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Научно-информационный центр
Межгосударственной Координационной
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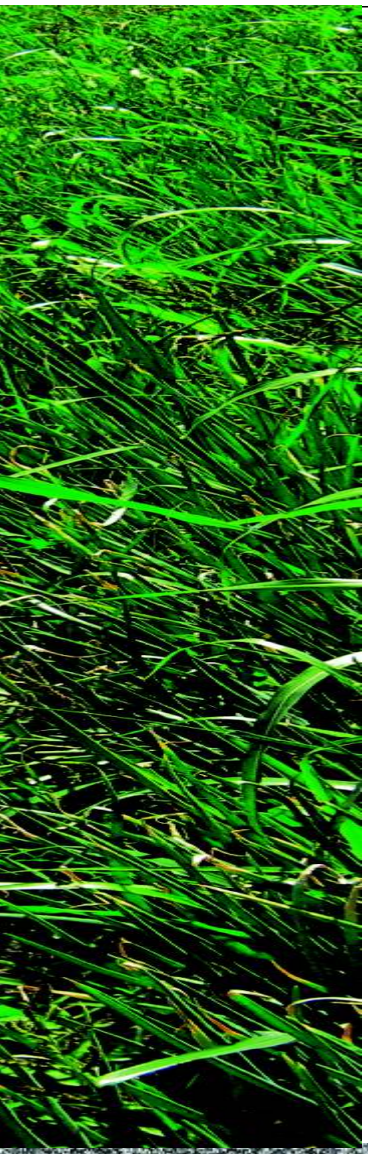
WPI - PL
Water Productivity on Plot Level

IWMI
International
Water Management
Institute



WPI - PL
Water Productivity
Improvement
on Plot Level

Innovative partnership

on the way to water productivity improvement

TASHKENT 2010

INNOVATIVE PARTNERSHIP

ON THE WAY TO WATER PRODUCTIVITY IMPROVEMENT

Tashkent -2010

CONTRIBUTORS:

1	Project Director	Viktor Dukhovny General Project Direction
2	Project Leader from SIC ICWC	Shukhrat Mukhamedjanov, project leading and report writing
3	Project Leader from IWMI	Herath Manthrithilake, general project leading
4	Expert-hydrotechnician from SIC ICWC	Larisa Averina, collection and processing of the source material, report prepararion
5	Manager from IWMI, Expert-hydrotechnician	Jusipbek Kazbekov, collection and processing of the source material, report prepararion
6	GIS expert	Alexandr Platonov, preparation of maps for report
7	Technician	Islom Ruziyev, processing of the source material, participation in writing of part 5.4
8	Technician	Gulom Umirzakov, collection and processing of the source material for report
9	Technician	Rustam Sagdullayev, collection and processing of the source material for report

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ABBREVIATION

ADB	Asian Development Bank
BISA	Basin Irrigation System Authority (in Uzbekistan)
BWMD	Basin Water Management Department (in Osh)
CA	Central Asia
CECI	Centre Canadien d'Etude et de Coopération Internationale
DF	Dehkan Farm
ER	Expected Results
FFS	Farmer Field School
IAC	Irrigation and Agrarian Consulting (in Tajikistan)
IC	Information Center
ICWC	Interstate Commission for Water Coordination
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
IWRM-Fergana	Integrated Water Resources Management Project in Fergana Valley
KRII	Kyrgyz Research Institute for Irrigation
MAWR&PIRK	Ministry of Agriculture, Water Resources and Processing Industry of the Republic of Kyrgyzstan
MAWRRU	Ministry of Agriculture and Water Resources of the Republic of Uzbekistan
MM&WRRT	Ministry of Melioration and Water Resources of the Republic of Tajikistan
MTC	Machinery and Tractor Center
NCSG	National Coordination and Support Group
NM	National Manager
PDMWR	Provincial Department of Melioration and Water Resources (in Sugd)
PO	Public Organization
ProDoc	Project Document
PSC	Project Steering Committee
RAS	Rural Advisory Service
SANIIRI	Central Asian Research Institute for Irrigation
SDC	Swiss Agency for Development and Cooperation
SIC	Scientific Information Center
TAIC/ZOKI	Training, Advisory and Innovations Center
TOT	Training of Trainers
WP	Water Productivity
WPI-PL	Water Productivity Improvement at Plot-Level Project
WUA SRU	WUA Support and Regulation Division
WUA	Water Users Association
WUG	Water Users Group
YPO	Yearly Plan of Operations

INTRODUCTION

A set of organizational-economic, agro technical and irrigating measures directed to get a big yield of crops makes the system of conducting an agricultural production. A regular irrigation takes the predominating place in the agricultural production of an arid zone.

The polls show that the majority of farmers who have come to agriculture from the other spheres of activity, have no sufficient knowledge in the irrigated agriculture, norms and terms of irrigation, they select the scheme of irrigation incorrectly, disregarding the features and conditions of specific fields as well as they conduct the irrigating systems' operation improperly. All of these taken together leads to the unprofitable conducting an agricultural production and unproductive water use.

So, for example, when the parameters of irrigation technique and technology are selected in the wrong way when the land with big slopes is irrigated– the raised dump of water with evacuation of nutritious elements is observed, the irrigated furrows are washed away, the non-qualitative irrigation occurs that lead to the crop's loss and deterioration of the agricultural production conditions. Or another example of irrigation is the irrigation which is made by using the big norms, especially in the conditions of close ground water occurrence, such irrigation leads to the inadmissible ground water rise that is resulted in the water logging and salinity of irrigation areas. Further the use of such land becomes low-profitable, or the land falls out of rotation.

Proceeding from the water saving conditions the "Water Productivity Improvement at Plot Level" project is much close on its orientation and content to the interests of farmers on their efforts to conduct their farms competently and effectively: to keep the soil fertility and improve its productivity, use water rationally, provides the profitability of farms. The task of the given project is, by means of strategic alliances, to bring the techniques, technologies and recommendations, developed by the scientific organizations, to the notice of farmer, and, thereby to increase his/her educational potential in the field of productive water and land use.

Up to now the farmers have solved their problems themselves and have not got used to address to advisory services for assistance. Though in Kyrgyzstan and Tajikistan such organizations are available, but they do not sufficiently proved themselves still, and the advices from the advisory services reach the farmer with great difficult. The basic lack of work of the existing advisory services is that they

offer their services to farmers, disregarding their daily requirements and interests, and are focused on the personal interests.

The project has put the requirement before the advisory services to focus their activities not on the expecting of requests from the farmers to get consultations, but to work on the basis of farmers' involvement and wide circulation of their own offers and effective technologies. Not to wait, when the farmer comes and asks consultations, but it is necessary to go to farmers, study their conditions and offer consultations and improve technologies themselves.

In order to implement the goals of project successfully the main task was put before the executors: to define the basic problems and ways of their decision which will allow to interest farmers and to gain their confidence to the offered technologies and close work with the organizations-distributors.

CHAPTER 1.
ORGANIZATIONAL STRUCTURE AND STRATEGY OF THE PROJECT EXECUTION, LOCATIONS AND INFORMATION ON CONDITIONS

The "Water Productivity Improvement at Plot Level" project performs its activity on the irrigated areas of Fergana valley, including five areas of three states of Kyrgyzstan, Uzbekistan and Tajikistan. In each of them the organizations have been selected as the partners, the activities of which corresponds to three basic directions, viz. scientific research, information centers and distribution. These organizations already have an experience of consultations' providing and also a sufficient technical and organizational-structural potential to adjust the process of transfer of knowledge to the farmers on hydrological and agro technical issues.

National partners and project structure that directed for effective partnership

The national partners have been selected in compliance with the criteria identified during the project formulation workshop held on 18-20 September 2008 and stakeholders' workshop on planning actions held on 19 November 2008. The selected organizations, the activities of which conform to the main three project directions, are represented by scientific organizations, information centers and advisory services (disseminators) that already have experience in consulting, as well as sufficient technical, organizational and structural capacity to process and share knowledge with the farmers. Project activity is implemented in three countries of Fergana Valley: Kyrgyzstan, Uzbekistan and Tajikistan.

18 key partners work within the project framework: 2 major partners in the regional group represented by Association SIC and IWMI and 16 national partners, organizations selected for securing project tasks implementation (See Figure 1).

In Osh City in the premises of Osh BWMD the country office of the project of Kyrgyzstan is located. Training room and the country office of the project on the Republic of Tajikistan are located in Khodjent City in the space provided by the Sogd PDMWR. The country office of the project in the Republic of Uzbekistan is located in the premises of Naryn-Karadarya BISA in Andijan City.

Organizational structure of the project and partners in three countries

In spite of delay with memoranda signing by the ministries, the national partners started their work since March 2009. Some objective delays of organizational character did not allow implementing the planned work, approved in the yearly plan of operations for 2009, at the desired time period and the pace required. But all the team members undertook timely and relevant measures so that it could not impact the general work progress and implementation of the project strategy. In connection with this, we would like to express our gratitude to our partners for their understanding.

In compliance with the proposals of the national partners, regional group jointly with them approved districts, WUAs and demonstration fields (by permission of farmers who agreed to organization of demonstration fields). The total number of demonstration fields is 26 with the following breakdown by countries: Kyrgyzstan – 6, Tajikistan – 5 and Uzbekistan – 15.

In Kyrgyzstan advisory work with farmers and dissemination of advanced technologies is carried out through 13 main trainers or consultants: agrotechnicians of Osh RAS and hydrotechnicians of WUA Support and Regulation Division. These both organizations work in the same districts. Osh RAS, based on its demonstration fields, consults farmers regarding agrotechnical arrangements, WUA Support and Regulation Unit focuses on implementing measurement of water flow in outlets and internal distribution of water between farmers. WUA Support Unit reconciles its advisory activity with that of Osh RAS.

In Tajikistan project activity covers 6 districts of Sogd Oblast, based on advisory services of “Irrigation and Agrarian Consulting” Ltd. and “Zarzamin”Ltd., 8 main trainers and consultants trained within the project framework.

In Uzbekistan the following BISA are selected as dissemination organizations: Syrdarya-Sokh, Naryn-Karadarya and Naryn-Syrdarya, which cover 13 districts of Fergana, Namangan and Andijan Oblasts.

1.1. Strategy of work execution and organizational structure of project.

There are 18 key partners work within the project framework: 2 major partners in the regional group represented by Association SIC and IWMI and 16 national partners, organizations selected for securing project tasks implementation (See Figure 1).

In compliance with the proposals of the national partners, regional group jointly with them approved districts, WUAs and demonstration fields (by permission of farmers who agreed to organization of demonstration fields). Figure 2 shows the map of location of demonstration fields within the framework of Fergana Valley

Project. The total number of demonstration fields is 26 with the following breakdown by countries: Kyrgyzstan – 6, Tajikistan – 5 and Uzbekistan – 15 (see Figure 3).

