ISSN 2181-9408

Scientific and technical journal





Sustainable Agriculture

№2(22).2024







Chief Editor

Salohiddinov Abdulkhakim

Vice-rector for international cooperation

Professor at "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

National Research University, Doctor of technical sciences

Scientific Editor

Yunusov Iskandar

PhD, "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

National Research University

Editor

Hodjaev Saidakram

Associate professor at "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

National Research University, Doctor of technical sciences

Candidate of technical sciences

EDITORIAL TEAM:

SH.Khamraev, PhD, minister, Ministry of the Water Resources of the Republic of Uzbekistan; **H.Ishanov,** PhD, chief specialist, Cabinet Ministers of the Republic of Uzbekistan; **Dr.Prof.B.Mirzayev,** Rector of "TIIAME" NRU; **Dr.Prof.T.Sultanov,** Vice-rector for research and innovations, "TIIAME" NRU; **Dr.Prof.M.Khamidov,** "TIIAME" NRU; **Dr.Prof. A.Pulatov,** PhD, associate professor, "TIIAME" NRU; **B.Pulatov,** PhD, "TIIAME" NRU; **G.Bekmirzaev,** PhD,"TIIAME"NRU; **M.Amonov,** PhD, associate professor,"TIIAME" NRU; **Sh.Khasanov,** PhD, associate professor, "TIIAME" NRU; **M.Tursunov,** PhD, "TIIAME" NRU; **B.Sultanov,** PhD, "TIIAME" NRU; **Dr.Prof.N.Khushmatov,** Chief Scientific Secretary of the Agricultural and Food Supply Production Center; **Sh.Murodov,** PhD, "TIIAME" NRU; **Dr.Prof. O.Tursunov,** "TIIAME" NRU; **M.Juliev,** PhD, "TIIAME" NRU; **Dr.Prof. A.Karimov,** "TIIAME" NRU.

EDITORIAL COUNCIL:

Dr.Prof.N.Vatin, Peter the Great St. Petersburg Polytechnic University, (Russia); **Dr.Prof.Y.Ivanov,** Russian State Agrarian University - Moscow Timiryazev Agricultural Academy, executive director of Engineering and Land Reclamation named after A.N. Kostyakov, (Russia); **Dr.Prof.D.Kozlov,** Moscow State University of Civil Engineering – Head of the Department Hydraulics and Hydraulic Engineering Construction of the Institute of Hydraulic Engineering and Hydropower Engineering, (Russia); **D.Ziganshina,** PhD, Scientific Information Center of Interstate Commission for Water Coordination in Central Asia; **J.Lubos,** associate professor at "Department of Water Recourses and Environmental Engineering" of Slovak University of Agriculture in Nitra, (Slovak); **Acad.Dr.Prof.P.Kovalenko,** National Academy of Agricultural Sciences of Ukraine, Advisor to the Director of the Research Institute of Melioration and Water Resources, (Ukraine); **Prof.N.Xanov,** Head of the Department of Hydraulic Structures RSAU – MAA named after K.A.Timiryazev, (Russia); **Krishna Chandra Prasad Sah,** PhD, M.E., B.E. (Civil Engineering), M.A. (Sociology) Irrigation and Water Resources Specialist. Director: Chandra Engineering Consultants, Mills Area, (Janakpur, Nepal); **Dr.Prof.A.Ainabekov,** Department Mechanics and mechanical engineering, South Kazakhstan State University named after M.Auezov, (Kazakhstan); **Acad.Dr.Prof.T.Espolov,** National academy of sciences of Kazakhstan, Vice-President of NAS RK, (Kazakhstan); **I.Abdullaev,** PhD, the Regional Environmental Center for Central Asia, Executive Director; **Sh.Rakhmatullaev,** PhD, Water Management Specialist at World Bank Group; **A.Hamidov,** PhD, Leibniz Centre for Agricultural Landscape Research|ZALF, (Germany); **A.Hamidov,** PhD, Leibniz Centre for Agricultural Landscape Research|ZALF, (Germany). **A.Gafurov,** PhD, Research scientist at the department of hydrology, GFZ Potsdam (Germany). **Dr,Prof. Martin Petrick,** Justus-Liebig-Universität Gießen JLU Institute of Agricultural Policy and Market Research; **Eldiiar Duulatov,** PhD, Research Fellow, Institute of Geology, National Academy of Sciences, Kyrgyzstan; **Gisela Domej,** University of Milan-Bikokka Professor of Earth and Environmental Sciences, Italy; **Moldamuratov Jangazy Nurjanovich,** PhD, Taraz Regional University named after M.Kh. Dulati, Head of the Department of "Materials Production and Construction", Associate Professor, Kazakhstan; **Muminov Abulkosim Omankulovich,** Candidate of Geographical Sciences, Senior Lecturer, Department of Meteorology and Climatology, Faculty of Physics, National University of Tajikistan. Tajikistan; **Mirzoxonova Sitora Oltiboevna,** Candidate of Technical Sciences, Senior Lecturer, Department of Meteorology and Climatology, Faculty of Physics. National University of Tajikistan. Tajikistan; **Ismail Mondial,** Professor of Foreign Doctoral Faculty, University of Calcutta, India; **Isanova Gulnura Tolegenovna,** PhD, Associate Professor of Soil Ecology, Research Institute of Soil Science and Agrochemistry named after UUUspanov, Leading Researcher, Kazakhstan; **Komissarov Mixail,** PhD, Ufa Institute of Biology, Senior Research Fellow, Soil Science Laboratory, Russia; **Ayad M. Fadxil Al-Quraishi,** PhD, Tishk International University, Faculty of Engineering, Professor of Civil Engineering, Iraq; **Undrakh-Od Baatar,** Head of the Central Asian Soil Science Society, Professor, Mongolia; **N.Djanibekov,** Dr, External Environment for Agriculture and Policy Analysis (Agricultural Policy), Leibniz Institute of Agricultural Development in Transition Economies (IAMO) Theodor-Lieser-Str. 2 06120 Halle (Saale) Germany; **A.Karimov,** Dr, Head of the ICBA Regional representative office for Central Asia and South Caucasus.;

