $\delta_4=0{,}19$, *B* $\left(X_i^*,Y_i^*\right)$, the results are shown below.

$$X_i^*=\frac{\delta_1X_1+\delta_2X_2+\delta_3X_3+\delta_4X_4}{\delta_1+\delta_2+\delta_3+\delta_4}=\frac{0{,}15\cdot2{,}5+0{,}2\cdot6{,}5+0{,}1\cdot12{,}5+0{,}19\cdot6{,}5}{0{,}15+0{,}2+0{,}1+0{,}19}=\frac{4{,}16}{0{,}64}=6{,}5.$$

$$Y_i^* = \frac{\delta_1 Y_1 + \delta_2 Y_2 + \delta_3 Y_3 + \delta_4 Y_4}{\delta_1 + \delta_2 + \delta_3 + \delta_4} = \frac{0{,}15 \cdot 6 + 0{,}2 \cdot 10 + 0{,}1 \cdot 6 + 0{,}19 \cdot 1}{0{,}15 + 0{,}2 + 0{,}1 + 0{,}19} = \frac{3{,}69}{0{,}64} = 5{,}77 \approx 5{,}8.$$

Hence, *B* (6.5; 5.77) is the ratio of the wellbore to the coordinate system shown in Figure 1, which is 6.5 units of distance along the *OX* axis (also known as kilometers) and 5.8 distances along the *OY* axis. As a result, the plants in the pastures (during the irrigation process) suffer the least damage, and it is as follows:

$$\min F = \frac{1}{m^2}\{\ \delta_1 \cdot \left[\left(X_1^* - X_1\right)^2 + \left(Y_1^* - Y_1\right)^2\right] + \delta_2 \cdot \left[\left(X_1^* - X_2\right)^2 + \left(Y_1^* - Y_2\right)^2\right] +$$

$$+ \delta_3 \cdot \left[\left(X_1^* - X_3\right)^2 + \left(Y_1^* - Y_3\right)^2\right] + \delta_4 \cdot \left[\left(X_1^* - X_4\right)^2 + \left(Y_1^* - Y_4\right)^2\right]\ \} =$$

$$= \frac{1}{m^2}\left\{0{,}15 \cdot \left(4^2 + 0{,}2^2\right) + 0{,}2 \cdot \left(0^2 + 4{,}2^2\right) + 0{,}1 \cdot \left(6^2 + 0{,}2^2\right) + 0{,}19 \cdot \left(0^2 + 4{,}8^2\right)\ \right\} =$$

$$= \frac{1}{m^2}\left(2{,}406 + 3{,}528 + 3{,}604 + 4{,}3776\right) = \frac{13{,}9156}{m^2},$$

Here, starting from m=2, the difference can be an integer. For example, if we take m = 2, then *minF*= 3.4789 units. If the herds are managed in a certain direction during irrigation, m> 2 can be, for example, m= 3, *then minF*= 1.5462.

Conclusions and proposals. In conclusion, the research shows that it is advisable to implement the following measures to increase the economic efficiency of the astrakhan industry and the sustainable development of the industry in the future, in particular:

- In order to provide economic incentives for the efficient use of pasture lands, it is necessary to improve the existing regulations, including the Land Code, the Law on Pastures and by-laws, and, if necessary, develop and adopt new regulations. At the same time, it is important to focus on strengthening the obligations and responsibilities of economic entities, state control, ecosystem, conservation and reproduction of biodiversity in order to ensure the efficient use of pastures;
- Strengthen the responsibility and accountability of state and local authorities in order to ensure continuous monitoring of the allocation, allocation and use of pasture land plots to economic entities using pasture lands;
- It is necessary to regulate the system of pasture use for pasture-using economic entities in each region, to develop and implement a science-based system that takes into account the capacity of livestock in the management and use of pastures, as well as to ensure continuous monitoring of pasture use.

References:

[1]. Decree of the President of the Republic of Uzbekistan No. PF-5696 of March 28, 2019 "On measures to radically improve the system of public administration in the field of veterinary medicine and animal husbandry." https://lex.uz

[2]. Resolution of the President of the Republic of Uzbekistan No. PP-3603 of March 14, 2018 "On measures to accelerate the development of the astrakhan industry." https://lex.uz

[3]. Resolution of the President of the Republic of Uzbekistan No. PP-4243 of March 18, 2019 "On measures to further develop and support the livestock sector." https://lex.uz

[4]. Resolution of the President of the Republic of Uzbekistan No. PP-4420 of August 16, 2019 "On measures for the integrated development of the karakul industry." https://lex.uz

[5]. Resolution of the President of the Republic of Uzbekistan No. PP-4984 of February 9, 2021 "On additional measures for further development of the karakul industry." https://lex.uz

[6]. Resolution of the President of the Republic of Uzbekistan No. PP-5178 of July 8, 2021 "On additional measures to support the efficient use of existing pastures in the country, the processing of silk and wool." https://lex.uz

[7]. Vinogradova M.A., Kherremov Sh.R., Roziev A.S. Some elements of the technology of desert astrakhan breeding in Turkmenistan. http://base.dnsgb.com.ua/files/journal/201111_03_077-080.pdf.

[8]. Annageldiyev O., Annamukhammedov O. First Report on the State of Farm Animal Genetic Resources in Turkmenistan. Ashgabat-2004. Association of Livestock Joint-Stock Companies of Turkmenistan "Turkmenmallary", Research Institute of Animal Husbandry and Veterinary Medicine, National Advisory Committee on Animal Genetic Resources (FAO).

[9]. Ukibaev H. Why did karakul breeding become a "noose" for agriculture? https://kursiv.kz/news/vlast-i-biznes/2018-08/pochemu-karakulevodstvo-stalo-udavkoy-dlya-selskogo-khozyaystva.

[10]. Nurumbetov T.Zh. The increase in the production of karakul is the basis for the development of the light industry of the Republic of Kazakhstan. J.: Technology of the textile industry. 2019. - No. 1 (379), pp. 261-265.

[11]. Shamsutdinov N.Z. Natural food resources of the arid regions of Central Asia: prospects for their use in phytomelioration and breeding. Monograph. "Forage plants of hayfields and pastures of the USSR", 303-310 p.

[12]. Mallaboev T.S. Intensification in animal husbandry and its economic efficiency. - T.: Uzbekistan, 1972. - 45 p.

[13]. Husanov R.H. Family (collective) contract in agricultural production - T.: Qatortol-Kamolot, 1999. - 56 p.

[14]. Kayumov F.K., Kim V.I., Alibaev I. Ways to eliminate the unprofitability of astrakhan farms and the prospects for their transfer to self-sufficiency and self-financing (review). T. UzNIIINTI. 1988. - 32 p.

[15]. Juraev F.J. Development of karakul in Uzbekistan - T.: Uzbekistan, 1983. - 102 p.

[16]. Farmanov T.H. Improving the efficiency of astrakhan breeding in the southern zone of Uzbekistan. Dissertation for the degree of candidate of economic sciences - T.: 1989.

[17]. Decree of the President of the Republic of Uzbekistan No. PF-5853 of October 23, 2019 on the approval of the "Strategy of agricultural development of the Republic of Uzbekistan for 2020-2030". https://lex.uz