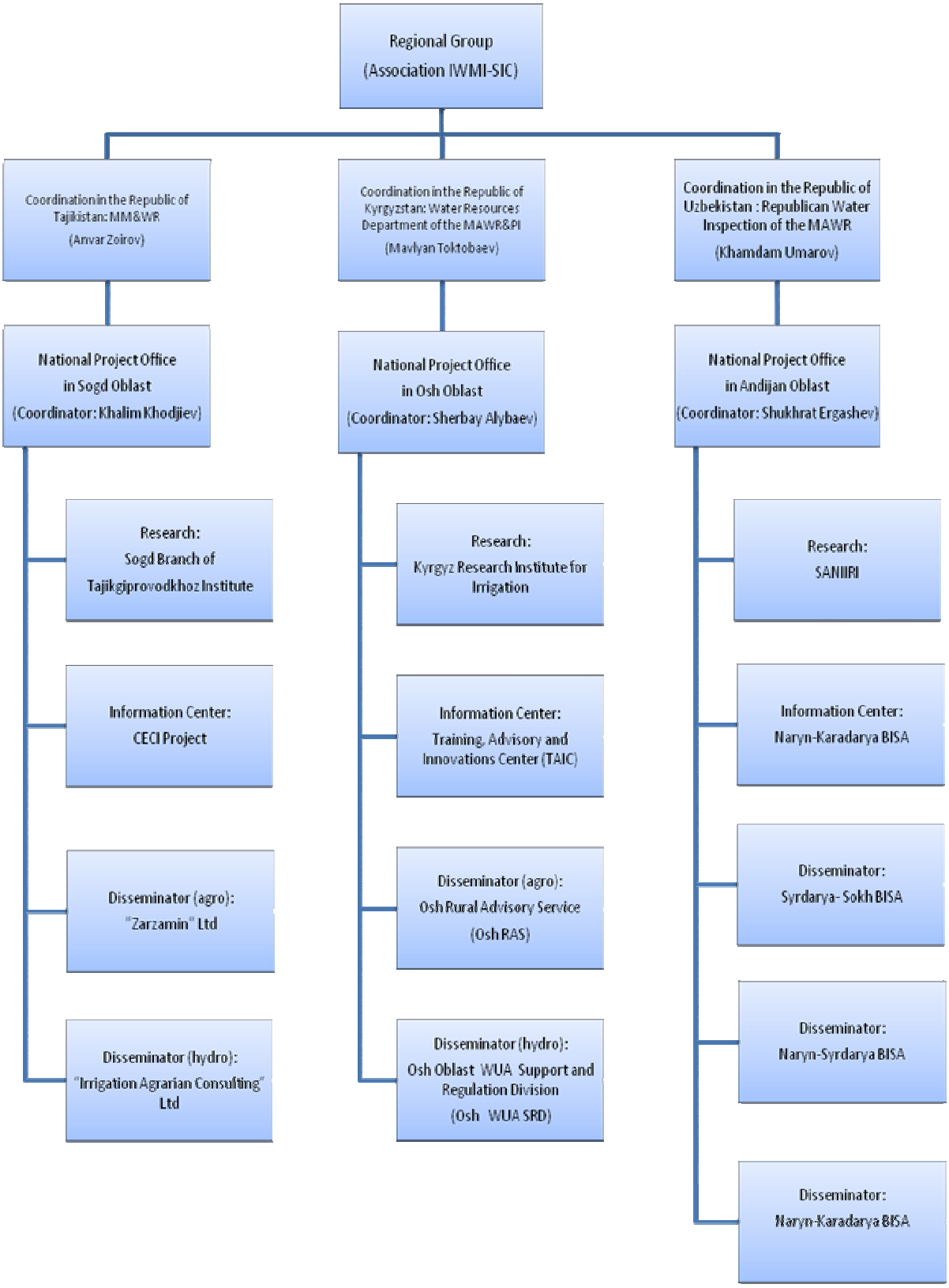


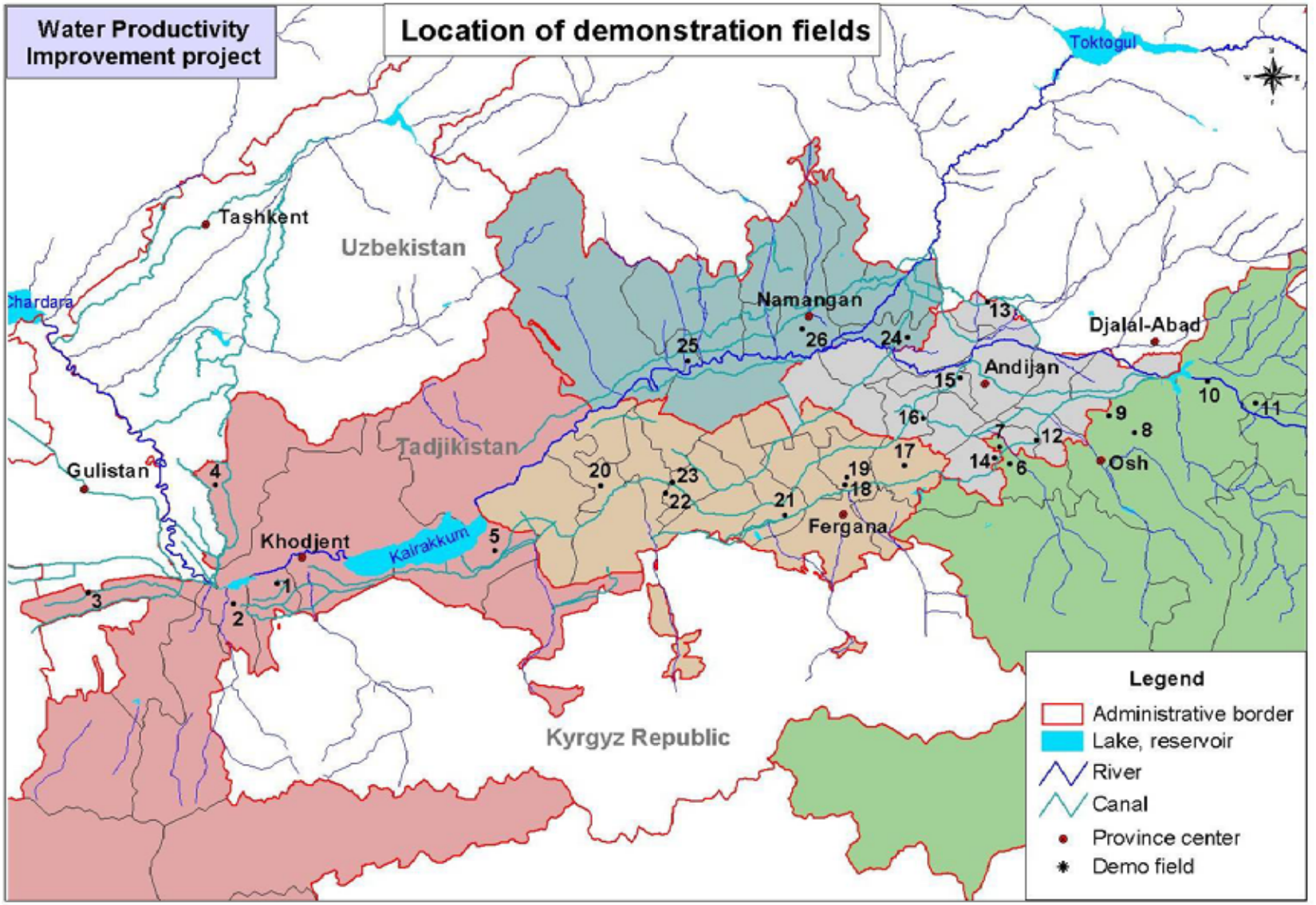
Figure 1. Structure of project organization and partners in the three countries

Figure 2.
Map of location of demonstration fields within Ferghana Valley:

Tajikistan:
1 – Buri Kurmas,
2 – Shark, 3 – Navbahor,
4 – Amakjon,
5 – Khimoyatbonu;

Kyrgyzstan:
6 – Tukhtarov,
7 – Tolobekov,
8 – Absattarov,
9 – Kyrgyzbaeva,
10 – Mamafaliev,
11 – Jusubaliev;

Uzbekistan: 12 – Akiev, 13 – Abdurahmon ota,
14 – Mirzakhmad sahovati,
15 – Baht imkon rivozh,
16 – Dilshoda,
17 – Kahramon davlat,
18 – Ergash ota,
19 – Sobir ota,
20 – Botirjon,
21 – Ortikov,
22 – Kosimov,
23 – Nilu,
24 – Durdona Gayrat,
25 – Omonov,
26 – Nabijon ota



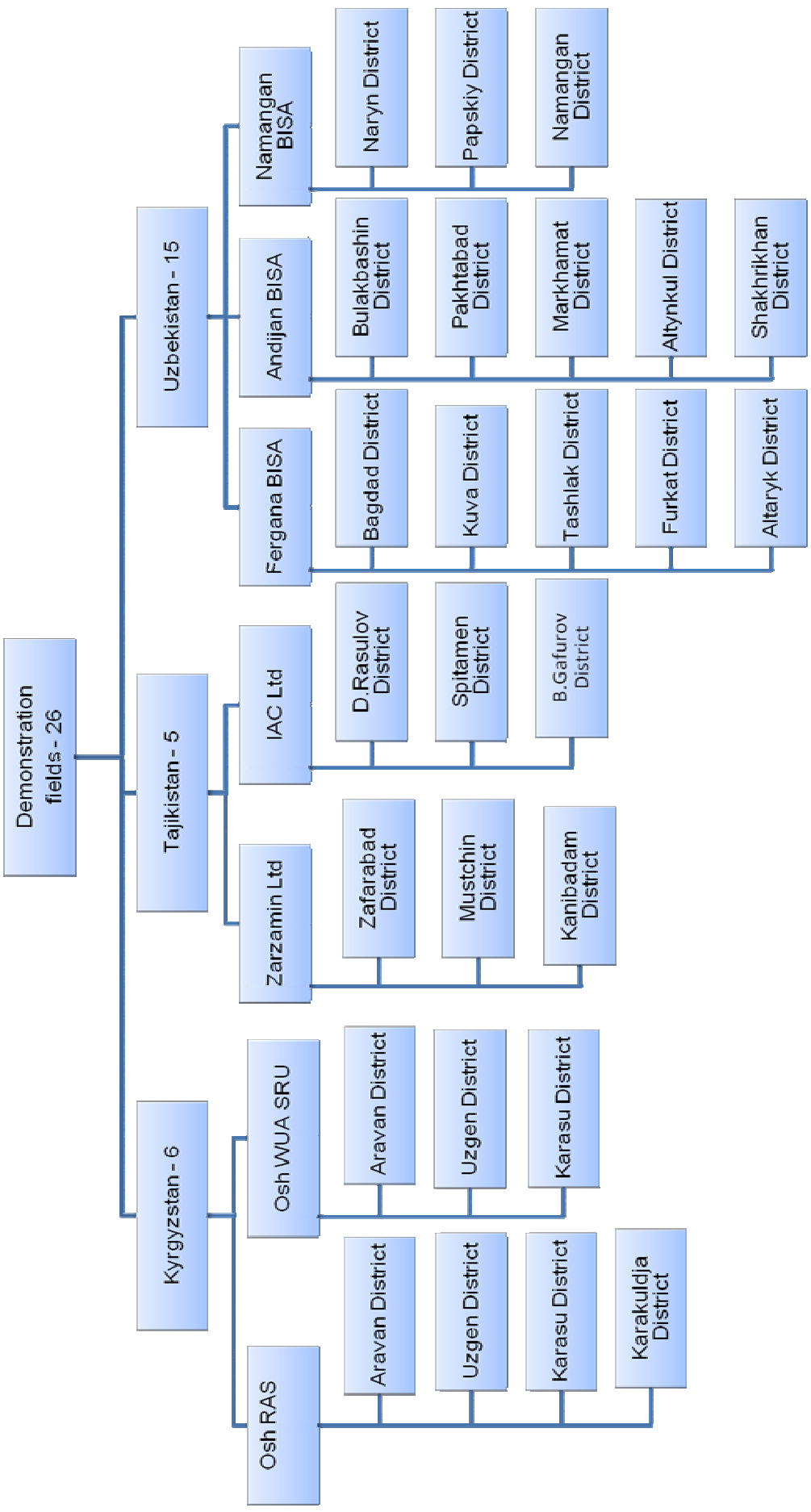


Figure 3: Distribution of demonstration fields by the districts

1.1.1 Strategy of work execution under the project in the Osh area of Kyrgyzstan.

In order to implement the project in Kyrgyzstan four organizations have been selected as the partners being met the requirements of project document which provides interrelation of various departments of an agricultural and water economic complex. The Kyrgyz Scientific-Research Institute of Irrigations, located in Bishkek, has been selected for the search of research materials and development of recommendations on the improved technologies. Two organizations as of Information Centre of CECI, located in Bishkek, that has the provincial office in Osh and the WUA Support and Regulation Unit (WUA SRU) under the Osh BWMD province process the research recommendations to the language understandable for farmer and train the trainees.

The Osh Rural Advisory Service (Osh RAS) and WUA SRU conduct the advisory work with farmers and distribution of the improved technologies through the work of 7 basic trainers-advisers in Aravansky, Karasuysky, Uzgensky and Karakuldjansky districts with coverage of 713 farms on a total area of around of 815 hectares (see Table 1).

Table 1: Data on coverage zone in Kyrgyzstan

Organization	District	Number of farms	The area covered by distribution, ha
Osh RAS WUA SRU	Aravan-1	82	90
	Aravan-2	26	30
	Karasu-1	24	18,5
Osh RAS	Karasu-2	109	107,5
	Uzgen	448	545
	Karakuldja	24	24
	Total across Kyrgyzstan	**713**	**815**

As it is known the farms with small area (up to 1 ha) are mostly in the Osh province. The planning of water use from the WUA side is made only up to the border of the canal from which the water outlets of water users are laid further. Water distributed and the norm fixing inside of each outlet is not made and due to the lack of water measuring devices and hydroposts, the water discharge is not fixed.

Figure 1:

Structural linkages and interrelations of partners in Kyrgyzstan

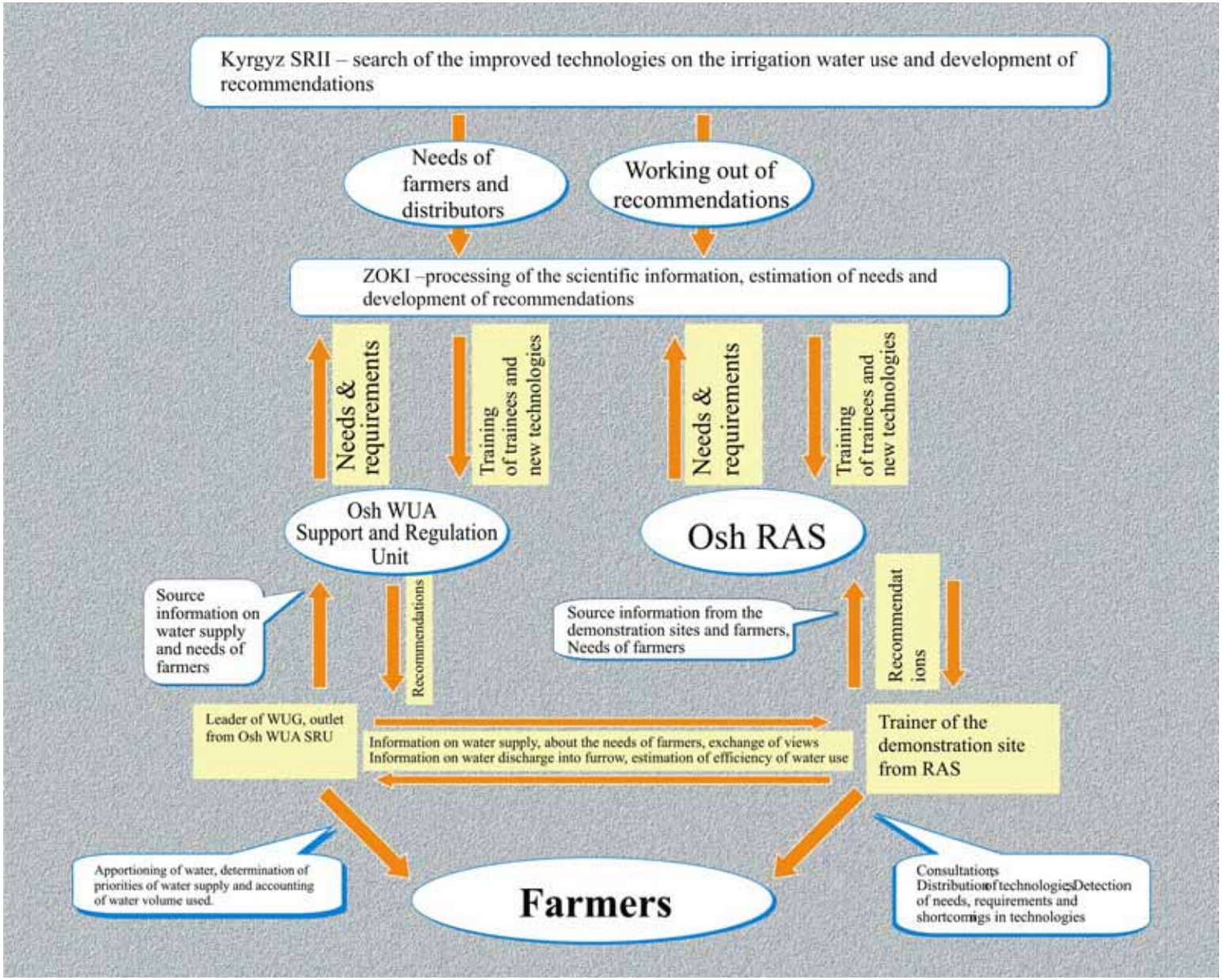
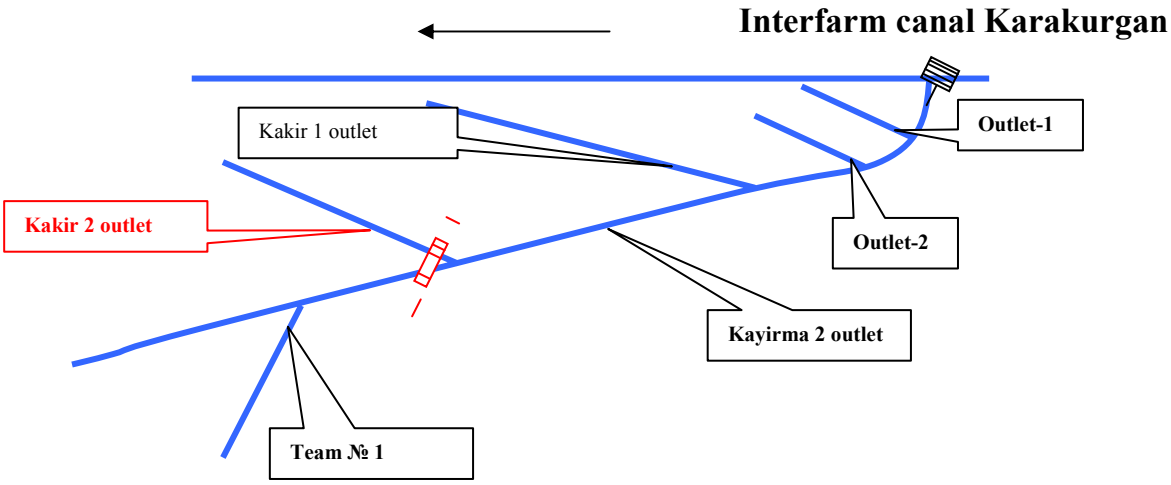