Designer: Dilmurod Akbarov.

Note: Only the authors of the article are responsible for the content and materials of the article. The editorial board does not respond to the content of the article!

Founder: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Our address: 39, Kari-Niyaziy str., Tashkent 100000 Uzbekistan , www.sa.tiiame.uz

The journal "Sustainable Agriculture" is registered in the Press Agency of Uzbekistan on the 12th of February in 2018 (license № 0957).

In 2019, the journal is included in the list of recommended scientific publications by the Higher Attestation Commission of the Republic of Uzbekistan.

ARCHITECTURE. LANDSCAPE ARCHITECTURE.

Z.Kannazarova, L.Ryssalieva, S.Khamidov, K.Khamraev, G.Jaliliova, B.Najodov
Management practices for improving soil health in the Aral Sea Basin: a case study from Karakalpakstan.....5

ECONOMY. ECONOMIC SCIENCE. OTHER BRANCHES OF THE ECONOMY.

K.A.Chariev
Scientific and methodological bases of resource potential and its importance in the formation of organic agriculture in the conditions of a green economy.....9

U.Alimov, N.Omonov
Theory and strategy of the Bioeconomy: the case of Finland.....13

Kh.Khujamkulova, Z.Salomova, M.Uralova
Investments in agriculture and the efficiency of their usage.....16

M.Inoyatova
Development of organizational and economic land regulation mechanism relations in the arid zone.....19

M.Tosheva
Prospects for using the principles of "green economy" in agriculture.....23

Sh.Khamrayeva
Control innovative the development of the bioeconomic branches of the Republic of Uzbekistan.....30

K.Nosurullaev
Methodological basis of formation of agricultural insurance services in developing countries.....34

N. Abdurazakova
"Green economy" and its role in solving water and energy problems in Uzbekistan.....37

K.Shaakramov
On the issue of improving the processes of modernization the national economy.....40

E.Shodiyev, U.Matkarimov
Improving accounting of financial results in agricultural enterprises and financial analysis: evidence from Uzbekistan.....44

M.Kholikulov
The importance of investments and the organizational-economic basis of involvement in the field of fruit and vegetable sector.....47

