

ANNEXES TO SECTION 4

LIST OF PILOT PROJECTS ON DIRECTION IV

FURROW IRRIGATION (FI)

I. Very high gradients (0.025 - 0.05)

A. Very highly permeable soils

04.Uz(FI) [A-I] – cotton

B.Kambarov

Furrow irrigation technique on pebble soils by surface and under-surface pipes in complex relief and high gradients in Namangan district of Namangan province on area of 500 ha.

Under high surface gradients, automorphous soil of low thickness and high permeability placed on pebbles recommendations on soil preservation technology under furrow irrigation from close network with flexible horses utilization are given.

06.Tad(FI) [A-I] - vineyard

K.Nurmatov

Study of optimal parameters of furrow irrigation technique and technology on base of pipe distribution network in state farm "Samgar" and "Khamzaaliyev" in Khudjand district.

Under high surface gradients, automorphous soil with low thickness and high permeability recommendations on furrow irrigation technique and technology for gardens and vineyards from close network with pipes utilization are given.

B. Soils of high permeability

01.Tad(FI) [B-I] - cotton

A.Kamoliddinov

Study and development of soil conservation technology of crop irrigation on sloping lands.

Under high surface gradients, automorphous soil of high permeability and subsident soil recommendations on soil conservation furrow irrigation with flexible horses are given.

02.Uz(FI) [B-I] - cotton

B.Kambarov

Technique and technology of irrigation on sloping lands in the South of the Republic of Uzbekistan.

Under high surface gradients gypsum bearing soils of high permeability and subsident soils recommendations on cotton irrigation technique and technology with flexible pipes utilization on the initial stage of deformation are given.

High surface gradients (0.0075 - 0.025)

B. Soils of high permeability

02.Tad(FI) [B-II] - cotton

R.Rakhmatilloev

Optimization of irrigation regime under concentrated irrigations and yield programming in collective farm "Pobeda" of Lenin district.

Under high surface gradients, automorphous soils with high permeability and subsident soils recommendations on cotton concentrated furrow irrigation technology parameters are given.

05.Tad(FI) [Б-II] - cotton

O.Komilov

Study and development of optimal parameters of cotton furrow irrigation technique and technology changes with flexible horses utilization.

Under high surface gradients, automorphous soils of high permeability and subsident soils recommendations on staged changes of cotton furrow irrigation technique and technology are given.

Г. Soils of low permeability

03.Tad(FI) [Г-II] - cotton

A.Akhrorov

Study of water saving efficiency and economic grounding of irrigation technology on long furrows with flexible horses on lands with gradients more than 0.01 (Yavan district).

Under high surface gradients, automorphous soils of low permeability efficiency of flexible horses in cotton irrigation norm close network on long furrows is determined.

Д. Soils of very low permeability

04.Tad(FI) [Д-II] - cotton

N.Nosirov

Determination of optimal parameters of furrow irrigation technique on background of deep loosening of compacted irrigated soils.

Under high surface gradients, automorphous soils of low permeability rational elements of cotton furrow irrigation technique are determined after deep loosening and suction reduction dynamics is defined.

III. Medium gradients (0.0025 - 0.0075)

Б. Soils of high permeability

15.Uz(FI) [Б-III] – cotton

V.Bibik

Development and study of irrigation technological schemes of sandy loam gypsum bearing soils of Karshi steppe.

Under medium gradients, automorphous strongly gypsum bearing soils with high permeability efficiency of furrow irrigation technology with flexible horses utilization is determined.

Г. Soils of low permeability

02.Kaz(FI) [Г-III] – maize for grain

R.Kvan

Study of furrow irrigation technique elements in command area of Arys-Turkestan canal.

Under medium gradients, half-automorphous soils of weak permeability maize irrigation technique elements are determined.

IV. Low gradients (0.001 - 0.0025)

А. Soils of very high permeability

03.Uz(FI) [А-IV] – cotton

L.Efremkina

Technological scheme and irrigation technology are developed on soils of high permeability.

Under low gradients, half-automorphous soils of high permeability cotton furrow irrigation efficiency is determined.

B. Soils with high permeability

01.Uz(FI) [Б-IV] - cotton

E.Zhigareva

Study of furrow irrigation technique and technology, irrigation equipment testing in Karshi steppe.

Under low gradients, automorphous gypsum bearing soils of high permeability and subsident soils efficiency of cotton furrow irrigation is determined with flexible horses utilization in period of initial deformation.

Г. Soils of low permeability

01.Tur(FI) [Г-IV] - cotton

O.Seidov

Development of technological processes of irrigation on leveled soils.

Under low gradients, hydromorphous soils of low permeability and saline groundwater efficiency of cotton furrow irrigation from close network with pipes utilization is determined.

V. Surface without gradient (< 0.001)

B. Soils of medium permeability

16.Uz(FI) [Б-V] - cotton

A.Voronov

Study of irrigation scheme organization and irrigation water use in state farms of Golodnaya steppe.

Under low surface gradients, half-automorphous soils of medium permeability recommendations on irrigation technology and organization for systems with flumes and pipes are given.

17.Uz(FI) [Б-V] - cotton

T.Djalilova

Test-productive study of cotton furrow irrigation water saving technology in Khanka and Khiva districts of Khorezm province.

Under low gradients, hydromorphous soils of medium permeability and saline groundwater efficiency of surge technology is determined.

Г. Soils of low permeability

02.Tur(FI) [Г-V] – cotton

O.Seidov

Study and introduction of irrigation method of high productivity.

Under low gradients, half-automorphous saline soils of low permeability efficiency of cotton furrow irrigation technology is determined on large checks without gradients with large discharge to the furrows is determined.

05.Uz(FI) [Г-V] – cotton

E.Kurbanbayev

Study of possibilities of massive cotton irrigation on large areas on lands without gradients in Karakalpakstan.

Under low gradients, half-automorphous saline soils of low permeability efficiency of cotton furrow irrigation technology is determined on checks without gradients.

01.Kaz(FI) [Г-V] – lucerne

G.Zhdanov

Study of secondary crops irrigation technique in rice rotation.

Under low gradients, hydromorphous soils of low permeability recommendations on lucerne furrow irrigation technology are given.

03.Kaz(FI) [Г-V] – maize for grain

K.Raimbayev

Irrigation technique impact on water-salt transportation processes dynamics within unsaturated zone.

Under low gradients, hydromorphous soils of low permeability leaching effect dependance from irrigation depth is determined.

Д. Soils of very low permeability

20.Uz(FI) [Д-V] – cotton

A.Novikova

Saline soils irrigation regime parameters verification in state farm "Kirkkiz" of Karakalpakstan.

Under low gradients, half-automorphous saline takyrs soils of low permeability efficiency of cotton automatic furrow irrigation technology is determined.

DRIP IRRIGATION

I'. Steep slopes (gradients > 0.05)

A. Soils of very high permeability

06.Uz(DI) [A-I'] - vineyard

T.Palvanov

Vineyards drip irrigation in Zaamin district of Djizak province.

Under high surface gradients, automorphous stony soils of low thickness with high permeability efficiency of vineyards drip irrigation with SANIIRI and "Moldavia-1" drippers utilization is determined.

B. Soils of high permeability

07.Uz(DI) [Б-I'] - vineyard

T.Palvanov

Vineyards drip irrigation in Koshrabad district of Samarkand province.

Under high surface gradients, automorphous soils of high permeability recommendations on design of drip irrigation technology of vineyards are given.

07.Tad(DI) [Б-I'] - pomegranate

G.Akhmedov

Study of optimal parameters of low-pressure drip irrigation with turbid water utilization.

Under high surface gradients, automorphous soils of high permeability recommendations on gardens low-pressure drip irrigation application are given.

B. Soils of medium permeability

22.Uz(DI) [B-I'] - vineyard

A.Novikova

Vineyards drip irrigation regime parameters verification in state farm "Kommuna" in Parkent district of Tashkent province.

Under high surface gradients, automorphous soils of medium permeability and subsident soils efficiency of vineyards drip irrigation technology is determined.

08'.Tad(DI) [B-I'] - apple trees

N.Nurmatov

Study of technique and technology of low-pressure drip irrigation system "Tadjikistan".

Under high surface gradients, automorphous soils of medium and high permeability recommendations on low-pressure drip irrigation system "Tadjikistan-1" are given.

I. Very high surface gradients (0.025 - 0.05)

A. Soils of high permeability

10.Uz(DI) [A-I] - cotton

A.Usmanov

Determination of drip irrigation efficiency on highly permeable stony soils for horticulture in collective farm "Yosh leninchi" of Fergana province.