Figure 2: Rectilinear scheme of Kaiyrma canal of "Kyzyr-Abad" WUA in Aravan district



Apportioning of water between the water users has the casual character, each water user uses the irrigation water at his/her own discretion, without any control, without any discipline, the arrangement or sequence. The planning water supply organizations are deprived of possibility to supervise the time and volume of use of water supplied, the water users are deprived of possibility to get timely and the required volume of irrigation water, especially it affects the water users located downstream not only within the canal, but also within outlets.

As a result the conflicts between farmers are solved by nobody, also the Water User Association which is the most lowest level in the general chain of the water economic structure works up to outlet, further, where just the farmers locate, there are no any decisions made, neither organizational, nor engineering issues at this level are considered.

Being based on three-year experience of project in work with farmers of the Osh province, the provincial group has developed the concept and strategy of work with farmers. In 2005, within the framework of IWRM-Fergana project the method on organization of effective water apportioning and irrigation water use in the conditions of Kyrgyzstan has been developed for the farmers located within one outlet (See "The mechanism of effective use of irrigation water in farms with small areas", Sokolok canal is as an example of it). Positive results of the given approach have allowed the provincial group to offer the partners in the Osh province to accept this technique as a basic one and assign the Osh WUA SRU with its introduction.

Since March the WUA SRU in Aravansky, Karasuysky and Uzgensky districts of the Osh province has selected the pilot canals and has organized the water account system on all outlets of the selected canals.

At the meeting of farmers the leaders of outlets have been chosen and assigned, with the consent of all farmers, to account the water on the outlet and its distribution between the farmers (See Table 2). The total interest of farmers in this approach is presented itself in a smaller payment for water, through the transition from the payment per hectare to the payment for water volume used by each farmer.

The whole concept of consultations and distribution of the improved technologies between the farmers is built on it, proceeding from the principle of the less water use, the less payment and the more profit.

Table 2: The information on the pilot canals and the chosen outlets of WUAs in the Aravansky, Karasuysky and Uzgensky districts

Name of WUA	Name of canal and outlet	Canal com-mand irrigated area, ha	Length of canal, km	Conveyance capacity m^3/sec	Num-ber of farmers	name of leader
«Kyzyr-Abad»	**Kayirma canal**	**90**	**3,3**	**0,25**	**82**	
	Kakyr-2 Outlet	17,65	0,8	0,13	29	Sadyrov Kalik
	Kakyr-1 Outlet	31	0,63	0,15	21	Ordobayev R
	Outlet № 1	9	0,54	0,06	12	Kulbekov R
	Outlet № 2	6	0,15	0,03	11	Umatov A
	Team №1	26,4	0,37	0,09	9	Khamidov M
«Maz-Aikal»	**K-6-2**	**107,95**	**1,6**	**0,25**	**109**	
	Outlet № 1	27,7			19	Baimatov N
	Outlet	4,85			5	Satimbayev I

Name of WUA	Name of canal and outlet	Canal com-mand irrigated area, ha	Length of canal, km	Conveyance capacity m^3/sec	Num-ber of farme rs	name of leader
	№ 2					
	Outlet № 3	16,2			18	Omurzakov A
	Outlet № 4	18,9			23	Aidarov A
	Outlet № 5	8,85			9	Bekmuratov T
	Outlet № 6	10,5			11	Sadykov N
	Outlet № 7	5,1			6	Ismailov T
	Outlet № 8	8,85			9	Amirkulov K
	Outlet № 9	7,0			9	Israilov Sh
«Karool-Dostuk»	**Karool-1**	**544,97**	**6,9**	**0,70**	**448**	
	Left Outlet	51,97			62	Mamadaliyev M.
	Uch-kocho	184			145	Eshenkulov C.
	Outlet № 1	92			76	Abdirashitov A
	Outlet № 2	82			68	Chalabayev K
	Outlet №3	135			97	Berdibeckov S

In turn the Osh RAS has organized the demonstration sites on each of the chosen cannels (see Appendix I) to which the trainers-agronomists are fixed and the functions of whom include the work with farmers, demonstration of the improved technologies and close interaction with leaders of outlets. See the location of the demonstration fields within the framework of project on Figure 2.

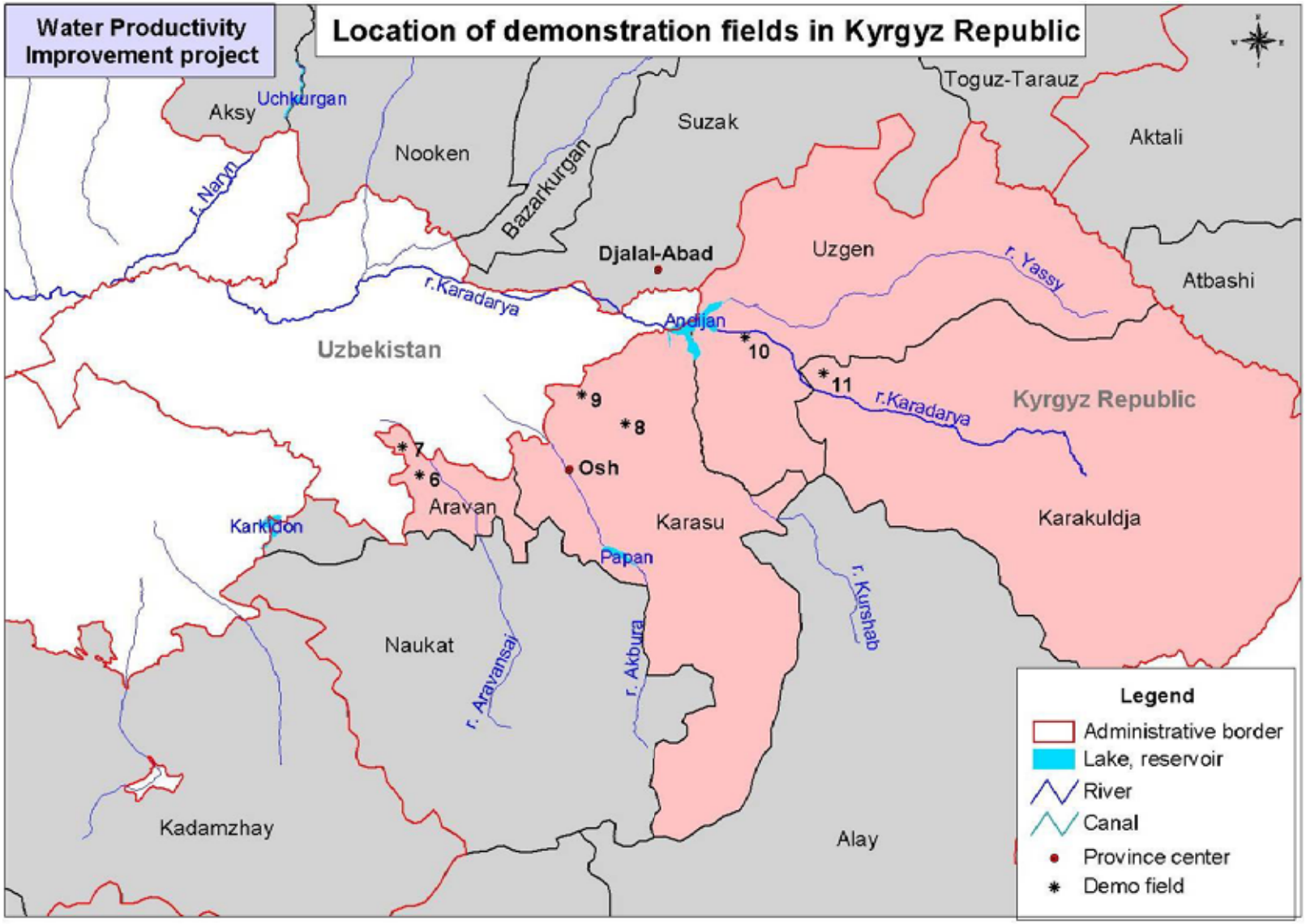
1.1.2 Strategy of work performance in the Fergana, Andijan and Namangan provinces of Uzbekistan within the framework of project.

In Uzbekistan SANIIRI has been chosen as the partner in order to select, work out and simplify the research materials. The functions of Information Centre are carried out by the former provincial experts of IWRM-Fergana project who have worked in the project since 2002 at Andijan BISA. The Basin Irrigation System Authority has been chosen as Syr-Darya-Sokh BISA in the Fergana province, Naryn-Karadarya BISA in the Andijan province and Naryn-Syr-Darya BISA in the Namangan province for distribution of the developed technologies (see Figure 3). The works on distribution of the improved technologies, consultations and training were executed in 13 districts:

Figure 2:

Location of the demonstration fields of districts of the Osh province :

(Aravan 1 – DF 6, Aravan 2 DF 7; Karasu 1 DF 8, Karasu 2 DF 9; Uzgen-10; Karakuldja -DF 11).



- In 5 districts, such as Bulakbashinsky, Marhamatsky, Shahrihansky, Pakhtaabadsky and Oltynkulsky of the Andijan province;
- In 5 districts, such as Tashlaksky, Kuvinsky, Altiariksky, Baghdadsky and Furkatsky of the Fergana province;
- In 3 districts, such as Namangan, Papsky and Naryn of the Namangan province.

Through the training centers of BISA and WUA, which are as the potential farmer schools, trainers-advisers rendered the regular consulting services to the farmers of 155 farms on the total area of 7784 hectares (Table 3).