A.Berdimurodov
The role and importance of digital technologies for innovative and sustainable development of the agricultural system of the Republic of Uzbekistan.....50

Z.S.Shokhojaeva, U.R.Sangirova
Improving the practice of subsidizing agricultural production.....53

I.Yunusov
Features and scientific-theoretical foundations of intensive development of the fish farming.....56

G. Shadmanova
Modern factors of modeling the development of production of farms and dehkan farms in Uzbekistan.....61

D.I.Mukumova,
The spatial gender equality and women's leadership in scientific activity in Uzbekistan.....63

ENVIRONMENTAL PROTECTION. WATER MANAGEMENT, HYDROLOGY.

M.Burkhonova, J.Narzullayev, B.Matyakubov
Comparison of furrow and sprinkler irrigation systems (in the example of carrot and cauliflower).....67

F.Bekchanov
Ensuring reliable operation of pump units.....71

E.Ozodov, N.Ozodova, D.Tadjiyev
Development of a multi-measuring system for control and prediction of process water resources on the arduino platform.....76

A.Djalilov, O.Nazarov
Implementation of intelligent control systems in water supply networks.....80

Kh.I.Muradov, A.U.Djalilov
Aquatic Elevation Tracking Mechanism.....84

Sh.Shoergashova, T.Liu, N.Ibrokhimova, B.Karimov
Land use impact on water quality of the zarafshan river basin.....88

HIGHER EDUCATION. PEDAGOGY.

S.Surmanov
A comparative analysis of reading skill development through graded readers.....92

O.Yoqubov
Implementing interactive learning methods requirements of time.....95

N.Yuldashova
English proficiency for advancing agricultural development.....98

M.Ziyadulloyeva
Enhancing agricultural development through teaching agricultural terms in English.....101

D.Madalieva
Study of the emergence of the concept of accounting in linguistic research.....104

POWER ENGINEERING, ELECTRICAL ENGINEERING, AUTOMATICS. COMPUTING TECHNOLOGY.

M.Ismailov, O.Ismailov, X.Temirova
Processing of blood cell images hybrid methods of acute lymphoblastic diagnosis CNN features.....106

M.Ismailov, O.Ismailov, X.Temirova
Dental Radiography Analysis Using YOLOv8 Deep Learning Using Raspbbery pi Device.....110

F.Kucharov, M.Begmatov
Electromagnetic consumer sensor.....113

S.R. Umarov, T.M.Bayzakov, Sh.B. Yusupov, A. Abduraxmonov, I. Kholmirzaev, S.Qurbonazarov
In greenhouses vegetable crops of seedlings cultivation electrotechnology effectiveness of assessment (sweet pepper plant on the example).....115

IN GREENHOUSES VEGETABLE CROPS OF SEEDLINGS CULTIVATION ELECTROTECHNOLOGY EFFECTIVENESS OF ASSESSMENT (SWEET PEPPER PLANT ON THE EXAMPLE)

S.R. Umarov - doctor of Economics, professor "TIIAME" NRU
T.M.Bayzakov - candidate of technical sciences, associate professor "TIIAME" NRU
Sh.B. Yusupov - doctor of philosophy in technical sciences, associate professor "TIIAME" NRU
A. Abduraxmonov – masters, "TIIAME" NRU
I. Kholmirzaev - assistant, TIET
S.Qurbonazarov -assistant, TIET

Abstract

New environmental modern devices and technologies to the creation of an important role has if, for them to practice current to high results and get to lead can. Due to the implementation of effective electrotechnology for growing sweet pepper seedlings by treatment with UV rays, the technology "Growing sweet pepper seedlings using electric irradiation devices" was developed based on the results of a one-factor experiment and the determined optimal parameters. This technology technical-economic indicators of the analysis according, sweet pepper seedlings grown in offered which are electric radiation of the device, the use of economic efficiency evaluated.