Under high surface gradients, automorphous soils of low thickness, placed on pebbles, efficiency of cotton and vegetables drip irrigation is determined.

08''.Tad(DI) [A-I'] – vineyard

N.Nurmatov

Study of technique and technology of low-pressure drip irrigation system "Tadjikistan".

Under high surface gradients, automorphous soils of medium and high permeability recommendations on low-pressure drip irrigation system "Tadjikistan-1" are given.

II. High slope gradients(0.0075 - 0.025)

B. Soils of high permeability

09.Tad(DI) [Б-II] - cotton

R.Rakhmatilloev

Study of cotton in-soil drip irrigation technology.

Under high surface gradients, automorphous soils of high permeability recommendations on cotton in-soil drip irrigation application are given.

II. Medium gradients (0.0025 - 0.0075)

B. Soils of high permeability

23.Uz(DI) [Б-III] - cotton

A.Novikova

Gardens irrigation regime verification on gypsum bearing soils in Nishan district of Kashkadarya province.

Under medium gradients, hydromorphous soils of high permeability and saline groundwater recommendations on cotton drip irrigation technology are given.

B. Soils of medium permeability

04.Kaz(DI) [Б-III] - cotton

F.Vyshpolsky

Drip irrigation efficiency on background of vertical drainage.

Under medium gradients, half-automorphous soils of medium permeability and secondary salinization efficiency of cotton drip irrigation with Israeli equipment utilization is determined.

Г. Soils of low permeability

19.Uz(DI)

S.Nerozin

Study of technique and technology of cotton drip irrigation in Chimkent province (state farm "Keles").

Under medium gradients, automorphous soils of low permeability efficiency of cotton drip irrigation technology with moduled Israeli equipment is determined.

IV. Low gradients (0.001 - 0.0025)

B. Soils of high permeability

08.Uz(DI) [Б-IV] - cotton

B.Mallayev

Cotton drip irrigation technique on lands of South-West Uzbekistan.

Under low gradients, hydromorphous soils of high permeability and desert climate efficiency of cotton drip irrigation is determined.

09.Uz(DI) [Б-IV] – cotton

S.Nerozin

Study of technique and technology of cotton drip irrigation in Kashkadarya province.

Under low gradients, automorphous soils of high permeability efficiency of cotton drip irrigation with moduled Israeli equipment is determined.

IN-SOIL IRRIGATION (ISI)

IV. Low gradients (0.001 - 0.0025)

B. Soils of medium permeability

13.Uz(ISI) [Б-IV] - cotton

V.Lunev

Test-productive study of cotton in-soil irrigation technique and technology of new-developed lands of Golodnaya steppe.

Under low gradients, half-automorphous soils of medium permeability cotton in-soil irrigation technology is determined.

14.Uz(ISI) [B-IV] - cotton

M.Gulyayev

In-soil irrigation system efficiency and design study.

Under low gradients, automorphous soils of medium permeability recommendations on cotton in-soil irrigation water saving technology are given.

21.Uz(ISI) [B-IV] - cotton

V.Luney

Study of cotton in-soil irrigation efficiency of new-developed lands of Golodnaya steppe.

Under low gradients, half-automorphous soils of medium permeability recommendations on cotton in-soil irrigation water saving technology are given.

SPRINKLER IRRIGATION (SI)
II. Medium gradients (0.0025 - 0.0075)

B. Soils of high permeability

11.Uz(SI) [B-III] - cotton

V.Sevryugin

Test-productive study of interrupted sprinkler irrigation in cotton rotation.

Under medium gradients, automorphous soils of high permeability efficiency of cotton rotation crops sprinkler irrigation with "Kuban" machine is determined.

B. Soils of medium permeability

18.Uz(SI) [B-III] - cotton

V.Sevryugin

Test-productive study of new long-stream sprinkler machine DDF-100.

Under medium gradients, automorphous soils of medium permeability efficiency of cotton rotation crops sprinkler irrigation with DDF-100 machine is determined.

V. Land without gradients (< 0.001)

B. Soils of high permeability

12.Uz(SI) [B-V] - cotton

H.Yakubov

Productive study of efficiency of sprinkler irrigation and technology efficiency is determined on saline lands of collective farm "Pakhtaara".

Under very low gradients, hydromorphous soils of high permeability and saline groundwater efficiency of long-term cotton sprinkler irrigation is determined.

PILOT PROJECTS ON DIRECTION 4 LOCATION

Pilot plots №	Symbol	Irrigation technique	Location			Theme
			Province	District	Farm	
REPUBLIC OF KAZAKHSTAN						
1	▼	FI	South-Kazakhstan	Chardara	state farm "50 let Oktabrya"	Study of secondary crops irrigation technique in rice rotation
2	▼	FI	South-Kazakhstan	Bugun	state farm "Isakhanov"	Study of furrow irrigation technique elements in command zone of Arys-Turkestan canal
3	▼	FI	South-Kazakhstan	Shaulder		Irrigation technology impact on water-transport processes dynamics in unsaturated zone
4	▼	DI	South-Kazakhstan	Turkestan	state farm "Ikan"	Drip irrigation efficiency on background of vertical drainage
REPUBLIC OF TADJIKISTAN						
1	▼	FI		Gissar	state farm "Leningrad"	Study and development of soil conservation technology of crops irrigation on sloping lands
2	▼	FI	Khatlon	Lenin	collective farm "Pobeda"	Optimization of irrigation regime under concentrated irrigation and programmed yield in "Pobeda" farm
3	▼	FI	Khatlon	Yavan	state farm № 2	Study of water saving efficiency and irrigation efficiency in long furrows with flexible horses with gradient more than 0.01
4	▼	FI	Khatlon	Yavan	state farm № 1	Establishing of furrow irrigation technique optimal elements on background of deep loosening on compacted soils

Pilot plots №	Symbol	Irrigation technique	Location			Theme
			Province	District	Farm	
5	▼	FI	Khatlon	Djilikul	state farm "23 Partsjezd"	Study and development of furrow irrigation technique and technology optimal elements on loess soils
6	▼	FI	Leninabad	Khudjand	state farms "Samgar", Khamzaaliyev	Study of irrigation optimal technique and technology on base of pipe network
7	▼	DI	Khatlon	Kolkhozabad	abandon of SPA TadjikNIIGiM	Study of low-pressure drip irrigation optimal parameters with turbid water
8 ‘	▼	DI		Varzob	state farm "Kominintern"	Study of low-pressure drip irrigation system "Tadjikistan" technique and technology
8 ’’	▼	DI	Leninabad	Asht	state farm "Bogdariv"	Study of low-pressure drip irrigation system "Tadjikistan" technique and technology
9	▼	DI	Хатлонская	Lenin		Study of cotton in-soil drip irrigation
TURKMENISTAN						
1	▼	FI	Mary	Turkmenali	collective farm "Leningrad"	Development of irrigation technological processes on lands with low gradients or without
2	▼	FI	Tashauz		collective farm "Kalinin"	Study and introduction of highly productive irrigation technique
REPUBLIC OF UZBEKISTAN						
1	▼	FI	Kahskadarya	Kassan	state farm № 52	Study of furrow irrigation technique and technology on subsident soils in Karshi steppe
2	▼	FI	Kahskadarya	Kassan	state farm № 52	Furrow irrigation technique and technology on subsident soils in South of Uzbekistan

Pilot plots №	Symbol	Irrigation technique	Location			Theme
			Province	District	Farm	
3	▼	FI	Djizak	Arnasay	state farm №149	Development of technological schemes and irrigation on soils of high permeability
4	▼	FI	Namangan	Namangan	state farm "Sverdlov"	Furrow irrigation technique on pebbles with pipes utilization on complex relief in Namangan province
5	▼	FI	Republic of Karakalpakstan	Kegeili	collective farm "Khalkaabad"	Study of possibility of cotton massive irrigation on huge areas in Karakalpakstan
6	▼	DI	Djizak	Zaamin	state farm "Poslavsky"	Vineyards drip irrigation in Zaamin district of Djizak province
7	▼	DI	Samarkand	Koshrabad	state farm "Sverdlov"	Vineyards drip irrigation in Koshrabad district of Samarkand province
8	▼	DI	Bukhara	Bukhara	cotton test station	Cotton drip irrigation technique in South-West of Uzbekistan
9	▼	DI	Kashkadarya	Karshi	state farm № 12	Study of technique and technology of cotton drip irrigation in Kashkadarya province
10	▼	DI	Fergana	Fergana	collective farm "Esh leninchi"	Determination of drip irrigation efficiency on highly permeable stony soils for horticulture
11	▼	SI	Tashkent	Srednechirchik	collective farm "Nord mayak"	Test-productive study of interrupted sprinkling by "Kuban" for crops in cotton rotation
12	▼	SI	South-Kazakhstan (Republic of Kazakhstan)	Pakhtaaral	state farm "Pakhtaaral"	Productive testing of irrigation regime efficiency and irrigation technique by sprinkling on saline soils in state farm "Pakhtaaral"
13	▼	ISI	SyrDarya	Akaltin	state farm № 10a	Test-productive study of cotton in-soil irrigation technique and technology on new-developed lands of Golodnaya steppe
14	▼	ISI	SyrDarya	Akaltin	state farm № 10a	Study of in-soil irrigation system design elements