Table 3: Data on coverage zone in Uzbekistan

Organization	Province	Quantity of farms	Area covered by distribution, ha
Naryn-Karadarja BISA	Andijan province	51	2802,3
Syr-Darya-Sokh BISA	Fergana province	71	3288,9
Naryn-Syr-Darya BISA	Namangan province	33	1693
Total:		**155**	**7784**

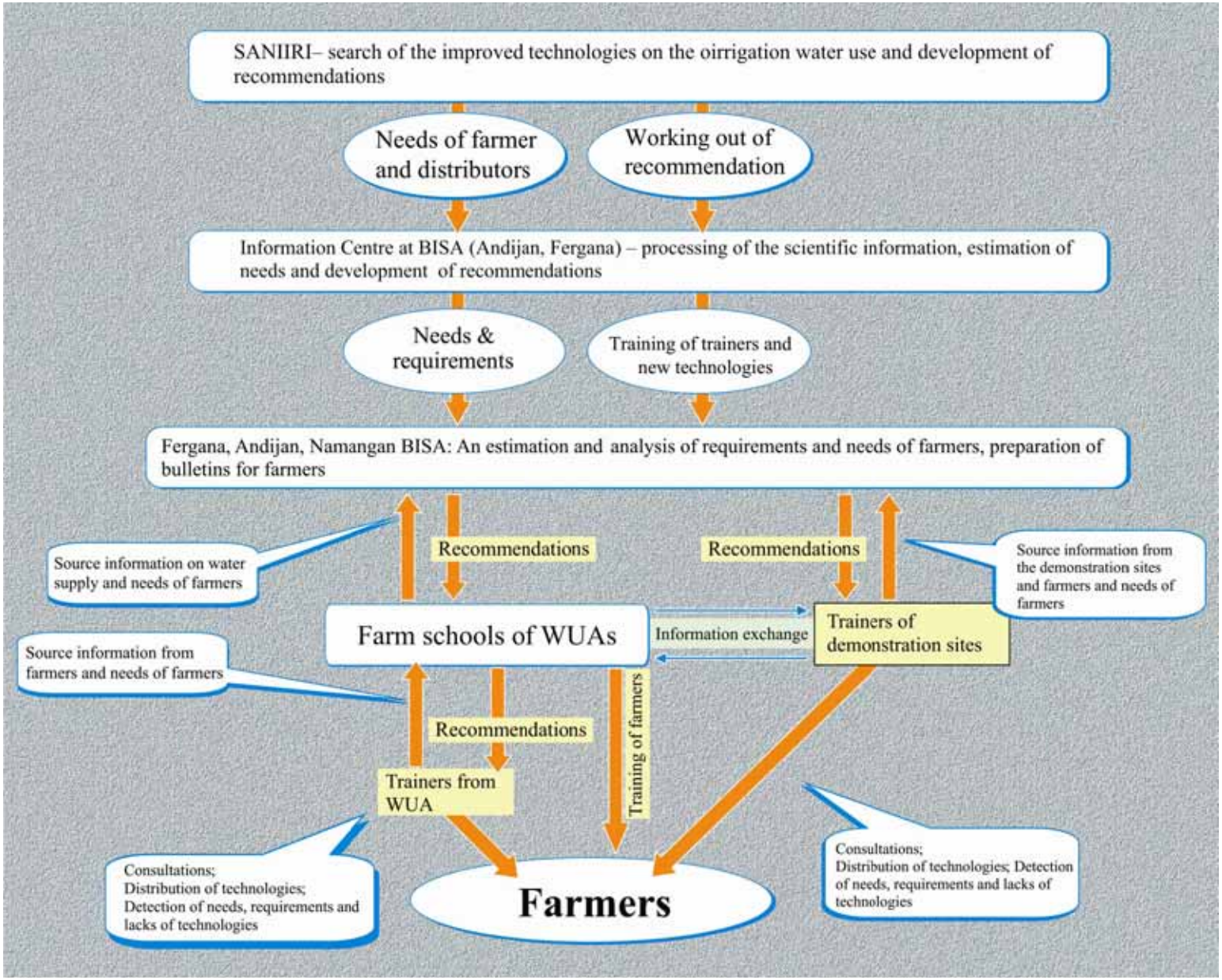
As a whole an execution of the project goals and tasks across Uzbekistan combines the following: in each province the pilot sites are selected 5 districts in the Fergana province, 5 districts in the Andijan one and 3 districts in Namangan one. In each area one WUA is selected and on the territory of which a pilot farm for is selected in order to organize the demonstration field (see Figures 3 and 4; Appendix 1).

One trainer-adviser is assigned for each demonstration field who works both at the demonstration field and with all farmers of the pilot WUA as well. At WUA one expert is selected among the other ones and works with the farmers in close cooperation and trainer of the demonstration field as well as he/she organizes the farmer field school at WUA.

Each trainer carries out the monitoring of farms' fields and he/she as an expert elicits the needs and requirements of farmers and reveals shortcomings and mistakes made by the farmer when irrigation and agro technical activities is performed. Such consultations and work with farmers is based on the experience got by experts of the Information centre in IWRM-Fergana project. Experts of the Information centre train in approaches and the mechanism to carry out monitoring and consultations for the farmers, all trainers of three provinces.

Figure 3:

Structural linkages and interrelations of partners in Uzbekistan



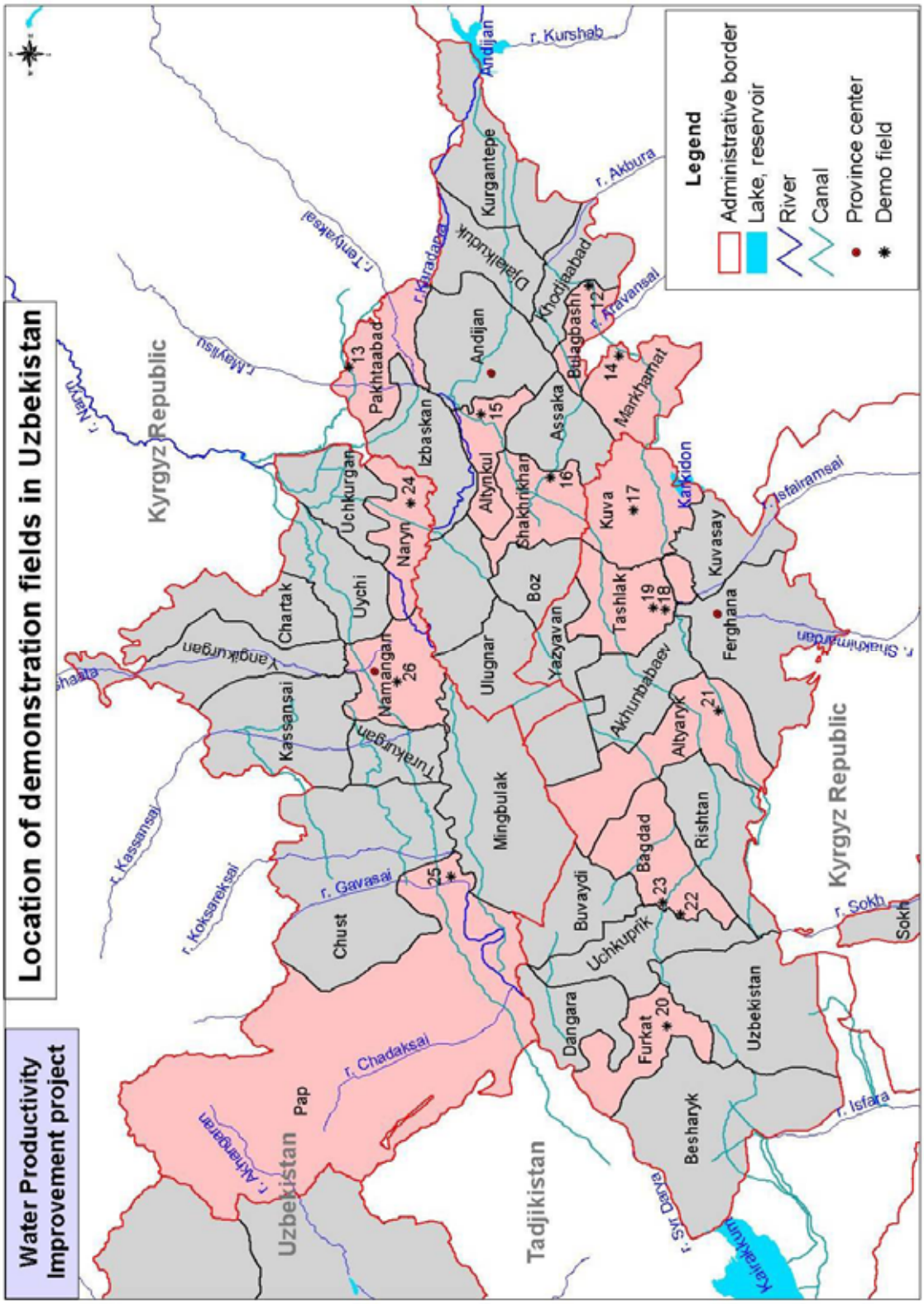


Figure 4:
Location of the demonstration fields of districts of the Andizhan, Fergana and Namangan provinces of Uzbekistan

The main indicator of successful work of each trainer and principle of his/her work is when the farmers search for the adviser in order to get consultation. The trainers define the problems and establish the possible ways of their decision, based on the economic parties of arising problems, interest the farmers in the additional income and increase of profit at the expense of their consultations and offered technologies. The trainers show the best experience either on a demonstration site, or on the advanced farmers, showing in the way of comparison what benefit they will have, if they carry out all necessary standard measures and use the improved technologies. What they have lost or will loose, if they commit one or many mistakes both in irrigation and in agro technical activities from year to year.

1.1.3 Strategy of work performance within the framework of project in the Sogdiysky province of Tajikistan

In Tajikistan 8 trainers-advisers, who have been trained within the framework of project, carried out the activities on distribution of knowledge and experience of works in 6 districts like J. Rasulovsky, Spitamensky, B.Rafuroaskom, Zafarabadsky, Matchinsky and Kanibadamsky of the Sogdiysky province on the basis of existing «Irrigation-Agrarian Consulting» Ltd and "Zarzamin"Ltd consulting services. The Canadian centre CECI carries out the functions of information centre and the Sogdiysky branch "Tajigiprovodkhoz» gives the scientific support.

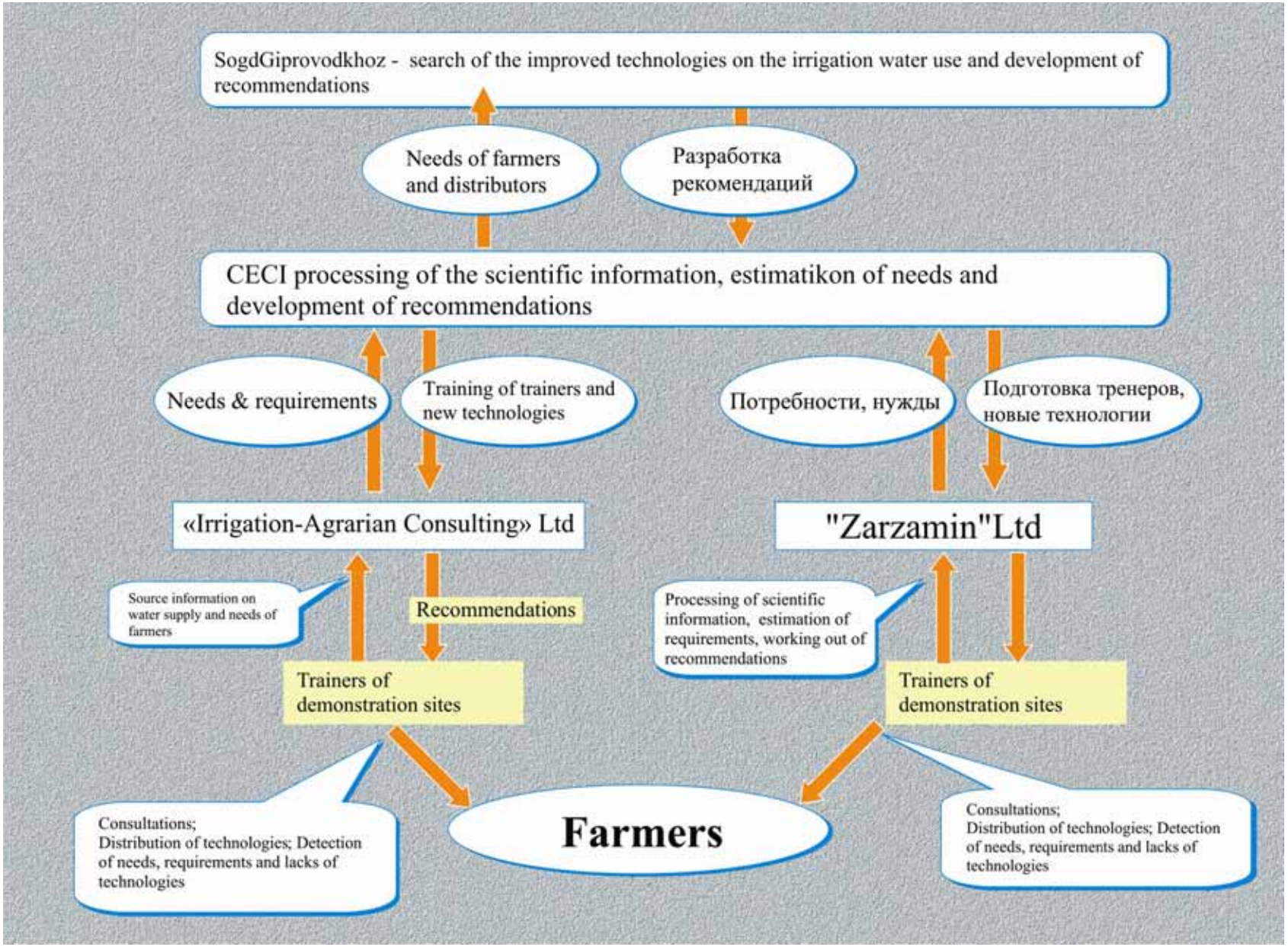
Initially the tasks assigned the project was planned to carry out on the basis of strategy of each organization perfected by it for many years. However in the course of work it was found out that the help of provincial group is necessary to define the strategy met the

needs and requirements of farmers and final goals of the project. Under the proposal of provincial group it has been decided to define the economic bases, allowing to interest farmers in technologies and consultations offered by the project. The provincial group has elicited that the farmers understand **how much the water supplied to them does not meet their requirements**, and **how much the financial expenses are great in total amount of costs for agricultural production**. The reason of these problems is the lack of knowledge among the farmers on norms and the volume of water received that gives an opportunity to the operational services of WUA and Raivodkhoz to exploit it in their own interests.

The decision of this problem consisted only in one matter that it is necessary to develop the mechanism to control the volume of water intake for farmers and to pay only for the water intake. For this purpose first of all it is necessary, that each farmer has the water measuring device on an input in a farm, each farmer is able to measure and calculate the volume of water intake and the farmer should be guided by the volume of water and norms for various crops. These positions have formed a basis of the further strategy of work with farmers. As a result the general execution of the project tasks is summarized as follows: the distribution operation services organize the water account system on the demonstration fields and to all farmers who wish to have it (see Appendix I and IV). On the basis of water measuring devices, which are fixed on their plots, the farmer is trained not only to the water measuring but also its calculation as well as how to conduct the documentation on the water intake from WUA or Raivodkhoz. The Information Centre provides with the materials necessary to carry out the training and together with the scientific research institute prepares the forms to conduct documentation. The Provincial Manager of project, simultaneously as the representative of the Provincial Water Economy Management, provides legality and performance of conducting of water account system by WUA and Raivodkhozes with the farmers and payments on the base of volume of water intake, the statement and legal registration of all documentation of the water account and payment.