Keywords: *sweet pepper seedlings, electric radiation device, indicators of the electric radiation device, eon the other side of radiation sweet pepper seedlings on the effects of economic efficiency.*

Introduction. The republic of uzbekistan republic of further development on the development of strategic, 2022-2026 years range by implied, "...the rural economy modernization to and rapid development, the rural economy, the products work out consistent development, food-food safety further strengthening, environmentally clean products production, production expansion, the agricultural sector export capacity significantly in the level increase..." on pressing task set is given. One of the urgent issues is the application of effective electrotechnology in production conditions or the justification of work modes, which ensures the reduction of the vegetation period in the implementation of the specified tasks, including the electric stimulation of sweet pepper seeds and seedlings, and in the cultivation of seedlings. New environmental modern devices and technologies to the creation of an important role has if, for them to practice current to high results and get to lead can.

Sweet pepper seedlings are planted in greenhouses for the autumn-winter season in late October - early November, for the winter-spring season in late December - early January, for the spring-summer season in open ground in late April - early May. The seeds, however sluggish sprouts that in mind keep, sweet pepper seeds mass planting for the term planned tomatoes, cucumber seeds qualification demands a weeks ago (February to end - march of the beginning) was the planting of. In greenhouses, it takes 80-90 days for the seeds to grow into seedlings, for the autumn-winter and winter-spring seasons, and 50-60 days for the spring-summer season in the open ground. 1(one) hectare open to a field planted with sweet pepper seedling cultivation for 800-1000 g pepper seed required is [2, 3]. The norm of sowing sweet pepper seeds in the cultivation of picking is 20-25 grams/m2, and in the cultivation without picking, the norm of sowing sweet pepper seeds is 5-6 grams/m2. When the seedling is grown without seeding, the seeds are sown in pots or in rows, the distance between them is 6-10 cm. Rows between the distance of 1 m2 to place 500 pieces of sweet pepper seedlings leave to was planting. In the case of growing seedlings, 3.5x3.5 cm, feed area is allocated for sweet pepper. Sweet pepper seedlings for the temperature +28..+30 °C, air relative humidity of 60-75% to be required is. Seedling structure in the period of the room internal temperature the outside temperature is close to be should be [3, 4, 5].

The republic of uzbekistan in the conditions applied by using the traditional method from one simple seeds have been selected, 1% li salted water soak planted the seeds to control (unheated seeds) than 2-3 days more early sprouts out of to be determined [3, 6].

Methods. It is based on the fact that the automated and mechanized method of growing seedlings is effective for the development of vegetable cultivation in greenhouses. Automatic seeding systems are used to reduce costs, increase the quality of production processes, and fill trays and cassettes with mixtures in greenhouses. Israel Hishtil the company by developed , produced, used to be simple, in size small and highly efficient that equipment work out introduced was. This method is automatic line of very expensive the ministry and climate conditions change when additional heating and lighting device requirements to due grown seedlings of the costs will increase. But, the period of growing seedlings and the growing season will not be shortened.

The plant sprouts out that enable to the seeds enriched in mainly the following processes are used: the seeds of the fungitsid with enriched; their surface, on the surface of the film form in which the drug combination and liquid complex fertilizer use; sodium salt (NaNO3) using the drug, with treatment given. But these chemical methods of application, soil fertility, reduce with a series of ground under the ground or with the water quality indicators on the effects of makes and food products toxicity cases of out comes. This is while, the seedlings of each different diseases suffering from out - comes. This is the reason for these methods, ecological pure , and effective method is not considered. The seeds on the ground or in special containers planting out before them, the initial processing (thermal, thermochemical, chemical, conventional , and so on) is given. Above noted, the methods using seed used for

seeding before the initial treatment to give the duration of the 2-72 hours up makes. The environmental aspect is very dangerous and very much work and energy require will. This method is the use of the product, the cultivation for term spending all spending of the costs of 60% to up that makes [7, 8].

Before sowing, the electric light treatment device for the seeds of vegetable and fruit plants is complex, treating it with appropriate radiation for the exposure parameters (wavelength, pulse frequency, exposure time) depending on the type of crop. creates a method of (mixed) exposure [11, 12]. There is a "pre-sowing seed treatment" where vegetable crops expose the seeds to the infrared or red spectral range. In this method, the product is evaluated by a certain ratio of radiation intensity and exposure time. That is in addition to, radiation is the flow of light diod a or a diod laser with the help formed to make can. But, this method only rural farm crops are limited to specific a type for it is designed. In this method, the cells of the irradiated objects, which are a type of resonators, enter into exchange with waves whose wavelength is proportional or a multiple of the cell size under the influence of radiation with a certain wavelength and direction of radiation. . At the same time, it creates "transverse oscillations" in cells and isolates intercellular metabolic processes [13].