Pilot plots №	Symbol	Irrigation technique	Location			Theme
			Province	District	Farm	
15	▼	FI	Kashkadarya	Kasba	state farm № 3	Development of technological schemes of sandy-loam gypsum bearing soils irrigation in Karshi steppe
16	▼	FI	Djizak	Arnasay	state farm № 14a	Study of irrigation arrangement and irrigation water use in Golodnaya steppe
17	▼	FI	Khorezm	Khiva	collective farm "Uzbekistan"	Test-productive study of water saving technologies of cotton furrow irrigation in Khiva district of Khorezm province
18	▼	SI	Tashkent	Zangiata	NISTO SANIIRI	Test-productive study of new sprinkler machine DDF-100
19	▼	DI	Chimkent (Republic of Kazakhstan)	Keles	state farm "Keles"	Study of cotton drip irrigation technique and technology in Chimkent province
20	▼	FI	Republic of Karakalpakstan	Turtkul	state farm "Kirkkiz"	Irrigation regime parameters verification on saline soils in state farm "Kirkkiz" of Karakalpakstan
21	▼	ISI	SyrDarya	Akaltyn	state farm № 10a	Cotton in-soil irrigation efficiency determination on new lands of Golodnaya steppe
22	▼	DI	Tashkent	Parkent	state farm "Kommuna"	Vineyards irrigation regime parameters verification under drip irrigation in state farm "Kommuna", Parkent district of Tashkent province
23	▼	DI	Kashkadarya	Nishan	KEUREP	Gardens irrigation regime verification on gypsum bearing soils of Nishan district of Kashkadarya province

Abbreviations:

FI – furrow irrigation;

DI – drip irrigation;

SI – sprinkling;

ISI – in-soil irrigation.

ANNEX 4. 3.

**IDENTIFICATION OF TEST-PRODUCTIVE PLOTS ON SOIL-CLIMATIC ZONES
AND WATER ALLOWANCE REGIONS OF CENTRAL ASIA (DIRECTION4)**

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Water allowance region	Soil salinization degree	Agricultural crop
01.Kaz (FI)	Ц-I-Б	Г-V	VII	CP3	lucerne
02.Kaz (FI)	C-II-Б	Г-III	V	СЛ3	maize
03.Kaz (FI)	C-II-Б	Г-V	VII	CP3	maize
04.Kaz (DI)	C-II-Б	Б-III	V	СЛ3	cotton
01.Tad (FI)	Ю-I-Г	Б-I	II	HE3	cotton
02.Tad (FI)	Ю-I-Б	Б-II	II	HE3	cotton
03.Tad (FI)	Ю-I-Г	Г-II	III	HE3	cotton
04.Tad (FI)	Ю-I-Г	Д-II	III	HE3	cotton
05.Tad (FI)	Ю-I-Б	Б-II	II	HE3	cotton
06.Tad (FI)	Ц-II-Г	A-I	I	HE3	vineyard
07.Tad (DI)	Ю-I-Г	Б-I'	II	HE3	pomegranate
08'.Tad (DI)	Ю-II-Д	Б-I'	II	HE3	apple tree
08''.Tad (DI)	Ц-II-Г	A-I	I	HE3	vineyard
09.Tad (DI)	Ю-I-Б	Б-II	II	HE3	cotton
01.Typ (FI)	Ю-I-A'	Г-IV	VII	СЛ3	cotton
02.Typ (FI)	Ю-I-A'	Г-IV	VII	СЛ3	cotton
01.Uz (FI)	Ю-I-Б	Б-IV	II	HE3	cotton
02.Uz (FI)	Ю-I-Б	Б-I	II	HE3	cotton
03.Uz (FI)	Ц-II-A'	A-IV	IV	HE3	cotton
04.Uz (FI)	Ц-II-Б	A-I	I	HE3	cotton
05.Uz (FI)	C-II-A	Г-V	V	CP3	cotton
06.Uz (DI)	Ц-II-Б	A-I'	I	HE3	vineyard
07.Uz (DI)	Ц-II-Б	Б-I'	II	HE3	vineyard

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Water allowance region	Soil salinization degree	Agricultural crop
08.Uz (DI)	Ц-II-A'	Б-IV	VI	СЛЗ	cotton
09.Uz (DI)	Ю-I-Б	Б-IV	II	СЛЗ	cotton
10.Uz (DI)	Ц-II-Г	A-I	I	HE3	cotton
11.Uz (SI)	Ц-II-B	Б-III	II	HE3	cotton
12.Uz (SI)	Ц-I-B	Б-V	VI	CP3	cotton
13.Uz (ISI)	Ц-II-Б	Б-IV	V	HE3	cotton
14.Uz (ISI)	Ц-II-Б	Б-IV	III	СЛЗ	cotton
15.Uz (FI)	Ю-I-Б	Б-III	II	HE3	cotton
16.Uz (FI)	Ц-II-Б	Б-V	V	СЛЗ	cotton
17.Uz (FI)	Ц-I-A'	Б-V	VII	СЛЗ	cotton
18.Uz (SI)	Ц-II-Б	Б-III	III	HE3	cotton
19.Uz (DI)	Ц-I-B	Г-III	III	СЛЗ	cotton
20.Uz (FI)	Ц-I-A	Д-V	V	СИЗ	cotton
21.Uz (ISI)	Ц-II-Б	Б-IV	V	HE3	cotton
22.Uz (DI)	Ц-II-Б	Б-I'	III	HE3	vineyard
23.Uz (DI)	Ю-I-Б	Б-III	VII	HE3	cotton

Abbreviations:

FI – furrow irrigation;

DI – drip irrigation;

SI – sprinkling;

ISI – in-soil irrigation.

Soil-climatic zone:

C-north

Ц-central

Ю-south

Zoning according to combination "water permeability-surface gradient"

A-highly permeable soil	I'	gradients more than 0.05
Б-soils of high permeability	I	gradients - 0.025 - 0.05

B-soils of medium permeability	II	gradients -0.0075 - 0.025
Г-soils of low permeability	III	gradients -0.0025 - 0.0075
Д-soils of very low permeability	IV	gradients -0.001 - 0.0025
	V	gradients lower than 0.001

Water allowance regions

Automorphous soils, groundwater table more than 3 m

- I - low thickness loamy deposits on sandy-pebble and sandy sediments
- II - medium thickness loamy deposits on sandy-pebble and sandy sediments
- III - high thickness loamy and clayey

Soils of transient line, groundwater table 2-3 m

- IV - light loamy and sandy-loam
- V - loamy and clayey

Hydromorphous soils, groundwater table 1-2 m

- VI - light loamy and sandy-loam
- VII - loamy and clayey

Compaction degree

- P-loose
- H-normal compaction
- У-compacted
- СУ-very much compacted
- .
- .
- .
- .
- .