Figure 5:

Structural linkages and interrelations of partners in Tajikistan.



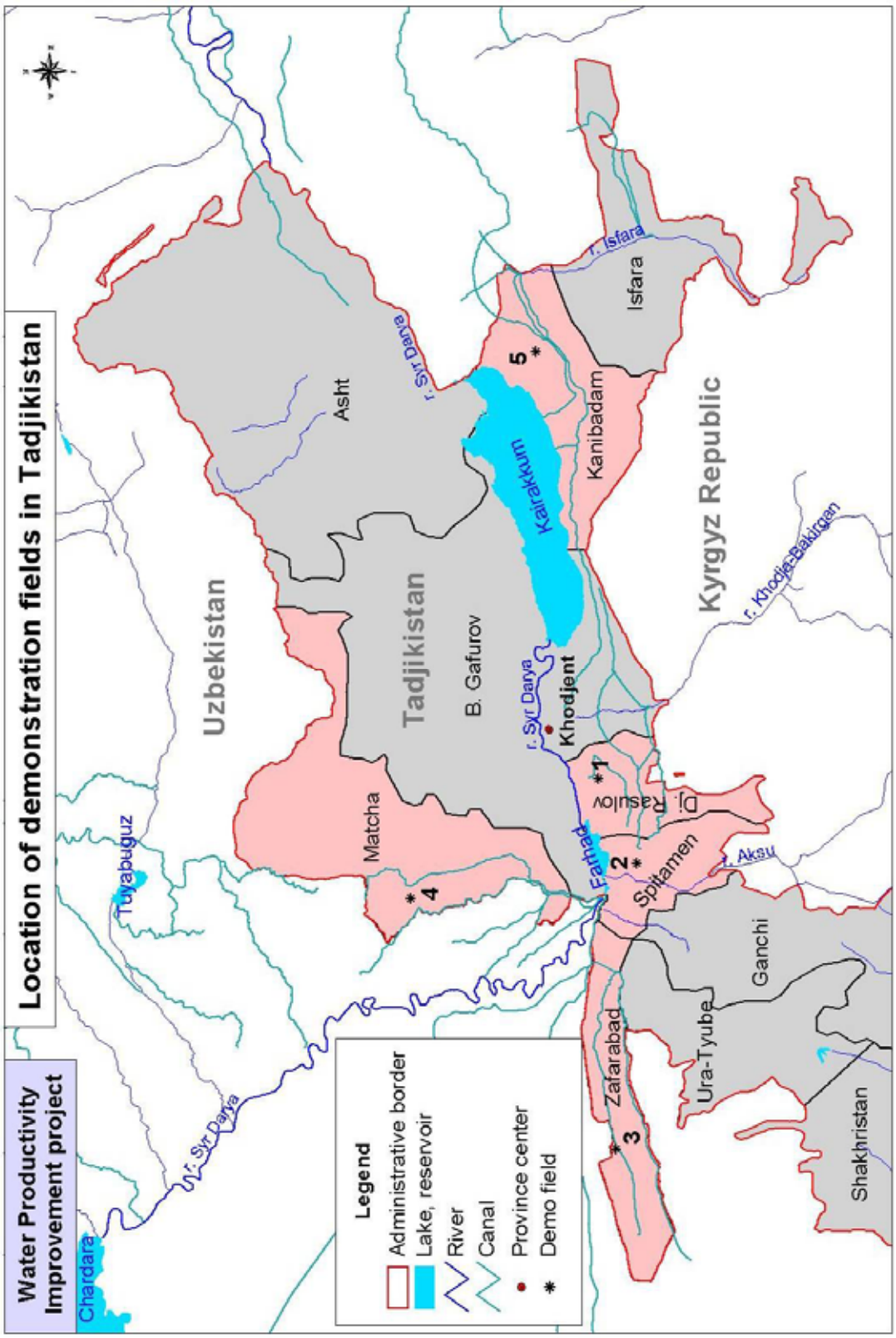


Figure 6:
Location of the demonstration fields of districts of the Sogdiysky province:

(J. Rasulovsky-DF 1, Spitamensky – DF 2, Zafarabadsky-DF 3, Mastchinsky – DF 4, Kanaibadamsky - DF 5)

Creation of the water account system for farmers is the first step in the general strategy. The second step is the continuous activities of distributors and all other participants of project in the work with farmers in order to increase the knowledge of farmers on all matters of irrigation and use of water intake.

Table 4: Coverage zone by the project

Organization	Province	Quantity of farms	Area covered by distribution, ha
«Irrigation-Agrarian Consulting» Ltd	Dj. Rasulov	28	1004
	Spitamen	30	1046
	B. Gafurov	15	866
	Total	**73**	**2916**
"Zarzamin"Ltd	Zafarabad	6	83,2
	Mastcha	5	146,5
	Kanibadam	12	1401,14
	Total	**23**	**1630,84**
Total across Tajikistan:		**96**	**4546,2**

Further, based on the trust got from the farmer to the representatives of project, their knowledge through consultations and training based on **their inquiries** are extended. For today the project covers 96 dekhkan farms on the total area of 4546, 2 hectares.

1.2 Location of project sites on the base of their natural-climatic, ameliorative and water economic conditions.

1.2.1 Characteristics of soil-ameliorative and water economic conditions of project sites in the Osh province of Kyrgyzstan.

Soil-ameliorative conditions of the irrigated land detect a process of irrigation and technology of an irrigation of the grown crops. On the base of geographical mark the Osh area is on the mark of within 500 m above the sea level in Aravansky and Karasuysky districts and to 1100-1600 m. in Uzgensky and Karakuldzhinsky ones. The soil cover on the irrigated land of project is characterized by typical and less often by light grey soils, as for the texture of soil it is mainly average loam soil. The level of ground waters is from 1 to 5 meters (see Table 5).

Table 5: Soil conditions of the Osh province

District	WUA	Above sea level, m	Evaporation m^3/ha	Precipitation, mm	GWL, m	Soil conditions
Aravan-1	«Kyzyr Abad»	700-800	13700	160	> 3	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m
Aravan -2	«Moviy Darye»	500-700	14900	145	2-3 м	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m
Karasu-1	«Mazai Kal»	800-900	12900	170	> 3 м	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m
Karasu -2	«Chomo»	700-800	13700	160	> 3 м	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m
Uzgen	«Karool Dostuk»	900-1100	11750	185	1-2 м	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m
Karakulja	“October	1100-1300	10600	200	> 5	Average loam soil with thickness of pit - run fines of more than 1 m, in some places up to 1 m

The Osh area locates in the south of Kyrgyzstan. The basic agricultural crops grown up in the Osh area are wheat, potato, cotton, corn, tobacco and vegetables. According to the law enforcement agencies of agriculture over 480 registered persons are engaged in farms of the Osh province.

The river Aravan-Say is the basic source of an irrigation of land of the Aravansky district, «Kyzyr-Abad" WUA. For the irrigation of farms the water intakes from the river Aravan-Say by gravity flow through the water intake constructions.

The rive Kurshab-Say and the Otuz Odir main canal are the irrigation sources in the Karasuisky district.

In Uzgensky district there are 3 farm cannels of 36, 74 km and the collector-drainage network is by the length of 12, 14 km. The irrigation system at "Karool-Dostuk" WUA is presented by the cannels like « Karool -1», "Moomun-Ata", "Dosh" and "Myrza". The collector-drainage network is intended for drainage of the land suspended to the "Karool-Dostuk" WUA.

1.2.2 Characteristics of soil-ameliorative and water economic conditions of project sites in the Sogd province of Tajikistan

The Sogdiysky province locates in the middle watercourse of Syr-Darya on the north of Tajikistan. The irrigated land of province basically locates in almost adir (foothill) zone and in the high water bed of Sir-Darya River that has basically caused the soil-ameliorative conditions of province. The absolute marks of the irrigated land are within 300-400 m above the sea level in the lower reaches and up to 600 m in a foothill zone. A soil cover is the average loamy, sandy loam in some places and in the near adir zone it is mostly the stony soil with opened pebbles. The thickness of the integument pit-run fines is more than 1 meter in a flood plain part and to 1 meter in the near adir zone. The level of the ground water is located below 8 meters except for the land of a flood plain part where the level of the ground water rises to 0,5 meters. The basic crops, like cotton, wheat, corn and vegetables are grown up (See Table 6). The irrigation sources in the Sogdiysky province are: VDK in the Mastchinsky district, Oksu River in the Spitamensky district, Khodjabakirgan canal in the J. Rasulovsky district, BFC, Isfara River, KD, pumping wells in the Kanibadamsky district.

Table 6: The soil conditions in the Sugd province

District	WUA	Above sea level, m	Thikness of fertile layer	Type of soil	GWL, m
Spitamensky	It is not established	400	> 1m	Sierozem light, the average light loamy	> 8 m
Dj. Rasulovsky	Madaniyat	300-400	> 0,7-1m	Sierozem light, the average loamy	> 5 m
B. Gafurovsky	Khodja Backirgan	400	> 1m	Sierozem light, the average loamy , non-stony	>5 m
Zafarabadsky	Kanz	400	> 1m	Sandy-loam, stony and light loamy soil	> 5m
Kanibadamsky	It is not established	350	> 0,7-1m	Sierozem light, automorphic	> 5m
Mastchisky	Sierozem light	300	> 0,7-1m	Sierozem light, loamy light salinity	1-2 m

1.2.3 Characteristics of the soil-ameliorative conditions of project sites in the Fergana, Andijan and Namangan provinces of Uzbekistan.

For the most part of Fergana valley in the territory of Uzbekistan it is typical a variety of soil-ameliorative conditions. The soil-ameliorative conditions are chan-

ged with regard of high-rise zones and the irrigation conditions depend on the water economic activities(See Table 7).

In the Fergana province in three of five pilot WUAs the light loamy texture of soil spreads with more or less heavy cover with more than 1 meter integument pit-run fines underlain by pebbles spread. In two WUAs the soils is more permeable and the texture of soil consists of sandy loam and pebbles. In the Andizhan and Namangan provinces the irrigated land of the pilot WUAs consist basically of the average loams with a small layer integument pit-run fines. The level of the ground water lies down on depth from 0.3 and more 1,5 m. The land is basically not salted.

In the Fergana province the Big Fergana Cannel is the basic source of water for irrigation of the Furkatsky and the Baghdad districts and the South Fergana Cannel is for Altyaryksky Tashlaksky Kuvinsky districts.

In the Andijan province Andijansay and the Big Fergana Cannel are the basic sources of water of Altynkulsky district. Mailysay River is the basic source of water of Pahtaabadsky district; the Shahrihansky area intakes water from Shahrihansaya. The basic source of water of Marhamatsky and Bulakbashinsky area is the South Fergana Canal.

Table 7: The soil conditions of the districts in three provinces of Uzbekistan

Province	District	WUA	Texture of soil	Thickness of fertile layer, m	GWL, m
Fergana	Furkatsky	Kukonlik Bustonboy orzusi	Sierozem-meadow heavy and in some places – the average heavy average loamy or light loamy	More 1	1.5 - 2.1
	Altyaryksky	Povulgon obi khayet	Heavy average loamy	0.5 - 2.0	1.3-2.3
	Bagdadsky	Kushtegirmon Hydro technique	Pebbles and loamy sand meadow and in some places – the average heavy light loamy or average loamy	0.3 - 1.0	1.0-5.0
	Kuvinsky	Tolmozor chashmasi	Sierozem – meadow heavy and in some places the average heavy light loamy	More 1	1,5-2,5
	Tashlaksky	K Umarov mirob	The average loamy and in some places – light loamy	0.3-0.5	1.6-2.2
Andijan	Altinkulsky	Zilol Tashkent suvi	Heavy average loamy and in some places light loamy soil	0.6-0.7	1.5-2.0
	Pakhtaabadsky	B. Usmanova	Heavy and average heavy average loamy and in some places heavy loamy	0.6-0.7	More 3
	Shakhrihansky	-	Heavy loamy and in some places – light loamy	0.8 -1.2	More 2
	Markhamatsky	Tomchi kuli	Heavy and average heavy average loamy and in some places – light loamy	0.6 - 0.7	1.5-2.5
	Bulackbashinsky	S. Kasimova	Average heavy and average loamy and in some places –	0.6 - 0.7	1.7-3.0

Province	District	WUA	Texture of soil	Thickness of fertile layer, m	GWL, m
			light loamy		
Namangan	Papsky	SirDaryo orom	Heavy and in some places – average heavy average loamy and in some places – light loamy	-	1.5-3.5
	Narinsky	Uzbekistan	Heavy and in some places – average heavy average loamy average loamy or heavy loamy	0.4 -0.7	1.4-1.6
	Namangansky	Ijodkor	Heavy and in some places – average heavy average loamy or heavy loamy	-	1.5-2,0

In the Namangan province the basic source of water is the Big Namangan Cannel in the «Sirdaryo орoм» WUA of the Papsky district, the Hakkulabadsky main cannel is in the "Uzbekistan" WUA of Naryn province, the Northern-Fergana cannel is in "Izhodkor" WUA of the Namangan province.

CHAPTER 2.
ASSESSMENT OF FARMERS' NEEDS AND REQUIREMENTS AND ANALYSIS ON CONFORMITY PROPOSED TECHNOLOGIES

2.1 - 2.2 Analysis of needs and the requirements by farmers defined at present within the framework of «Water productivity improvement at plot-level» project

As a result of meetings and conversations with farmers along with positive results in farms, lacks in the management of agricultural production and blanks of the hydro engineering and agro ameliorative knowledge have been brought to light, the aforementioned matters impact negatively on the increase of productivity of irrigation water and land, and as result of it, on the low profitableness of farmers.