Experiences. The technology "Cultivation of sweet pepper seedlings using electric irradiation devices" developed on the basis of the results of a one-factor experiment and the determined optimal parameters obtained from the implementation of the effective electrotechnology of growing sweet pepper seedlings by treatment with UV rays. It was introduced in the greenhouse farms of "SOBR STORY SERVISE" LLC and "ELYOR SMART AGRO" LLC, Yukochirchik district, Tashkent region, in the experimental farm of the research institute. The economic efficiency of the existing technology of growing sweet pepper seedlings and the use of electric irradiation devices in the cultivation of sweet pepper seedlings were evaluated.

According to him, the electric irradiation device consists of electric and ultraviolet irradiators, the total cost of the device is 49.6 million. is more than soums (1-table).

Table - 1

Indicators of the electric radiation device

№	equipment naming	Measurement unit	number	1 meter radiator capacity, kW	1 meter of the radiator's price, sum	total, mln. sum
1.	Electric radiators	m	9900	0,012	5000	49,5
2.	Ultraviolet radiators	pieces	1	0,06	70000	0,14
	Total:					49,64

Data for calculation:

- 1 hectare to who planted sweet pepper seeds number n=11120000;
- Duration of electric radiation – 60 days;
- Duration of treatment of sweet pepper seedlings with electric irradiator

Table - 2

Economic efficiency of the effect of electric radiation on sweet pepper seedlings, million sums

№	Indicator	Control	Offer realistically technology
1	Sweet pepper seedling cultivation duration, month,	3	2
2	The cost of compost, biohumus and its preparation per hectare, sums	556000000	556000000
3	1 hectare to that planted the seed cost, sum	111200000	111200000
4	Price of biofertilizers for 1 hectare, sums	900000	900000
5	Controller working servants of monthly job the right (1 hectares to 4 units working staff), sum	18000000	12000000
6	Electrical energy cost, sum	477900	318600
7	Price of electric energy consumed by electric radiators, sums	-	6145000
	Total	686577900	686563600
	Rate costs, 25% of	171644475	171640900
	Unexpected expenses, 20%	137315580	137312720
	Total costs, sums	995537955	995517220

Cost accounting

1. We determine the total cost of the device to calculate depreciation deductions. The total price of the device for electric irradiation of sweet pepper seedlings is presented in Table 1, the total price of which is 49.64 million sums.

2. We calculate the cost of 1 piece of sweet pepper seedlings according to the existing and proposed technology according to the following formula:

$$C_k = \frac{E}{n} \quad (1)$$

In this, F - available and offer the new technology on sweet pepper seedlings grow to 1 hectare to the area of spending-term costs, amount, sum; p - available and offer the new technology grown on unsuitable, sweet pepper seedlings , the number, pieces.

45% of the seeds sown according to the current technology, 70% of viable seedlings are obtained based on the new technology, that is, due to the use of electric radiation devices

The price of 1 seedling is based on the available technology

$$C_{k1} = \frac{E}{n} = \frac{995537955}{5004000} = 198,9$$ sum,

based on the proposed technology

$$C_{k1} = \frac{E}{n} = \frac{995517220 + 49640000}{7784000} = 134,8$$

sum to up makes.

3. Taking into account that the average selling price of one piece of sweet pepper seedlings in the market is 300 soums, we calculate the profit from the sale of sweet pepper seedlings according to the existing and proposed technology

According to the existing technology

$$D_1 = (300 - 198,9) \cdot 5004000 = 505704240$$ sum,

and according to the proposed technology,

$$D_2 = (300 - 134,8) \cdot 7784000 = 1290120160$$

sum up the will.