Salinization

- HE3-non-saline
- СЛ3-slightly saline
- СР3-medium saline
- СИ3-strongly saline

Irrigation technique elements assessment

Pilot plot index	Soil-climatic zone	Index "gradients-permeability"	Ground water table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water technological expenses			m _{HT} [m ³ /ha]	Efficiency
															Evaporation [%]	Filtration [%]	Release [%]		
FURROW IRRIGATION																			
gradients 0.025 - 0.05																			
04.Uz (FI)	Ц-II-Б	А-I	>10	I	H	HE3	cotton	O	70	0.6	0.31	1	6	974		7.5	10	800	0.82
								K	100	0.6	0.25	2	9	1366	1	20	28	697	0.51
								PC	40	0.6	0.1	5.7	7.1	1070	0.9	40	3.1	600	0.56
01.Tad (FI)	Ю-I-Г	Б-I	>20	II	H	HE3	cotton	O	100	0.6	0.05		36	1080	3	15	12	756	0.7
								K	100	0.6	0.05		42	1260	3	16	19	781	0.62
								PC	75	0.6	0.1	8	14	1120	1.5	27	6.5	750	0.65
02.Uz (FI)	Ю-I-Г	Б-I	>10	II	P	HE3	cotton	O	50	0.9	0.05		34.2	1371	5	3	7	116	0.85
								K	100	0.9	0.17		43	2915	2	42	15	5	0.41
								PC	40	0.9	0.1	5.7	7.1	1070	0.9	40	3.1	119	0.56
																	5	600	
06.Tad (FI)	Ц-II-Г	А-I	>20	I	P	HE3	vine yard	O	200	1.5	0.2		29	700	2.5	16.5	11	490	0.7
								K	200	1.5	0.5		36.7	2200	3	45	23	630	0.29
								PC	40	0.6	0.1	5.7	7.1	1070	0.9	40	3.1	600	0.56
gradients 0.0075 - 0.025																			
02.Tad (FI)	Ю-I-Б	Б-II	>80	II	H	HE3	cotton	O	100	0.6	0.05		46	1393	5	4	15	105	0.76
								K	100	0.6	0.08		72	3329	6	18	40	9	0.36
								PC	125	0.6	0.25	4.5	9.5	1150	1.3	23	9.2	119	0.66

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Ground water table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water technological expenses			m _{HT} [m ³ /ha]	Efficiency
															Evaporation [%]	Filtration [%]	Release [%]		
																		8 750	5
05.Tad (FI)	Ю-I-Б	Б-II	>30	II	H	HE3	cotton	O K PC	100 120 125	0.6 0.6 0.6	0.15 0.12 0.25	4.5	24 72 9.5	2160 4320 1150	3 4 1.3	12 23 23	16 39 9.2	149 0 146 9 750	0.69 0.34 0.66 5
03.Tad (FI)	Ю-I-Г	Г-II	>3	III	H	HE3	cotton	O K PC	120 120 200	0.6 0.6 0.6	0.4 0.15 0.1	14	24 41 49	1200 3075 1470	3 5 5.7	7.4 20.5 10	17 35 16	877 123 0 110 0	0.73 1 0.4 0.68 1
04.Tad (FI)	Ю-I-Г	Д-II	>3	III	P	HE3	cotton	O K PC	125 125 200	0.6 0.6 0.6	0.25 0.12 0.05	9 11 26	11.6 26.4 105	1393 1520 1614	1.3 9.6 11	5.4 8 6	12 26 22	112 8 859 110 0	0.81 0.56 5 0.67
gradients 0.0025 - 0.0075																			
15.Uz (FI)	Ю-I-Б	Б-III	>10	II	У	HE3	cotton	O K PC	50 100 275	0.6 0.6 0.6	0.3 0.3 0.75	3.5	2.8 24 6.5	1000 4320 1050	0.5 4 1.1	28.5 60 20	16 7.6	710 864 750	0.71 0.2 0.71 4
02.Kaz (FI)	С-II-Б	Г-III	2,5-	V	H	СЛЗ	maiz	O	250	0.7	0.5	4.3	20.8	1111	1.9	4.4	12	909	0.81

Pilot plot index	Soil-climatic zone	Index "gradients-permeability"	Ground water table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water technological expenses			m _{HT} [m ³ /ha]	Efficiency
															Evaporation [%]	Filtration [%]	Release [%]		
			3,5				e	K PC	250 400	0.7 0.6	0.25 0.25	10.1 14	25.9 36.8	1337 1380	3 5	9.5 8.5	16 14	952 100 0	8 0.71 2 0.72 5
gradients 0.001 - 0.0025																			
03.Uz (FI)	Ц-II-A'	A-IV	2.2-3.3	IV	P	HE3	cotton	O K PC	187 203 225	0.9 0.9 0.9	1.39 0.55 1.5		4.7 45.5 2.1	1402 4932 890	1 8 0.5	34 67 28	5	911 986 600	0.65 0.2 0.71 5
01.Uz (FI)	Ю-I-Б	Б-IV	>10	II	H	HE3	cotton	O K PC	165 280 400	0.9 0.9 0.9	0.125 0.28 1.2		139 165 7.9	4212 6600 950	15 0.9	55 16	10 3.8	257 8 132 0 750	0.61 0.2 0.79 2
01.Typ (FI)	Ю-I-A'	Г-IV	1.4-1.7	VII	Y	HE3	cotton	O K PC	100 200 400	0.9 0.9 0.9	0.7 0.7 0.35		3.9 11.8 30.3	1100 1650 1060	2 2 3.7	14 30 5	10 6.3	924 957 950	0.84 0.58 0.85
gradients lower than 0.001																			
16.Uz (FI)	Ц-II-Б	Б-V	2.0-3.0	V	H	СЛЗ	cotton	O K PC	420 420 400	0.9 0.9 0.9	0.75/ 0.25 0.5 0.6	12	34.8 77.7 17.5	1400 3700 1050	4 7 2.2	31 55 8	10 3.6	910 1036 900	0.65 0.28 0.86

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Ground water table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water technological expenses			m _{HT} [m ³ /ha]	Efficiency
															Evaporation [%]	Filtration [%]	Release [%]		
17.Uz (FI)	Ц-I-A'	Б-V	1.4-1.9	VII	У	СЛЗ	cotton	O K PC	400 400 400	0.9 0.9 0.9	0.5 0.51 0.6	10.6	6.3 24 17.5	314 1220 1050	0.5 3 2.2	11. 5 18 8	5 5 3.6	276 903 900	0.88 0.74 0.86
02.Typ (FI)	Ц-I-A'	Г-V	1.5-2.2	VII	Н	СЛЗ	cotton	O K PC	100 200 400	0.9 0.9 0.9	0.7 0.7 0.35	17	3.9 11.8 30.3	1100 1650 1060	2 2 3.7	14 30 5	10 6.3	924 957 950	0.84 0.58 0.85
05.Uz (FI)	С-II-A'	Г-V	1.5-3.2	V	У	СРЗ	cotton	O K PC	200 200 400	0.9 0.9 0.9	0.92 0.82 0.35	2.3 17	5.6 7.2 30.3	1030 1185 1060	2 2 3.7	8 18 5	6.3	927 948 950	0.9 0.8 0.85
20.Uz (FI)	Ц-I-A	Д-V	2.5-3.0	V	СУ	СИЗ	cotton	O PC	250 400	0.9 0.9	1.2 0.2	22.5	6.6 6.2	1270 1250	2 6.5	13 4	9.5	1000	0.85 0.8
01.Kaz (FI)	Ц-I-B	Г-V	1.2-1.5	VII	У	СРЗ	lucerne	O K PC	200 400	0.7 0.9 0.06	0.9 check 0.25	20.8	5 30.2	1165 1750 1140	0.9 10 3.5	25 38 7	6	863 910 950	0.74 1 0.52 0.83 5
03.Kaz (FI)	С-II-Б	Г-V	1.0-2.0	VII	СУ	СРЗ	maize	O K						800 1200		28. 1 36. 7		575 760	0.71 9 0.63 3
DRIP IRRIGATION																			
gradients more than 0.05																			
06.Uz (DI)	Ц-II-	A-I'	>40	I	P	HE3	vine	O						220			5	209	0.95

Pilot plot index	Soil-climatic zone	Index "gradients-dient-permeability"	Ground wa-ter table [m]	Water allow-ance region	Com-paction degree	Soil salini-zation degree	Agri-cultu-ral crop	Data typ	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water tech-nological expenses			m _{HT} [m ³ /ha]	Effici-ency
															Evapo-ration [%]	Filtra-tion [%]	Re-lease [%]		
	B						yard	K PC	100 60	2.5 0.6	0.22 0.06	8	20 19.4	650 800	1 1	20 19	10 5	450 600	0.69 0.75
07.Uz (DI)	Ц-II-B	Б-I'	>10	II	H	HE3	vine yard	O K PC	100 60	2.5 0.6	0.1 0.06	8	30 19.4	75 430 1000	1 1	15 19	5 10 5	71 320 750	0.95 0.74 0.75
22.Uz (DI)	Ц-II-B	Б-I'	>50	III	H	HE3	vine yard	O K PC	175	0.6	0.1	10.2	19.4	80 910 1000	1 1	14 19	3 5	76 746 750	0.95 0.82 0.75
08'.Tad (DI)	Ю-II-Д	Б-I'	>20	II	H	HE3	ap-ple trees	O K PC	125	0.6	0.1	10.2	27.2	100 525 1310	0.5 2.5	4.5 18	2 25 11	98 368 900	0.98 0.7 5
07.Tad (DI)	Ю-I-Г	Б-I'	>80	II	H	HE3	pom-egra-nate	O K PC	60 60	2 0.6	0.1 0.06	8	42 19.4	750 1260 1000	3 1	25 19	8 16 5	690 705 750	0.92 0.56 0.75
gradients 0.025 - 0.05																			
10.Uz (DI)	Ц-II-Г	A-I	>70	I	H	HE3	cot-ton	O K PC	210 40	0.6 0.6	0.16 0.1	5.7	44 7.1	197 2000 1070	2 0.9	35 40	5 17 3.1	187 920 600	0.95 0.46 0.56
08''.Tad (DI)	Ц-II-Г	A-I	>70	I	P	HE3	vine yard	O K PC	40	0.6	0.1	5.7	7.1	200 1000 1070	1 0.9	29 40	2 10 3.1	196 600 600	0.98 0.6 0.56