When the needs and requirements of farmers have been studied the analysis of the received results shows that the situation has developed as follows:

1. The farms do not have sufficient information on the technique elements and technological scheme of irrigation (the lengths of the irrigation furrows are made without regard of biases of fields and water penetration of soils). The skilled irrigators, who well know the characteristic of fields and etc., in many farms are not available permanently. The farmers make irrigation very often on the long furrows. There are no any skilled irrigators in many zones.
2. The farmers, who do not have any idea about irrigation norms, are at a loss in definition of irrigation terms and duration. The farmers use the overestimated irrigation norms when irrigate along with that the big losses on dump and filtration take place.
3. The required volume of irrigation water is inopportunely intake.
4. The farms are not well equipped with water account devices and the payment for irrigation water is made by hectares according to the data fixed by the workers of the district water economy management (in Tajikistan and Kyrgyzstan). Today many farmers already understand the necessity of the water account devices and agree to place them on the farms at their own expenses and train on the matters concerning the organization of water account system in farms.

5. Almost in all farms the plan water use is not available due to this fact the farms do not have any slightest idea about the required water volume.
6. The farmers accept the erroneous technological irrigation schemes.
7. The people of dekhkan farms are not well skilled and operationally experienced on land where ground water lifting is observed.
8. The farms meet with difficulties to determine the norms, kinds and terms of entering the organic and mineral fertilizers, and also in matters of struggle against illnesses and pests of plants. Some agro technical activities are performed out of time and incorrectly.
9. The farmers do not have knowledge of their rights and duties that is especially important at drawing up of contracts with various structures, in particular with WUA and raivodkhoz.

All these problems have been analyzed by experts of the irrigation scientific research institute and trainers of the partner organizations in each country and compared with earlier certain needs and requirements of farmers. The conclusion is drawn and it is found out that the majority of needs and requirements of farmers at present correspond to the early revealed ones within the framework of IWRM-Fergana project. The lack of economic and legal interrelation of WUA with farms, and also the low level of legal literacy of farmers lead to the variety of problems which require consideration and decision-making together with the various organizations and structures, including the state ones.

2.3 - 2.4 Selection of technologies met to the requirements of farmers and prepared for circulation and also require the adaptive research.

The analysis of earlier consulting materials on the signs of practical requirement and inquiries of farmers has been made. As a result the IWRM-Fergana project has given 19 recommendations and technologies to all partners, these materials can be widely circulated and used at the farmers:

1.	Agro technical activity and preparation of land for the irrigation period
2.	Possibilities of land productivity improvement on the basis of agro ameliorative certification of farms**.**
3.	Struggle against illnesses and pests of cotton.
4.	Instruction on carrying out the supervision and measuring of water discharge by means of Chipoletti and Thomson spillways.

5.	Moisture determination of soil. Fixing the terms and norms of irrigation on change.
6.	Mechanism of effective irrigation water use in farms with small areas (Sokolok Canal is as an example of it).
7.	Needs and problems in the farms that impede to water and land productivity improvement
8.	Manual on the selection of water measuring device, the requirements on their building and operation.
9.	Irrigation water requirement of main agricultural crops by the phase of growing.
10.	Use of mineral fertilizers for cotton in the conditions of Fergana valley.
11.	Recommendations about the conclusion of contracts between the farmer and WUA
12.	Manuals on advisory work with farmers.
13.	Manuals on calculation and selection of norms and technique elements of irrigation of cotton and winter wheat on the base of IWRM-Fergana project.
14.	Weed plants and struggle against them.
15.	Recommendations for selection of the technological irrigation scheme.
16.	Farms in Kyrgyz Republic, rights and duties.
17.	Agricultural co-operatives in the Kyrgyz Republic.
18.	What is the irrigation condition of agricultural crops?
19.	Manual on planning and performing the agro technical works at cotton cultivation.

In Kyrgyzstan and Tajikistan as a result of comparison of these technologies with the data of poll of farmers on conducting an agricultural production by them, 17 have been selected from 19 technologies, met the requirements of modern farmers.

The remained 2 technologies (№18 and №19) are necessary to be finished and adapted with regard of local conditions of the Osh and Sogdiysky provinces:

1. Some terms of agricultural crops sowing in irrigation technologies do not correspond to environmental conditions of the Osh and Sogdiysky provinces;
2. The technological map of irrigation considering the conditions of the Andijan province is necessary to adapt to the conditions of the Osh and Sogdiysky provinces.

In Kyrgyzstan the following 10 technologies, selected from 17 technologies, have been finalized with regard of local conditions and they are already accepted and used for training of consultants of the Osh RAS, WUA SRU of the Osh province and farmers. These technologies are also introduced on the demonstration sites for the purpose of further circulation among other farmers:

1. The water account on farms with use of water measuring constructions of SANIIRI, Chipoletti and Thomson.
2. The selection of water measuring devices.
3. The technique of effective irrigation water use in farms with the small areas (a Sokolok technique).
4. Advisory work with farmers.
5. Calculation and selection of norms and technical elements of irrigation.
6. Weed plants and struggle against them.
7. Use of mineral fertilizers under a cotton and others crops.
8. Struggle against illnesses and pests of crops.
9. The irrigation condition of various agricultural crops (for the pilot areas).
10. Fixation of terms and norms of irrigation on the base of soil humidity.
11. Other technologies are analyzed, adapt to local conditions, and it is planned to apply them in a following vegetative period.

Additionally the search of existing research, design and advisory materials of other organizations (KyrgSRI of irrigation, KyrgSRI of agriculture, the Kyrghyz Agrarian University, “Kyrgyzsuudolboor” Design Institute, "Vodavtomatika" Design Institute, Osh RAS) has been performed and the materials, met the needs and requirements of farmers, on irrigation water use are selected:

On the basis of these materials KyrgyzRSRI has developed 6 additional recommendations about the following technologies to be circulated:

1. Manual for self-education on the theme of «Irrigation as the main element of effective regulation of factors of plants’ life».
2. Preparation of an irrigated site to the vegetative irrigation and creation of water saving farm irrigation system.
3. Use of the improved elements of irrigation techniques and technology on furrows and inflow on regulated strips.
4. Use of the improved agro technical measures for soil fertility and water improvement by means of mulching row-spacing.
5. A fertilize irrigation by means of introducing the liquid mineral fertilizers with irrigation water (fertigation).

6. How to define the date of next irrigation and calculate the norm of a vegetative irrigation in the field conditions.

At present the partners of ZOKI has simplified, translated into the Kyrgyz lanuage and give 4 of 10 technologies, accepted by farmers, to trainers for circulation:

1. Water measuring devices, the water account through them, conditions of their building.
2. Hydro modular zoning of the Osh province.
3. Water consumption by the main crops in the conditions of Kyrgyzstan.
4. Selection of technique and technology for the furrow irrigation depending on a slope and area soil.

The information leaflets on the “Water Productivity Improvement on Plot Level” project activity. At present 3 more technologies are prepared in the form of brochures for printing:

1. Fixation of date for the next irrigation in field conditions on the base of average daily water consumption and on the species of plants.
2. Water - physical analysis of soil, determination of soil moisture in the field conditions.
3. Cultivation technology of cotton in the conditions of the Osh province.
4. **In Tajikistan** on the basis of needs and requirements of farmers under the “Water Productivity Improvement at Plot Level” project the Tajikgiprovodkhoz has prepared and given to CECI the following materials in the form of brochures for distribution:
5. The General points on irrigation of the cultivated crops.
6. Recommendations on equipping the demonstration fields of “Navbakhor” of Zafarabadsky province and "Amakchon" of Matchinsky province dekhkan farms with water intake facilities and water account devices.
7. Irrigation techniques improvement and recommendations.
8. Maps of depth occurrence of the ground water level in Matchinsky and Spitamensky provinces.
9. Rules of measuring the water discharge by means of standard spillways (triangular, trapezoid, rectangular and in the chute cannels) and recommendations on the equipping with water distributing facilities for dekhkan farms from the transporting pipelines.
10. Optimization of the saline soil improvement methods (the survey inforation).
11. Some problems and lacks of activities and the way of their solving.

12. Maps of depth occurrence of the ground water level in Zafarabadsky and Kanibadamsky provinces.
13. The scheme of demonstration fields' location.
14. Building of SANIIRI and Chipoletti water measuring constructions (drawings).
15. Recommendations on performance of washing the saline soil.
16. The condition of irrigation of the basic crops on the base of natural and water economic conditions of Sogdiysky province.
17. Mineralization maps of Matchinsky and Spitamensky provinces.
18. Recommendations on carrying out the salt surveying and washings of the saline soil.
19. Checks of the flow meters of variable level.

A workbook and recommendations on the land improvement of the saline soil are being worked out by Tajikgiprovodkhoz. In its turn CECI is considering the requirements of farmers in the field of irrigation water us, have prepared the following materials for distribution:

1. The record-book of irrigation water for dekhkan farm.
2. The Methodical manual on operation and installation of water measuring devices.
3. The condition of irrigation of crops. The water use scheduling.
4. The irrigation technological scheme.
5. What is the field day?
6. Kinds of washing of land and the way of their use.
7. The methods of the irrigation water account.
8. The water -physical analysis of soil for the water-supply calculation in soil.
9. Field works on the water account and registration and calculation in order to determine the water discharge.
10. Payment for the irrigation water intake services.
11. The basic articles of the Water Code of the Republic of Tajikistan.
12. The Structure and tasks of WUA and their mutual relation with dekhkan farm (farm).
13. Water losses in the irrigation canals.
14. The basic articles of the Land Code Water Code of the Republic of Tajikistan
15. The Vertical drainage. Colmatage.

16. Land improvement of the irrigated populated soils.
17. The activities directed to prevent the secondary salinization of soils.
18. The basic articles of the Republic of Tajikistan on dekhkan farm (farm).

6 recommendations in the form of booklets are made up by CECI and translated into Tajik:

1. Cotton pest control (a spider mite, a plant louse and bollworm).
2. Organization and functions of WUA.
3. Use of mineral fertilizers and their impact on soil.
4. Method of cultivation and productivity of crops.
5. Winter wheat cultivation.
6. Ways of reduction of water logging of the irrigated land.

In **Uzbekistan** 17 technologies have practically been selected out of 19 ones from the IWRM-Fergana project and can be used for distribution and introduction for the purpose of irrigation water use improvement and increase the crops' yield productivity. In addition to them SANIIRI has prepared «Recommendations on an optimum combination of technique elements of irrigation by furrows for the various conditions of Fergana valley» for distribution, in which the various ways of methods and technologies of crops irrigation are considered, including:

- The permanent discharge of irrigation stream into furrow;
- A many-tier way of irrigation;
- Variable irrigation stream to furrows;
- Faltering irrigation stream (discrete irrigation);
- Furrow irrigation on the horizontal-planned sites;
- Technique elements of the furrow irrigation on abrupt slopes;
- Technique elements of irrigation through a furrow.

Thus all sections of recommendations are accompanied by tables, where the basic criteria and indicators (water penetration of soils, length of a furrow, discharge into a furrow, time of a lag and water supply as well as gross and net irrigation norm, etc.), the recommendations on technique elements of irrigation, including the calculation data on duration of evacuation of the cumulative layer of moisture, and also the general duration of absorption at various irrigation technologies are given.

These recommendations are given to the Information Centre for the distribution and introduction in the farms of Fergana valley for the water use efficiency and moisture productivity improvement at plot level. The Information Centre together with the project partners – trainers-distributors from BISA was studied the given "Recommendations" in details and has come to conclusion that the given material is more expected for the scientific employees, it should be simplified as much as possible to the level of farmer's understanding, and only after that it can be used for distribution. Also the experts of Information Centre have thought inexpedient the use of recommendations on the optimum technique elements of irrigation for the large mechanized farms, irrigation on horizontally planned sites, discrete irrigation and variable irrigation stream to furrows, they are nowhere applied in Fergana valley so far.

- At present SANIIRI has processed the given document and presented it to the Information Centre in the form of 4 separate recommendations:
- Recommendations on an optimum combination of technique elements of irrigation by furrows for the various conditions of Fergana valley.
- Recommendations on the selection of techniques elements of furrow irrigation, providing high efficiency.
- Recommendations on the condition of irrigation of winter wheat depending on a depth occurrence of the ground water level and texture of soil.
- Recommendations on washings the saline soils.

The Information Centre together with the project partners, using the materials which have been collected by the IWRM-Fergana project, regularly, practically 2 times a month issues the bulletins and recommendations on carrying out the agro technical activities and technologies on cultivation of crops taking into account the terms, and also agro meteorological features of the winter, spring and summer periods of year. For the current year the Information Centre has prepared 3030 brochures, 21 bulletins and 8 recommendations in Uzbek for distribution among the farmers.

CHAPTER 3.
TRAINING, DISSEMINATION AND ADVISORY ACTIVITIES

3.1 General strategy of carrying out the consultations, approaches on the organization of advisory service and vision of farmer schools.

One of the important and complicated matters in distribution of improved technologies is the work with users of these technologies, i.e. farmers. How much the farmer will apprehend the offered advices, so the success of the undertaken by distributors activities depends. From this point of view it is very important to choose the correct strategy of activities and approaches in order to extend the knowledge of farmers on the basis of a permanent information transfer and carrying out the consultations concerning the effective technologies in agricultural production. Prior to develop the correct strategy of activities it is necessary to determine a number of matters which are basic ones in the decision of the given task and the required condition when the development of approaches for work with farmers is made up:

1. Whether the consultation and knowledge are necessary to the farmer?
2. What is necessary for the farmer in the form of consultations and knowledge?
3. How is it convenient to the farmer to get these consultations and knowledge?
4. Through whom and where is it convenient and desirable to get consultations and knowledge to the farmer?
5. Whether the farmer will manage to use the consultations and knowledge got?
6. What is it necessary to make, that the farmer wants and manages to use the consultations and knowledge got?
7. What is it necessary to make, that the farmer has the possibility to strengthen his knowledge and consultations permanently and extend them?
8. Who should give consultations and knowledge and train the farmer?
9. How often should the farmer get consultations and knowledge?
10. When should the farmer get consultations and knowledge?

Only when we have the full answer to all these questions, only then we can develop approaches on advisory work with farmers and organize the training farmer schools or field schools.