4. The offer of the new technology on sweet pepper seedlings from the sale receive additional benefits to consider:

$$W = D_2 - D_1 = 1290120160 - 505704240 = 784415920$$ sum

5. Electric radiation from the device use at the expense of, sweet pepper seedlings grown in standard seedlings of per hectare 2780000 pieces to increase and therefore 1 pieces of seedlings of the costs 64,68 to sum reduction is achieved.

6. The offer of the new technology on 1 hectare of the area grown for sweet pepper seedlings removable additional benefits 784,4 million. to sum up, if, additional costs apart nearly 734,8 million. the sum of the benefits to get the opportunity will create.

Conclusions

1. As a result of the research, after irradiating sweet pepper seeds and observing their germination, the following optimal parameters of the process of irradiating sweet pepper seeds were determined: the duration of irradiation is 9-10 min. Germination of sweet pepper seeds when processed in these parameters is 8 days.

2. As a result of the research, the following optimal parameters of the process of growing sweet pepper seedlings with irradiation were determined: source voltage 210 V. The duration of growing sweet pepper seedlings is 45-47 days when processed in these parameters.

3. Economic calculations showed the feasibility of using electric irradiators in the cultivation of sweet pepper seedlings. According to the analysis of the technical and economic indicators of the device, the annual profit of the farm will be 734.8 mln. is soum.

References:

1. Decree of the President of the Republic of Uzbekistan №PF-60 dated January 28, 2022 "On the new development strategy of Uzbekistan for 2022-2026"s
2. Kolomeychenko V.V., Bedenko V.P. Any theory produksionnogo in proceedings rasteniy i fitotsenozov / Vestnik agrarnoy nauka. 2008. №4(8). S. 17-21.
3. Rasulov F.F. Repeated crop cultivation technology elements of improvement during the period of sweet pepper varieties selection: Doctor of Philosophy in Agricultural Sciences – Tashkent. TDAU, 2017. – 117 b.
4. Unleashed A. F., The Magnifying V. A., Mironyuk A. N., Timofeev Doubles. V., Otsenka effektivnosti ispolzovaniya energosberegayutshix lamps the beginning osvetshcity wide selskoxozyaystvennIx pometshwidth // J. AgroEkoInjeneriya -2018. VIpusk 94. – S. 1-6.
5. Yunusov S.A., E Dusmuratova S.I., Aripov A.O., Chairman A., Zuev V.I. Vliyanie oblucheniya lamps is the uv razlichnoy motshnas's pride raznoy ekspozitsii nor energy prorastaniya i vsxojest semyan. // Agriculture in the modern resource - efficient technologies: Respublikanskaya molodejnaya nauchno-prakticheskaya conference and Sbornik nauchn. state. Tashkent, 2007. – S. 312-315.
6. Bayzakov t. m., YuSh supov.B., F. f. Rasulov, b. a. karimov of sweet pepper seedlings growing for the electric and the use of cutting clonal metho // international journal “Sustainable agriculture”. 2021. - №3(11). 2021. – rr. 46-49.
7. Poloves Ya. V. PrideI nakopleniya i sposobI umensheniya can trackthat Itochno cargo kolichestva nitratov v kultura ix rasteniyax // J. Molodoy ucheniy - 2019. - № 23 (261). - S. 154-157.
8. Prikupes L.B. Texnologicheskoe osvetshwidth v agropromIshlennom complex Rossi // J. SVETOTEXNIKA - 2017, № 6. – S. 6-9.
9. Malaxova S. D., Tyutyunkova M. V., Fedorov In Z. S., Demyanenko Doubles. V. Svetodiodnoe osvetshwidth that pride vIratshive distractedtshnIx kultura // J. ProblemI regionalnoy environmental. -2019. №5. S. 29-34.
10. Khodjaev T.A. Vliyanie neytronnogo oblucheniya nor cement xlopchatnika // J. Mir sovremennoy nauka. -2014. №3. – S. 1-8.
11. Bayzakov T.M., Yunusov R.F., Yusupov Sh.B. Vliyanie elektrostimulyatsii neither fiziko-texnicheskie i agrotexnicheskie xarakteristik of rasteniy // Highly effective agriculture farm machines of the creation and technical means of the use of the level of raising innovative solutions: the international scientific-technical conference articles collection. – Gulbakhor, 2022. – B. 469-473.