Pilot plot index	Soil-climatic zone	Index "gradients-dient-permeability"	Ground wa-ter table [m]	Water allow-ance region	Com-paction degree	Soil salini-zation degree	Agri-cultu-ral crop	Data typ	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water tech-nological expenses			m _{HT} [m ³ /ha]	Effici-ency										
															Evapo-ration [%]	Filtra-tion [%]	Re-lease [%]												
gradients 0.0075 - 0.025																													
09.Tad (DI)	Ю-I-Б	Б-II	>80	II	H	HE3	cot-ton	O	100	0.6	0.15	4.5	14.2	63.4	2	26	2	62	0.98										
								K												125	0.6	0.25	9.5	1150	1.3	23	10	794	0.62
								PC																					
gradients 0.0025 - 0.0075																													
23.Uz (DI)	Ю-I-Б	Б-III	0.6-3.5	VII	H	CP3	cot-ton	O	300	0.9	0.2	10.2	78	390	7	32	10	351	0.9										
								K												400	0.9	0.5	23	1150	2.8	10.5	8.2	900	0.78
								PC																					
04.Kaz (DI)	C-II-Б	Б-III	1.5-2.5	V	H	CJ13	cot-ton	O																					
19.Uz (DI)	Ц-I-Б	Г-III	>3	III	H	CJ13	cot-ton	O	400	0.9	0.18	20.5	94	175	3	15	5	166	0.95										
								K												400	0.9	0.25	50	1250	5.5	6.5	12	100	0.59
								PC																					
gradients 0.001 - 0.0025																													
08.Uz (DI)	Ц-II-A'	Б-IV	1.1-2.0	VI	H	CJ13	cot-ton	O	100	0.6	0.42	3.2	4.3	160	0.9	18.5	2	157	0.98										
								K												300	0.6	1	5	970	3	750	0.7		
								PC																				750	6
09.Uz (DI)	Ю-I-Б	Б-IV	2.9-3.6	II	H	CJ13	cot-ton	O	400	0.9	1.2	4.1	7.9	125	1.5	25	2	123	0.98										
								K												744	0.6								
								PC														750	0.79						

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Ground water table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water technological expenses			m _{HT} [m ³ /ha]	Efficiency	
															Evaporation [%]	Filtration [%]	Release [%]			
																				2
IN-SOIL IRRIGATION																				
gradients 0.001 - 0.0025																				
13.Uz(ISI)	Ц-II-Б	Б-IV	2.2-2.5	V	H	HE3	cotton	O K PC	100 350	0.6	0.5	8	13.2	1100 1425 1230	2 1.6	14 11.5	4 10 7.4	1056 1055 950	0.96 0.74 0.795	
14.Uz(ISI)	Ц-II-Б	Б-IV	3.0-3.5	III	H	CJ13	cotton	O K PC	350	0.6	0.5	8	13.2	1480 1860 1230	2 1.6	24 30 11.5	4 10 7.4	1060 1079 950	0.72 0.58 0.795	
21.Uz(ISI)	Ц-II-Б	Б-IV	2.2-2.5	V	H	HE3	cotton	O K PC	100 350	0.6	0.5	8	13.2	1210 1510 1230	2 1.6	9 18 11.5	4 10 7.4	1053 1057 950	0.87 0.7 0.795	
SPRINKLING																				
gradients 0.0025 - 0.0075																				
11.Uz(SI)	Ц-II-Б	Б-III	>3	II	H	HE3	cotton	O K PC	130 275	0.6 0.6	0.6 0.75	5 3.5	7 6.5	690 1938 1050	15 1 1.1	6 14.5 20	29 7.6	545 1085 750	0.79 0.56 0.714	

Pilot plot index	Soil-climatic zone	Index "gradients-dient-permeability"	Ground wa-ter table [m]	Water allow-ance region	Com-paction degree	Soil salini-zation degree	Agri-cultu-ral crop	Data typ	L ₆ [m]	a [m]	q ₆ [l/s]	t _{доб} [hour]	T _{пол} [hour]	m _{6p} [m ³ /ha]	Irrigation water tech-nological expenses			m _{HT} [m ³ /ha]	Effici-ency
															Evapo-ration [%]	Filtra-tion [%]	Re-lease [%]		
18.Uz(SI)	Ц-II-B	Б-III	>10	III	H	HE3	cot-ton	O K PC	170 325	0.6 0.6	0.15 0.5	12 5.5	36.3 13	785 1922 1200	21 2 1.9	5 20 13	23 10	581 1057 900	0.74 0.55 0.78 4
gradients lower than 0.001																			
12.Uz(SI)	Ц-I-B	Б-V	1.0-1.5	VI	H	CP3	cot-ton	O K PC	120 250	0.6 0.6	0.6 0.75	4.85	5.2 5	764 1307 900	12 0.7 0.7	8 41.3 16		611 760 750	0.8 0.58 0.83 3

Explanations:

O- experimental data;

K- control data;

PC - SANIIRI recommendations (N.Laktayev)

L₆ - furrow length [m];

a - distance between furrows [m];

q₆ – discharge into furrow [l/s];

t_{доб} - time of flow running up to the end of furrow [hour];

T_{пол} – total time of irrigation [hour];

m_{HT} – irrigation depth net [m³/ha]; m_{HT} – irrigation depth gross [m³/ha].

ANNEX 4.5.

Assessment of irrigation water per unit production expenses

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{op} [m ³ /ha]	M _{HT} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Water expenses per unit production	
															Expenses gross [m ³ /c]	Expenses net [m ³ /c]
FURROW IRRIGATION																
gradients 0.025 - 0.05																
04.Uz (FI)	Ц-II-Б	А-I	>10	I	H	HE3	cotton	O	0.82	6818	5591	2742 (29)	29.5	12.9 (78)	231.1	189.5
							K	0.51	9560	4876			16.6		576	293.7
01.Tad (FI)	Ю-I-Г	Б-I	>20	II	H	HE3	cotton	O	0.70	6480	4536	1080 (14)	36.0	9.7 (37)	180	126
							K	0.62	7560	4687			26.3		287.5	178.2
02.Uz (FI)	Ю-I-Г	Б-I	>10	II	P	HE3	cotton	O	0.85	6855	5827	10635 (61)	27.5	12.3 (81)	249.2	211.9
							K	0.41	17490	7171			15.2		1150.6	471.8
06.Tad (FI)	Ц-II-Г	А-I	>20	I	P	HE3	vineyard	O	0.70	8400	5880	9200 (52)	110	45 (69)	76.4	53.5
							K	0.29	17600	5104			65		270.8	78.5
gradients 0.0075 - 0.025																
02.Tad (FI)	Ю-I-Б	Б-II	>80	II	H	HE3	cotton	O	0.76	9751	7411	3565 (27)	40	6 (18)	243.8	185.3
							K	0.36	13316	4794			34		391.6	133.2
05.Tad (FI)	Ю-I-Б	Б-II	>30	II	H	HE3	cotton	O	0.69	10800	7452	2160 (17)	31.8	7.7 (32)	339.6	234.3
							K	0.34	12960	4406			24.1		537.8	182.8
03.Tad (FI)	Ю-I-Г	Г-II	>3	III	H	HE3	cotton	O	0.731	7200	5263	5100 (41)	30.8	3.9 (14)	233.8	170.9
							K	0.400	12300	4920			26.9		457.2	182.9
04.Tad (FI)	Ю-I-Г	Д-II	>3	III	P	HE3	cotton	O	0.810	6965	5642	3675 (35)	33.6	6.7 (25)	207.3	167.9
							K	0.565	10640	6012			26.9		395.5	223.5
gradients 0.0075 - 0.0025																
15.Uz (FI)	Ю-I-Б	Б-III	>10	II	У	HE3	cotton	O	0.71	8000	5680	4960 (38)	19.2	6.7 (54)	416.7	295.8
							K	0.20	12960	2592			12.5		1036.8	207.4
02.Kaz (FI)	С-II-Б	Г-III	2,5-3,5	V	H	СЛЗ	maize	O	0.818	6666	5453	1354 (17)	53	0.0 (0)	125.8	102.9
							K	0.712	8020	5710			53		151.3	107.7
gradients 0.001 - 0.025																