What do we have for today under our conditions in the project cover zone? As a matter of experience and results of the work done in IWRM-Fergana project on the activity of "Water productivity improvement at plot level" it is safe to say that the consultations and knowledge are necessary for farmers. The farmers are in need of knowledge and consultations on all the matters concerning the agricultural production, both economic and legal points, and, certainly, agronomical and irrigation issues are interconnected, and ones depend on another ones. It is very important to find the priority problems in each specific case, the one that is most of all interesting for the farmer and the main thing is to find and connect a chain of these problems to those ones that are directly connected with land and water productivity as the basic indicators of agricultural production.

In order the farmer apprehends something it is necessary to give both consultations and knowledge for the farmer without any even the smallest hint of compulsion. It is necessary to reach the farmer at first that means that it is necessary to work with the farmer in the fields, on his/her field. It is necessary to do the utmost to get the confidence of the farmer, to be friends with the farmer; the farmer should see the friend in each of us, the entrusted person, whose words are justified. Only when we find the sick points of the farmer if we manage to gain his/her trust, only then we can speak about schools for training. Heretofore, how many times we try nothing will be expected to be done good from the field or farmer schools.

The process of schools' organization is long and very difficult and if someone organizes the farmer schools for the sake of reporting or for any project, it is possible to consider this process as of failure variant. It is impossible to tell with certainty now, where and what way of the farmer schools' organization is the correct. In any case this will be a way of tests and errors and the most important thing is necessary to understand that the organization and establishment of farmer schools is not end in itself. It is only one of the mechanisms to extend the knowledge of farmers. Anyhow, no need to exclude this variant to extend the knowledge of farmers. Anyway, there are certain preconditions to establish the farmer schools:

- Specialization of many farmers is far from the agricultural production, and it means that it is necessary for them to study in one way or another;
- There are many general issues, interesting for farmers, and which are necessary to be known by all farmers in order to improve the productivity with less expenses, and it means that it is possible to get together them and train.

Where and who should conduct the training and consultations? The experience of 2009 has shown that the farmer schools as well as the advisory services should be organized there where farmers come for the decision of their daily problems more often. Therefore it would be more logical to speak at first about where and in what kind it is necessary to organize the advisory services and the farmer schools attached to which should exist as one of the mechanisms of consultations and training.

Today the farmers, anyway, come to the Water Use Association more often once a week there where this structure works. In Uzbekistan and in Tajikistan the WUAs organization has irreversible process even if in future it will be reorganized, the structure on distribution of irrigation water will exist. The advisory service and farmer schools it is logical to organize at WUAs also for the reason that only here there are qualified experts of hydro – technicians who should bring the irrigation water to each farmer and it obliges them already to study the requirements of farmers, their soil-ameliorative conditions, composition and structure of cultivated crops and, certainly, they are interested in the profit of the farmer being solvent. Therefore it is very important to have not only hydro technician, but also the agronomist at WUA.

The project has already taken the first step in this direction and the pilot WUAs have employed 2 agronomists by one to each in 2009. It is necessary to base on the management system of the former collective farms where all the processes of agricultural production were managed basically by agronomist and hydro technician. At WUA which has the same area, as the former collective farms, the agronomist and the hydro technician will not manage so much but advise how to

manage the agricultural production in optimal and effective way. Just these two experts should me the key specialists – consultants for farmers and WUA.

At WUA the premise for experts and a room for training are accommodated where the farmers if necessary can address. Schools for training of farmers can and will operate, when the farmers have the need in it. If during the work with farmers the issues, infringing the interests of the majority of farmers, are defined and if farmers agree to gather in WUA it is possible to conduct a training lesson. But besides, the farmer is very easy to be frightened off, if themes are imposed, if they do not meet the specific problems of farmers, the farmers will not come to this school more than one. It is possible to gather in the field and conduct the training in the field of one of the farmers either with big, obviously visible problems, or at the farmer with good results on use of improved technologies or to conduct the field training for the small groups on the location of farms.

Thus, **our vision on the organization of farmer schools** consists in the following:

1. Farmer schools should compound the advisory service and serve as one of mechanisms of distribution of innovative technologies and training;
2. Farmer schools should be organized in structures, which are closely located to farmers and where farmers address on agricultural production matters more often. In all three countries such structure is WUA.

3. Farmer schools attached to advisory services should be organized in each WUA;
4. The training can be conducted both in the field and in WUA;
5. Experts of WUA – the hydro technician and the agronomist (in the future this staff should include the lawyer, the economist and the entomologist) should serve as the basic and key trainers-advisers;
6. These experts are engaged in advisory activity and permanently work with farmers and simultaneously they are trainers of the farmer schools;
7. Experts advisers and trainers should work in the interests of farmer; their major principle is to protect the interests of farmer;
8. When it is necessary experts from other organizations are involved to highlight the specific issues that are interesting to farmers or more detailed consideration of them.
9. For descriptive reasons the demonstration site is organized on the territory of WUA which can serve as field range for farmers;
10. Premises of farmer schools (as well as advisory services) should be equipped with the demonstration posters, bulletins, brochures.

3.2. Strategy of carrying out the training within the framework of WPI- PL project.

3.2.1 Strategy and methods of carrying out the trainings for trainees and farmers within the framework of WPI- PL project in Kyrgyzstan, results and their estimation

Strategy and technique of carrying out the trainings for partners-trainers (whom, when, where, how many and by what method to train) have been defined by the Information centre of CECI:

- Together with heads and executors of the partner organizations the quantitative structure of trainers is defined these are provincial advisers of Osh RAS – 7 persons, experts of the provincial department of support and regulation of WUA and co-coordinators of the provincial WUASRU - 6 persons. Demo farmer has been appointed on each demonstration site as an observer.
- Further the terms and dates of trainings are defined – the trainings are conducted once a month. In the end of each training the subjects and date of the following training (on the base of inquiries and requirements of trainers and farmers) was defined. Within a month a trainer of CECI prepared for the

following training, and advisers of Osh RAS and WUASRU conduct the training of farmers in the demonstration fields, using the skills, knowledge and materials got from the trainers of CECI.

- The theoretical part of trainings were conducted in the Osh RAS, the practical training is in the demonstration fields. The Osh RAS provided with all necessary equipment (a projector, the computer, the screen, a marker board, etc.) and available methodical materials if necessary.
- During the trainings the materials and technologies (17 technologies) prepared during the first phase of IWRM-Fergana, the scientific materials of the Kyrgyz scientific research institute of irrigation and the Kyrgyz Agrarian University, teaching materials of CECI are used. During the training the participants get the distributing materials, brochures and leaflets. The partners have got more than 1000 brochures, manuals (40 titles), issued by CECI on various technologies and agricultural subjects.
- The following methods of training were applied to conduct the trainings: mini lecture, presentation, discussion, brain storm and work in groups. 40-50 % of all the training time is practice in the field (use of water measuring constructions, definition of water penetration of soil, a selection of length of a furrow and the water discharge into furrows, introduction of a "Sokolok" method and etc.).
- The head of Osh RAS has spoken on the local TV and highlighted the “Water productivity improvement at plot level” project purposes and tasks.
- When the knowledge transfer to trainers and farmers we adhered to the strategy to conduct the trainings accepted in the project. The list of trainings conducted by the Kirghiz National Group for trainers-distributors and farmers during the current year on November 1, 2009, is resulted in Appenix II.

On December 22-23, 2009 at the initiative of CECI 2-days seminar-training is planned on the discussion of the fulfillment of work schedule for 2009, activity of each partner, successes and lacks.

Reports-protocols of all conducted trainings are applied to the annual report of Kyrgyzstan.

Data on the total quantity of the conducted trainings within the framework of WPI-PL project are shown in Table 8.

Table 8: Total number of the conducted trainings in Kyrgyzstan

Organizer of training	Number of trainings	Number of participants, person	Number of dissemination materials	For whom the training was conducted
CECI	5	35		Trainers
Osh WUASRU	3	93		Farmers
Osh RAS	6	162		Farmers
Total	**14**	**290**	**1000 brochures and bulletins**	

3.2.2 Strategy of carrying out the trainings for trainees and farmers within the project framework in Tajikistan, results and their estimation.

For the decision of the project tasks on extension of knowledge and providing the advisory services a selection of advisers and trainers who have a direct communication with farmers and responsible to carry out the direct work with farmers has been made. Together with heads and executors of the partner organizations the approaches and strategy of knowledge and necessary information for transfer to trainers and farmers have been defined:

- 10 trainers for service of 96 farms have been selected. 14-15 farms, the served area on 450-530 hectares are fixed to each trainer.
- Each trainer a month meet farmers with periodicity 2-3 times, finds out their needs and requirements, carries out individual consultations on all matters of agro-hydro technologies. In a case of arising of general issues the trainer collects all farmers and conducts the training seminars (group consultation) at farmer schools.
- For the decision of individual questions the trainers get in touch with Information Centre (CECI) and Giprovodkhoz, the materials got from them in the form of newsletters bring to the notice of farmers, so the a feedback is carried out in this way.
- For the purpose of quick information transfer about the recommended agro-hydro technologies to farmers in the J. Rasulovsky province, the heading under the name of «Recommendations to farmers»is created in the local «Proletar of Tonga» newspaper where on the 1st and 15th day of each month the recommendations and advices about cultivation of agricultural crops are published and references are given where it is possible to address for the additional information. In preparation of recommendations to the farmers published in the newspaper, the experts of the provincial agricultural

management, skilled dekhkans (aksakals) as well as experts of Irrigational Agrarian Consulting are involved.

The basic methods of advisory work applied directly in the farms, are as follows:

- Visual monitoring of fields of farms on the use of irrigation water and agro technical activities;
- Poll of farmers on-site about their needs and requirements and transfer this information to Giprovodkhoz and CECI for processing and specification, and also an estimation of satisfaction of farmers by the received results;
- An estimation of plants' condition;
- Recommendations on elimination of lacks of technology;
- Consultations and offers on cimproving the used technologies based on knowledge, received by trainers at the training;

The results of carrying out the monitoring of farms and poll of farmers are entered into the «Journals of consultations» that are specially developed within the framework of project (see Appendix III).

The Trainers of the «Irrigational Agrarian Consulting» Ltd. and «Zarzamin"Ltd. have taken part in 9 trainings organized by the Information Centre – CECI. On the basis of knowledge received on the trainings the training seminars with farmers of Spitamensky, B.Gafurovsky and Djb.Rasulovsky, Matchinsky, Zafarabadsky and Kanibadamsky provinces were held. In Appendix II the schedule of all conducted trainings is presented.

Table 9: Total quantity of the conducted trainings in Tajikistan

Organizer of training	Quantity of training pc	Quantity of participants person	For whom the training was conducted
CECI	9	90	Trainers & Farmers
IAC	8	555	Farmers
Zarzamin	9	244	Farmers
Total across Tajikistan	**26**	**889**	

Today as a result of carrying out the advisory work with farmers it can be considered that fact that the **farmer have actually realized the necessity to organize the water account system** having felt a considerable economic benefit from the measurement of actual water volume of which on 1/3, and sometimes 1/2 varied from the volume for which the farmer paid to WUA or rayvodkhoz. And as a result it became:

- The inquiry on building of 53 hydro posts (see Appendix IV), and not only on the demonstration fields, but also on the sites close to them, and not violently, but at the desire of farmers for their own account. Though there were the technical deviations in certain cases when building of water measuring devices (in particular, the location has not been correctly selected and the height of threshold of hydropost has not been observed, these facts have been specified by experts hydro technicians) which were necessary to eliminate in order to certify ГП in future.
- The development and introduction of the certificate of acceptance-transfer of irrigation water from rayvodkhoz/WUA to the farmer and contracts on behalf of farmers on water intake and its payment on actual received water volume (in the Tajik language).

3.2.3 Strategy of carrying out the trainings for trainees and farmers within the framework of WPI- PL project in Uzbekistan and results and their estimation

Unlike Kyrgyzstan and Tajikistan, in Uzbekistan there are no advisory services, therefore the strategy of carrying out the training among farmers has been decided to build, being based on those conditions which have already been developed, namely on the base of WUA work, for the reason, that here there are qualified experts- hydro technicians who should bring the irrigation water to each farmer, and already it obliges them to study the needs and requirements of farmers, soil-ameliorative conditions of their fields, composition and structure of the cultivated crops and, certainly, they are interested in increase of the farmer's income to be solvent. The estimation of an existing situation and revealing of problems of farmers is the main task of project, on the base of which each executor and especially Information Centre and the provincial BISA as the organizations-distributors should line up the strategy of advisory work for the achievement of the final goal of project – water and land productivity improvement.

The first, it is necessary to tell that the positive step in adjustment of the advisory activity was the fact that the Information Centre and distributors from the provincial BISA with the help of advisers from the provincial groups have prepared posters, posters on WPI-PL project and have provided the provincial WUA in which the premises for farmer schools have been accommodated with them as visual aids. Further, using the big material collected in the IWRM-Fergana project, the advisers of Information Centre together with the provincial BISA have prepared the methodical manuals and recommendations for the purpose of distribution them to the farmers and have provided the farmer schools with them at WUA as a distributing material.

From the beginning of March 2009 the Information Centre started to issue the bulletins being based on the needs and requirements of farmers with regularity of 1-2 times a month. For example, in March 2009 the bulletin № 2 was issued which contain the below-mentioned materials:

- Norms and terms of additional mineral fertilizing of grain crops are specified;
- The basic activities for preparation of fields to cotton are recommended;
- Recommendations on carrying out the sowing of cotton (terms, norms of sowing and depth of embedding with regard of kind and baring seeds, and also width of row-spacing) are given.

The given bulletin has been disseminated in due time and numbers among farmers, advisers and trainers by distributors, considering a need of the given material by farmers. Since March for all period of vegetation of 2009 it has been spent 21 seminars have been held for the trainers, advisers and distributors of project in whom 422 persons have taken part in.