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{op} [m ³ /ha]	M _{HT} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Water expenses per unit production	
															Expenses gross [m ³ /c]	Expenses net [m ³ /c]
03.Uz (FI)	Ц-II-A'	A-IV	2.2-3.3	IV	P	HE3	cotton	O K	0.65 0.20	5608 14796	3645 2959	9188 (62)	21 12.5	8.5 (68)	267 1183.7	173.6 236.7
01.Uz (FI)	Ю-I-Б	Б-IV	>10	II	H	HE3	cotton	O K	0.61 0.20	12636 19800	7708 3960	7164 (36)	25 12.5	12.5 (100)	505.4 1584	308.3 316.8
01.Typ (FI)	Ю-I-A'	Г-IV	1.4-1.7	VII	У	HE3	cotton	O K	0.90 0.74	6000 7836	5400 5799	1836 (23)	21.8 16	5.8 (36)	275.2 489.8	247.7 362.4
gradients lower than 0.001																
16.Uz (FI)	Ц-II-Б	Б-V	2.0-3.0	V	H	СЛЗ	cotton	O K	0.65 0.28	5600 11100	3640 3108	5500 (50)	21 15	6 (40)	266.7 740	173.3 207.2
17.Uz (FI)	Ц-I-A'	Б-V	1.4-1.9	VII	У	СЛЗ	cotton	O K	0.88 0.74	3454 6100	3040 4514	2646 (43)	32.7 26	6.7 (26)	105.6 234.6	93 173.6
02.Typ (FI)	Ц-I-A'	Г-V	1.5-2.2	VII	H	СЛЗ	cotton	O K	0.84 0.58	4400 6600	3696 3828	2200 (33)	40 16.5	23.5 (142)	110 400	9.4 232
05.Uz (FI)	С-II-A'	Г-V	1.5-3.2	V	У	СРЗ	cotton	O K	0.9 0.8	2060 2370	1854 1896	310 (13)	19 19	0 (0)	108.4 124.7	97.6 99.8
20.Uz (FI)	Ц-I-A	Д-V	2.5-3.0	V	СУ	СНЗ		O K	0.85	3810	3238		23.9		159.4	135.5
01.Kaz (FI)	Ц-I-Б	Г-V	1.2-1.5	VII	У	СРЗ	lucerne	O K	0.741 0.520	2330 3500	1726 1820	1170 (33)	152.3 100	52.3 (52)	15.3 35	11.3 18.2
03.Kaz (FI)	С-II-Б	Г-V	1.0-2.0	VII	СУ	СРЗ	maize	O K	0.719 0.633	4800 4800	3451 3038	0 (0)				
DRIP IRRIGATION																
gradients more than 0.05																
06.Uz (DI)	Ц-II-Б	А-I'	>40	I	P	HE3	vineyard	O K	0.95 0.69	6160 7150	5852 4934	990 (14)	186.7 53.8	132.9 (247)	33 132.9	31.3 91.7
07.Uz (DI)	Ц-II-Б	Б-I'	>10	II	H	HE3	vineyard	O K	0.95 0.74	1875 3010	1781 2227	1135 (38)	95.7 71.9	23.8 (33)	19.6 41.9	18.6 31

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{op} [m ³ /ha]	M _{HT} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Water expenses per unit production	
															Expenses gross [m ³ /c]	Expenses net [m ³ /c]
22.Uz (DI)	Ц-II-B	Б-I'	>50	III	Н	HE3	vineyard	О К	0.95 0.82	1600 3640	1520 2985	2040 (56)	121.4 85.1	36.3 (43)	13.2 42.8	12.5 35.1
08'.Tad (DI)	Ю-II-Д	Б-I'	>20	II	Н	HE3	яблони	О К	0.98 0.7	4400 5250	4312 3675	850 (16)	240 150	90 (60)	18.3 35	18 24.5
07.Tad (DI)	Ю-I-Г	Б-I'	>80	II	Н	HE3	ромегранате	О К	0.92 0.56	16500 10080	15180 5645	-6420 (-64)	50 37	13 (35)	330 272.4	303.6 152.6
gradients 0.025 - 0.05																
10.Uz (DI)	Ц-II-Г	А-I	>70	I	Н	HE3	cotton	О К	0.95 0.46	6500 12000	6175 5520	5500 (46)	28 17	11 (65)	232 705.9	220.5 324.7
08''.Tad (DI)	Ц-II-Г	А-I	>70	I	Р	HE3	vineyard	О К	0.98 0.6	6000 10000	5880 6000	4000 (40)	150 90	60 (67)	40 111.1	39.2 66.7
gradients 0.0075 - 0.025																
09.Tad (DI)	Ю-I-Б	Б-II	>80	II	Н	HE3	cotton	О К	0.9 0.62	5261 7680	4735 4762	2419 (31)	66 35.5	30.5 (86)	79.7 216.3	71.7 134.1
gradients 0.0075 - 0.0025																
23.Uz (DI)	Ю-I-Б	Б-III	0.6-3.5	VII	Н	CP3	cotton	О К	0.9 0.46	3120 8320	2808 3827	5200 (62)	26 19.1	6.9 (36)	120 435.6	108 200.4
04.Kaz (DI)	С-II-Б	Б-III	1.5-2.5	V	Н	СЛЗ	cotton	О К	0.95 0.68	4000 7000	3800 4760	3000 (43)	24.5 24.5	0 (0)	163.3 285.7	155.1 194.3
19.Uz (DI)	Ц-I-Б	Г-III	>3	III	Н	СЛЗ	cotton	О К	0.95 0.59	3150 6800	2992 4012	3650 (54)	24.2 19	5.2 (27)	130.2 357.9	123.6 211.3
gradients 0.001 - 0.025																
08.Uz (DI)	Ц-II-А'	Б-IV	1.1-2.0	VI	Н	СЛЗ	cotton	О К	0.98 0.7	3040 5385	2979 3770	2345 (44)	33.8 29	4.8 (13)	90 185.7	88.1 130
09.Uz (DI)	Ю-I-Б	Б-IV	2.9-3.6	II	Н	СЛЗ	cotton	О К	0.98 0.6	3110 6200	3048 3720	3090 (50)	43.8 32.7	11.1 (34)	71 189.6	69.6 113.8

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{gp} [m ³ /ha]	M _{nr} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Water expenses per unit production	
															Expenses gross [m ³ /c]	Expenses net [m ³ /c]
IN-SOIL IRRIGATION																
gradients 0.001 - 0.025																
13.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	O	0.96	4400	4224	1300 (23)	47.3	12.3 (35)	93	89.3
								K	0.74	5700	4218		35		162.8	120.5
14.Uz(ISI)	Ц-II-B	B-IV	3.0-3.5	III	H	CJ3	cotton	O	0.72	4440	3197	1140 (20)	36.6	5.1 (16)	121.3	87.3
								K	0.58	5580	3236		31.5		177.1	102.7
21.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	O	0.87	4840	4211	1200 (20)	44	13 (42)	110	95.7
								K	0.7	6040	4228		31		194.8	136.4
SPRINKLING																
gradients 0.0075 - 0.0025																
11.Uz(SI)	Ц-II-B	B-III	>3	II	H	HE3	cotton	O	0.79	2760	2180	3054 (53)	28.5	3.4 (14)	96.8	76.5
								K	0.56	5814	3256		25.1		231.6	129.7
18.Uz(SI)	Ц-II-B	B-III	>10	III	H	HE3	cotton	O	0.74	5485	4059	2205 (29)	19.3	5 (35)	284.2	210.3
								K	0.55	7690	4230		14.3		537.8	295.8
gradients lower than 0.001																
12.Uz(SI)	Ц-I-B	B-V	1.0-1.5	VI	H	CP3	cotton	O	0.8	4582	3666	-661 (-17)	33	3 (10)	138.8	111.1
								K	0.58	3921	2274		30		130.7	75.8

Explanations:

O- experimental data

K- control data

M_{gp}- irrigation depth "gross-field" within the growing period

M_{nr}- irrigation depth "net-field" within the growing period

Achieved reduction of irrigation water expenses - absolute and relative difference between irrigation depth "gross-field" in control and experiment

Output increment - absolute and relative difference between output achieved in control and experiment

Irrigation water productivity at the field level - "return" by output irrigation water amount in m³ at the field level

ASSESSMENT OF IRRIGATION WATER USE EFFICIENCY

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{op} [m ³ /ha]	M _{HT} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Irrigation water use productivity at the field level	
															experiment and control [kg/m ³]	FAO recommendations [kg/m ³]
FURROW IRRIGATION																
gradients 0.025 - 0.05																
04.Uz (FI)	Ц-II-Б	А-I	>10	I	H	HE3	cotton	O	0.82	6818	5591	2742 (29)	29.5	12.9 (78)	0.433	0.4-0.6
								K	0.51	9560	4876		16.6		0.174	
01.Tad (FI)	Ю-I-Г	Б-I	>20	II	H	HE3	cotton	O	0.70	6480	4536	1080 (14)	36.0	9.7 (37)	0.556	0.4-0.6
								K	0.62	7560	4687		26.3		0.348	
02.Uz (FI)	Ю-I-Г	Б-I	>10	II	P	HE3	cotton	O	0.85	6855	5827	10635 (61)	27.5	12.3 (81)	0.401	0.4-0.6
								K	0.41	17490	7171		15.2		0.087	
06.Tad (FI)	Ц-II-Г	А-I	>20	I	P	HE3	vineyard	O	0.70	8400	5880	9200 (52)	110	45 (69)	1.310	2.0-4.0
								K	0.29	17600	5104		65		0.370	
gradients 0.0075 - 0.025																
02.Tad (FI)	Ю-I-Б	Б-II	>80	II	H	HE3	cotton	O	0.76	9751	7411	3565 (27)	40	6 (18)	0.410	0.4-0.6
								K	0.36	13316	4794		34		0.255	
05.Tad (FI)	Ю-I-Б	Б-II	>30	II	H	HE3	cotton	O	0.69	10800	7452	2160 (17)	31.8	7.7 (32)	0.294	0.4-0.6
								K	0.34	12960	4406		24.1		0.186	
03.Tad (FI)	Ю-I-Г	Г-II	>3	III	H	HE3	cotton	O	0.731	7200	5263	5100 (41)	30.8	3.9 (14)	0.428	0.4-0.6
								K	0.400	12300	4920		26.9		0.219	
04.Tad (FI)	Ю-I-Г	Д-II	>3	III	P	HE3	cotton	O	0.810	6965	5642	3675 (35)	33.6	6.7 (25)	0.482	0.4-0.6
								K	0.565	10640	6012		26.9		0.253	
gradients 0.0025 - 0.0075																
15.Uz (FI)	Ю-I-Б	Б-III	>10	II	У	HE3	cotton	O	0.71	8000	5680	4960 (38)	19.2	6.7 (54)	0.240	0.4-0.6
								K	0.20	12960	2592		12.5		0.096	
02.Kaz (FI)	С-II-Б	Г-III	2,5-	V	H	СЛЗ	maize	O	0.818	6666	5453	1354 (17)	53	0.0 (0)	0.795	0.8-1.6

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{op} [m ³ /ha]	M _{HT} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Irrigation water use productivity at the field level	
															experiment and control [kg/m ³]	FAO recommendations [kg/m ³]
			3,5				/3	K	0.712	8020	5710		53		0.661	
gradients 0.001 - 0.0025																
03.Uz (FI)	Ц-II-A'	A-IV	2.2-3.3	IV	P	HE3	cotton	O	0.65	5608	3645	9188 (62)	21	8.5 (68)	0.375	0.4-0.6
								K	0.20	14796	2959		12.5		0.084	
01.Uz (FI)	Ю-I-B	Б-IV	>10	II	H	HE3	cotton	O	0.61	12636	7708	7164 (36)	25	12.5 (100)	0.198	0.4-0.6
								K	0.20	19800	3960		12.5		0.063	
01.Typ (FI)	Ю-I-A'	Г-IV	1.4-1.7	VII	У	HE3	cotton	O	0.90	6000	5400	1836 (23)	21.8	5.8 (36)	0.363	0.4-0.6
								K	0.74	7836	5799		16		0.204	
gradients lower than 0.001																
16.Uz (FI)	Ц-II-B	B-V	2.0-3.0	V	H	СЛЗ	cotton	O	0.65	5600	3640	5500 (50)	21	6 (40)	0.375	0.4-0.6
								K	0.28	11100	3108		15		0.135	
17.Uz (FI)	Ц-I-A'	B-V	1.4-1.9	VII	У	СЛЗ	cotton	O	0.88	3454	3040	2646 (43)	32.7	6.7 (26)	0.947	0.4-0.6
								K	0.74	6100	4514		26		0.426	
02.Typ (FI)	Ц-I-A'	Г-V	1.5-2.2	VII	H	СЛЗ	cotton	O	0.84	4400	3696	2200 (33)	40	23.5 (142)	0.909	0.4-0.6
								K	0.58	6600	3828		16.5		0.250	
05.Uz (FI)	С-II-A'	Г-V	1.5-3.2	V	У	СРЗ	cotton	O	0.9	2060	1854	310 (13)	19	0 (0)	0.923	0.4-0.6
								K	0.8	2370	1896		19		0.802	
20.Uz (FI)	Ц-I-A	Д-V	2.5-3.0	V	СУ	СИЗ	cotton	O	0.85	3810	3238		23.9		0.627	0.4-0.6
								K								
01.Kaz (FI)	Ц-I-B	Г-V	1.2-1.5	VII	У	СРЗ	lucerne	O	0.741	2330	1726	1170 (33)	152.3	52.3 (52)	6.536	1.5-2.0 (сено)
								K	0.520	3500	1820		100		2.857	
03.Kaz (FI)	С-II-B	Г-V	1.0-2.0	VII	СУ	СРЗ	maize	O	0.719	4800	3451	0 (0)				0.8-1.6
								K	0.633	4800	3038					
DRIP IRRIGATION																
gradients more than 0.05																
06.Uz (DI)	Ц-II-B	A-I'	>40	I	P	HE3	vineyard	O	0.95	6160	5852	990 (14)	186.7	132.9	3.030	2.0-4.0
								K	0.69	7150	4934		53.8	(247)	0.752	
07.Uz (DI)	Ц-II-B	Б-I'	>10	II	H	HE3	vineyard	O	0.95	1875	1781	1135 (38)	95.7	23.8 (33)	5.102	2.0-4.0
								K	0.74	3010	2227		71.9		2.387	
22.Uz (DI)	Ц-II-B	Б-I'	>50	III	H	HE3	vine-	O	0.95	1600	1520	2040 (56)	121.4	36.3 (43)	7.576	2.0-4.0

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{оп} [m ³ /ha]	M _{нт} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Irrigation water use productivity at the field level	
															experiment and control [kg/m ³]	FAO recommendations [kg/m ³]
							yard	K	0.82	3640	2985		85.1		2.336	
08'.Tad (DI)	Ю-II-Д	Б-I'	>20	II	H	HE3	яблони	O K	0.98 0.7	4400 5250	4312 3675	850 (16)	240 150	90 (60)	5.464 2.857	
07.Tad (DI)	Ю-I-Г	Б-I'	>80	II	H	HE3	роме гранате	O K	0.92 0.56	16500 10080	15180 5645	-6420 (-64)	50 37	13 (35)	0.303 0.367	
gradients 0.025 - 0.05																
10.Uz (DI)	Ц-II-Г	A-I	>70	I	H	HE3	cotton	O K	0.95 0.46	6500 12000	6175 5520	5500 (46)	28 17	11 (65)	0.431 0.142	0.4-0.6
08''.Tad (DI)	Ц-II-Г	A-I	>70	I	P	HE3	vineyard	O K	0.98 0.6	6000 10000	5880 6000	4000 (40)	150 90	60 (67)	2.500 0.900	2.0-4.0
gradients 0.0075 - 0.025																
09.Tad (DI)	Ю-I-Б	Б-II	>80	II	H	HE3	cotton	O K	0.9 0.62	5261 7680	4735 4762	2419 (31)	66 35.5	30.5 (86)	1.255 0.462	0.4-0.6
gradients 0.0025 - 0.0075																
23.Uz (DI)	Ю-I-Б	Б-III	0.6-3.5	VII	H	CP3	cotton	O K	0.9 0.46	3120 8320	2808 3827	5200 (62)	26 19.1	6.9 (36)	0.833 0.230	0.4-0.6
04.Kaz (DI)	С-II-Б	Б-III	1.5-2.5	V	H	СЛЗ	cotton	O K	0.95 0.68	4000 7000	3800 4760	3000 (43)	24.5 24.5	0 (0)	0.612 0.350	0.4-0.6
19.Uz (DI)	Ц-I-Б	Г-III	>3	III	H	СЛЗ	cotton	O K	0.95 0.59	3150 6800	2992 4012	3650 (54)	24.2 19	5.2 (27)	0.768 0.279	0.4-0.6
gradients 0.001 - 0.0025																
08.Uz (DI)	Ц-II-A'	Б-IV	1.1-2.0	VI	H	СЛЗ	cotton	O K	0.98 0.7	3040 5385	2979 3770	2345 (44)	33.8 29	4.8 (13)	1.111 0.539	0.4-0.6
09.Uz (DI)	Ю-I-Б	Б-IV	2.9-3.6	II	H	СЛЗ	cotton	O K	0.98 0.6	3110 6200	3048 3720	3090 (50)	43.8 32.7	11.1 (34)	1.408 0.527	0.4-0.6
IN-SOIL IRRIGATION																
gradients 0.001 - 0.0025																

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Data type	Efficiency [%]	M _{gp} [m ³ /ha]	M _{nr} [m ³ /ha]	Achieved reduction of irrigation water expenses [m ³ /ha(%)]	Yield [c/ha]	Output increment [c/ha(%)]	Irrigation water use productivity at the field level	
															experiment and control [kg/m ³]	FAO recommendations [kg/m ³]
13.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	O K	0.96 0.74	4400 5700	4224 4218	1300 (23)	47.3 35	12.3 (35)	1.075 0.614	0.4-0.6
14.Uz(ISI)	Ц-II-B	B-IV	3.0-3.5	III	H	CJ3	cotton	O K	0.72 0.58	4440 5580	3197 3236	1140 (20)	36.6 31.5	5.1 (16)	0.824 0.565	0.4-0.6
21.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	O K	0.87 0.7	4840 6040	4211 4228	1200 (20)	44 31	13 (42)	0.909 0.513	0.4-0.6
SPRINKLING																
gradients 0.0025 - 0.0075																
11.Uz(SI)	Ц-II-B	Б-III	>3	II	H	HE3	cotton	O K	0.79 0.56	2760 5814	2180 3256	3054 (53)	28.5 25.1	3.4 (14)	1.033 0.432	0.4-0.6
18.Uz(SI)	Ц-II-B	Б-III	>10	III	H	HE3	cotton	O K	0.74 0.55	5485 7690	4059 4230	2205 (29)	19.3 14.3	5 (35)	0.352 0.186	0.4-0.6
gradients lower than 0.001																
12.Uz(SI)	Ц-I-B	Б-V	1.0-1.5	VI	H	CP3	cotton	O K	0.8 0.58	4582 3921	3666 2274	-661 (-17)	33 30	3 (10)	0.720 0.765	0.4-0.6

Explanations:

O- experimental data

K- control data

M_{gp} - irrigation depth "gross-field" within the growing period

M_{nr} - irrigation depth "net-field" within the growing period

Achieved reduction of irrigation water expenses - absolute and relative difference between irrigation depth "gross-field" in control and experiment

Output increment - absolute and relative difference between output achieved in control and experiment

Irrigation water productivity at the field level - "return" by output irrigation water amount in m³ at the field level

ASSESSMENT OF ALTERNATIVE WATER SAVING METHODS OF IRRIGATION EFFICIENCY

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Efficiency	Achieved reduction of irrigation water expenses [m ³ /ha ("%")]	Yield [c/ha]	Output increment [c/ha (%)]	Irrigation water use productivity at the field level		annual water expenses (approximate)		Comparative expenses	
												experiment and control [kg/m ³]	FAO recommendations [kg/m ³]	Water saving technology [th.rouble/ha]	Existing furrow irrigation (control) [th.rouble/ha]	Water saving technology [rouble/c]	Existing furrow irrigation (control) [rouble/c]
DRIP IRRIGATION																	
gradients more than 0.05																	
06.Uz (DI)	Ц-II-B	A-I'	>40	I	P	HE3	vineyard	0.95	990 (14)	186.7	132.9 (247)	3.030	2.0-4.0	2.51	2.43	13.4	45.2
07.Uz (DI)	Ц-II-B	Б-I'	>10	II	H	HE3	vineyard	0.95 0.74	1135 (38)	95.7 71.9	23.8 (33)	5.102 2.387	2.0-4.0	1.65	1.6	17.3	22.3
22.Uz (DI)	Ц-II-B	Б-I'	>50	III	H	HE3	vineyard	0.95 0.82	2040 (56)	121.4 85.1	36.3 (43)	7.576 2.336	2.0-4.0	1.6	1.73	13.2	20.3
gradients 0.025 - 0.05																	
10.Uz (DI)	Ц-II-Г	A-I	>70	I	H	HE3	cotton	0.95 0.46	5500 (46)	28 17	11 (65)	0.431 0.142	0.4-0.6	2.58	3.4	92	200.1
gradients 0.0025 - 0.0075																	
23.Uz (DI)	Ю-I-B	Б-III	0.6-3.5	VII	H	CP3	cotton	0.9 0.46	5200 (62)	26 19.1	6.9 (36)	0.833 0.230	0.4-0.6	1.9	2.67	73.1	139.6
19.Uz (DI)	Ц-I-B	Г-III	>3	III	H	СЛЗ	cotton	0.95 0.59	3650 (54)	24.2 19	5.2 (27)	0.768 0.279	0.4-0.6	1.91	2.36	78.8	124.3
gradients 0.001 - 0.0025																	
08.Uz (DI)	Ц-II-A'	Б-IV	1.1-2.0	VI	H	СЛЗ	cotton	0.98 0.7	2345 (44)	33.8 29	4.8 (13)	1.111 0.539	0.4-0.6	1.88	2.08	55.8	71.7
09.Uz (DI)	Ю-I-B	Б-IV	2.9-3.6	II	H	СЛЗ	cotton	0.98 0.6	3090 (50)	43.8 32.7	11.1 (34)	1.408 0.527	0.4-0.6	1.9	2.24	43.3	68.6

Pilot plot index	Soil-climatic zone	Index "gradient-permeability"	Groundwater table [m]	Water allowance region	Compaction degree	Soil salinization degree	Agricultural crop	Efficiency	Achieved reduction of irrigation water expenses [m ³ /ha ("%")]	Yield [c/ha]	Output increment [c/ha (%)]	Irrigation water use productivity at the field level		annual water expenses (approximate)		Comparative expenses	
												experiment and control [kg/m ³]	FAO recommendations [kg/m ³]	Water saving technology [th.rouble/ha]	Existing furrow irrigation (control) [th.rouble/ha]	Water saving technology [rouble/c]	Existing furrow irrigation (control) [rouble/c]
IN-SOIL IRRIGATION																	
gradients 0.001 - 0.0025																	
13.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	0.96 0.74	1300 (23)	47.3 35	12.3 (35)	1.075 0.614	0.4-0.6	2.92	2.14	61.7	61.2
14.Uz(ISI)	Ц-II-B	B-IV	3.0-3.5	III	H	CJ3	cotton	0.72 0.58	1140 (20)	36.6 31.5	5.1 (16)	0.824 0.565	0.4-0.6	2.93	2.12	80	67.3
21.Uz(ISI)	Ц-II-B	B-IV	2.2-2.5	V	H	HE3	cotton	0.87 0.7	1200 (20)	44 31	13 (42)	0.909 0.513	0.4-0.6	3.01	2.21	68.3	71.3
SPRINKLERING																	
gradients 0.0025 - 0.0075																	
11.Uz(SI)	Ц-II-B	B-III	>3	II	H	HE3	cotton	0.79 0.56	3054 (53)	28.5 25.1	3.4 (14)	1.033 0.432	0.4-0.6	2.16	2.16	75.7	86.3
18.Uz(SI)	Ц-II-B	B-III	>10	III	H	HE3	cotton	0.74 0.55	2205 (29)	19.3 14.3	5 (35)	0.352 0.186	0.4-0.6	2.7	2.54	140	177.7
gradients lower than 0.001																	
12.Uz(SI)	Ц-I-B	B-V	1.0-1.5	VI	H	CP3	cotton	0.8 0.58	-661 (- 17)	33 30	3 (10)	0.720 0.765	0.4-0.6	2.52	1.79	76.4	59.6

Note:

Calculation of annual operational expenses for water saving methods in irrigation in comparison with existing furrow irrigation

$$Z = (K / T) + \Theta_3 + (C_B * M_{\text{op}})$$

Data used in calculation are represented in table 04.04. (values of M_{op}) and table 04.06