The analysis of conducting the trainings has shown that from the total quantity of trainings and offered innovations held the success have those where the economic interest of farmer was traced. As a result of performance of the offered recom-endations the farmers stated themselves that yield crops of this year have grown, however, not within the expected ones. The insufficient increase of a crop in some demonstration sites all the same has been got because of the weak knowledge and experience of carrying out the first experiments.

Table 10: Total quantity of the conducted trainings in Uzbekistan

Organizer of training	Quantity of training pc	Quantity of participants person	Quantity of the distributive materials, pc	For whom the training was conducted
Andijan IC	12	226		Trainers & Farmers
Fergana BISA	1	28		Farmers
Namangan BISA	3	70		Farmers
Andijan BISA	5	98		Farmers
Total across Uzbekistan	**21**	**422**	**3030 brochures 21 bulletins 8 recom-mendations**	

There, where really it was possible to interest the farmer by the offered innoations, and the farmer has felt a real advantage and has received the results after consultations, the valid and confidential relations to trainers-advisers of the project

were built. So, one of the components for realization of the project tasks has been solved and the way has been specified, where and to whom the farmer can address in case if he/she needs a consultation is.

Data on the total quantity of the conducted trainings within the framework of WPI-PL project are shown in the Table 10.

3.3 Development of approaches to carry out the monitoring of farms for revealing of needs and requirements and conducting the advisory work in farms

One of the matters required to be solved in the given project is the development of technique, mechanism or manual for trainers on estimations of fields of farmers and provision of consultations. When the works of trainers with farmers was assessed some problem has been found out on the matter that each trainer and the adviser faces: «What is it necessary to begin the work with, on what should be drawn attention, what questions to be asked and what kind of recommendations and consultations to be provided». The trainers have insufficient knowledge and experience available in order to provide the successful works with farmers on rendering the assistance in the form of advices and consultations. It has appeared the unified form and the Manual are required to be act so that the trainers were not in loss and have a clear view of what they should do when the come to the farmer field.

The regional group has undertaken the development of such document and the universal form of monitoring of farms was proposed which gave the chance to use the standard recommendations for the farmers in one form, based on the technological map of crops' cultivation, tracing of possible deviations from the norms recommended as well as the reasons which have caused these deviations (See Table 11). These forms have been transferred to the provincial executors for approbation by the trainers on the sites. Considering the fact that the technological map for various crops and for various soil-ameliorative conditions will be

different, it has been proposed, before the beginning of the next year, experts of the Information Center of each country to prepare the technological maps with regard of conditions in which their farmers are, and on these basis to prepare the monitoring form proposed by the provincial group

As for the Uzbek part of project these forms have been used from the moment of their preparation since July. Though all previous operations and terms have been recollected on the base of poll of farmers, it was the first approbation of possible use of these forms.

Republic ..... **Farm:** ..... **Table 11**

Province ..... **Sown area**

District **Texture of soil:** Pebbles with low cover thickness of pit-run fines

WUA ..... **Crop:** Cotton

Monitoring of crops' growing and works performed in a farm

Standard indicators of agronomic activities and phases of cotton cultivation				**Actual indicators of agricultural work and phases of cotton cultivation**				**Deviation of actual term from the normative-expected one**		**Reasons caused the deviation of actual term from the normative-expected one**	
Approx date	Phases of growing	Approx inter phase interval	Activities in the inter phase period	Date	Inter phase activities	inter phase interval	Inter phase activities	Phase of growing	Inter phase activities	Phase of growing	Inter phase activities
25.11			Pre-arable irrigation								
03.12		5 months	Introduction of mineral fertilizers composed of 80 % of phosphorus & potassium & 5 t/ha of manure								
05.12			Under-winter ploughing								
25.03			Early-spring processing								
08.04			Presowing processing								
10.04			Introduction of nitrogen fertilizers of 30 % from the annual norm, (phosphorus & potassium of 70 %, if they are not introduced before ploughing).								
15-20.04	**Cotton sowing**										

16-17.04		5-10 days	Cutting of furrows									
17-22.04			Activate irrigation									
25-26. 04			Cultivation with hoeing									
			Sowing or re-sowing									
20-25.04	**Seedling emergence**											
30.04-01.05..		5-6 days	Cultivation									
30.04-01.05.	**Emergence of 2-3 of real leaves**											
5-10.05		25-30 days	Thin out of shoots									
12.05			Hoeing									
15.05			Weeding									
17.05			Cultivation the second with introduction of nitrogen potassium fertilizers composition									
20.05			Cutting of furrows									
20-25.05			The first irrigation									
25-30.05			Cultivation after irrigation									
30.05-01.06.	**Budding**											
30.05-01.06.		7-10 days	The second weeding									
02-05.06.			Hoeing of raw-spacing									

02-05.06.			Hoeing of raw-spacing								
05-06.06.			Cutting of furrows with the second additional fertilizing by introducing the nitrogen fertilizers of 25 % of annual norm.								
05-06.06.	**Flowering**										
07-10.06.		10-12 days	The second irrigation								
10-13.06.			After irrigation cultivation								
17-20.06.			The third weeding								
20-22.06.	**Mass flowering**										
20.06.		25-30 days	Cutting of furrows with the third additional fertilizing by introducing the nitrogen fertilizers of 30 % of annual norm.								
22-25.06			The third irrigation								
25-29.06.			After - irrigation cultivation								
05-10.07.			The fourth irrigation								
09-15.07.			After-irrigation cultivation								
15-20.07	**Fruitification**										
23-29.07		25-30 days	The fifth irrigation								
26.07-04.08			After-irrigation cultivation								
05-08.08.			The sixth irrigation								
05-08.08.			After-irrigation cultivation								
15-18.08.			The seventh irrigation								
20.08.			Embossing								
25-28.08.			The eighth irrigation								
28.08-01.09.			After-irrigation cultivation								
28.08-10.09.	**Ripening**										
5.09 - 5.10			Cotton harvest								

CHAPTER 4.
EVALUATION OF FARMERS' SATISFACTION WITH THE PROVIDED CONSULTATION AND ADOPTION OF TECHNOLOGIES.

The evaluation of farmers' satisfaction with the provided trainings and adaptation (introduction) of the obtained technologies in their fields was carried out at the end of the vegetation period in December 2009, when raw cotton was fully harvested. For the sake of objectivity, the evaluation was done immediately on-site, without involving of local partners. The provincial working group went out to the fields to talk to farmers informally. The time for evaluation had been selected at the end of the year, in other words, at the end of the season intentionally, because at that time farmers usually have enough time to appraise and to discuss their work in more detail. This evaluation provided us an opportunity to draw certain conclusions, as well as to highlight positive and negative aspects in work organization concerning dissemination, training and demonstration of the technologies, which will enable to adjust the strategy of advisory work within this project. The evaluation method represents a free and informal conversation with the farmers about dissemination of the offered technologies, their efficiency and satisfaction with the provided services.

Farmers in all three countries noted the important role of the project regarding provision of consultations, training and handout materials, their usefulness and diversity, as cultivation of crops is a complex process. They also highlighted the urgency of certain issues and topics offered to farmers, who distinguished their timeliness and seasonality.

The analysis of the results showed, that consulting work gives non-visible but high effects for those farmers, who has applied these consultations: most farmers accept consultations, they need them, and in some places the farmers look for the consultants themselves. Farmers willingly take the bulletins, but still the question is – how far did they use them? To find this out we need to develop a monitoring technique, able to trace the results of the consulting efforts and dissemination of the technologies.

The results of evaluation of farmers' satisfaction with the provided consultations, trainings and materials (including their own proposals on proper organization and increasing the effectiveness of dissemination work) are given below:

- Farmers support the idea of attracting of the most experienced and acknowledged agronomists into the WUA staff. Unfortunately, there are places (Kanibadam, Spitamen and Mastchin districts), where such practice was not been integrated due to the absence of the WUA. Nevertheless, the farmers noted their necessity and utility. In those areas where the WUA have already been set, the farmers are concerned with the financial issue of the agronomist staff under the WUA. To settle this issue, they recommend approving the agronomist staff by councils or by annual the WUA meetings, as well as including their maintenance costs (living expenses) into the budget. Farmers under the WUA also proposed the idea of close cooperation between agronomist, hydromechanics specialist and MTP (e.g. in Uzbekistan). Farmers of Bulakbashin district referred to the experience of Khudjabad district, the khokym of which initiated the consolidation of MTPs under the WUA and invited an experienced agronomist. Such center under the WUA should not be just a consulting center, but also a place, where all the stakeholders will be able to exchange their views and experiences as well as to make admissible decisions. According to farmers' opinion, the participation of the most experienced farmers and watermen in those discussions is very important.

- Farmers recognize the importance of monitoring form (see Table 3.3.1 of this report), based on the technological scheme, designed and proposed by the project as a basis for consultations, where normalized package of activities for the whole season set as a planned schedule. Farmers also propose to disseminate such technological schemes in form of booklets to

know the sequence of the activities, rates and to plan their steps for the forthcoming season. In case of any deviation, caused by objective reasons, farmers can always seek the advice or clarification from the WUA agronomist.

- Farmers accept the materials disseminated in the framework of the project. For example, a farmer from Shakhrikhan district noticed that project trainings and bulletins are very useful. If before he was watering 4 hectares of his land by means of 400-meter long furrows during 13 days, then now, following the recommendation he has shorten his furrows to only 50-meter long, and completes irrigation within 3 days. The timesaving effect is obvious. However, many farmers confessed to having not enough time to read brochures and bulletins due to objective reasons. Therefore, farmers from Uzbekistan proposed to start gathering other farmers informally to explain the matter and utility of the offered bulletin, (make a preliminary promotion, so called "spin-up") and then to disseminate it among the interested farmers. It is important, that all the materials would also reach the hired seasonal workers and watermen, in other words, those working directly in the field. In Kyrgyzstan, the advanced farmers from Karool Dostuk village and from Andijan "Ok-Kalmok" WUA expressed their interest in additional information and materials concerning high-tech developments, for example: drip irrigation, purchase of tensiometers and hothouse gardening.
- From the conversations with farmers, it became clear that training and consultations are accepted positively. They are learning a lot and trying to implement the recommendations. As an administrative assignment, particularly in Uzbekistan and Tajikistan, farmers expressed their request to organize trainings for watermen too (a farmer usually hires a seasonal waterman per each 2-3 hectares) and to set a Waterman School under the WUA. The project consultants conducted a number of trainings on key issues of efficient water management, but, unfortunately, not all farmers can participate in all these trainings due to the work pressure. They showed up to the sessions quite irregularly, because of lack of time. Some of them are overloaded with work not directly connected with the agriculture. Most of them are tired of meetings, therefore it is better to organize trainings just at their sites at convenient for them time and place, or even during social events in non-formal environment.
- Consultations for farmers are going well, but they think that the consultations have to be more convincing for farmers, the convincing argumentation concerning the correct water supply is very important. They say that farmers' credit should be deserved. One of the farmers from Bulakbashin district said, "...A farmer today is one's own master; he has his own seal, and if he thinks that trainings are useful for him, he will be listening to them, but if he believes that all arguments are untenable, he will skip them. Our goal is to make consulting agronomists sound convincingly and trustworthy to farmers…" "Pakhta Bank" agronomist of Furkat district, who

has participated in the farmers' meetings, also noted that, что "if consult the farmers correctly, so they can feel that they might benefit from it they definitely would seek advises. We have to deserve their trust. There are farmers gaining 30-40% more because they followed consultations".

- Farmers also noted that the consultations should not be single-mission ones, they have to be given during trainings or separate meetings. Besides methodical and informational education, consultations should also cover the current issues of the farmers. Therefore, a consulting agronomist needs to visit the farmers' fields to make an assessment of the field and plants condition, course of land treatment and after quick evaluation give the farmers advises and recommendations. Farmers also want to have consultations not only during the season, but during the preparatory works as well. In Kuvin district, a farmer has underlined the importance of tillage and mentioned that "tractor operator tries to plough not too deep to save his efforts and fuel, so ploughing horizon does not exceed 18-20 cm. Today "Magnum" tractors can be easily operated within the cab. Farmers have to insist that tractor operators plough to the depth not less than 40 cm. Moreover, they have to plough 3-4 times. Planning and irrigation for the forthcoming season strongly depends on winter tillage."
- Farmers also noted the complexity of productivity improvement issues. They have requested that the project would cover legal aspects such as agreements with service or resource suppliers, or marketing in Kyrgyzstan. For example, one of the farmers noted, that "... last year the price for wheat was 16-17 som per kg, and this year the price was 4-5 som per kg, i.e. to sell the wheat was at a loss, because the purchasing prices were low. One and all farmers sow the culture that was of the highest demand and had the best price last year and go bankrupt. That's why a marketing service or some kind of informational support has to be organized".
- In all three countries, farmers underlined the role of the demonstration of project technologies in the field. They noted that it's a good approach to dissemination and a good opportunity to practice the theoretic knowledge gained during the training, i.e. practice in the demonstration field where farmers can observe with their own eyes the plants growing process or irrigation technique and then apply (repeat) the same actions in their own fields; they can ask the questions concerning the adoption of the technologies in their own fields.

The package of key innovations that farmers accept includes the following:

- *The water-metering system, transition to new payment mode (by actually used volume), creating of Private Farm Groups (users of one outlet), improvement of contractual relations and efficient water use at field level in Kyrgyzstan.* In Osh province (Uzgen, Karasuy and Aravan districts), the informed farmers of five neighboring outlets plan to integrate the same

system. So, they have asked the project experts to assist them with the consultations as they intend to change over to another water use model, which implies election of the outlet leader, creating of Water User Groups (WUG), construction of gauging stations (hydro-posts) with their own resources and manpower (with the methodical support of project specialists - to assure the construction and maintenance quality), and to switch from payment per hectare to payment by volume of actually used water. They also want to introduce the agreement on water supply between the WUA and the leader of Private Farm Groups (users of one outlet), who in his own turn makes an agreement on water apportionment and implementation of the technologies increasing the crop capacity of the fields and water productivity at field level with each farmer.

- *The water-metering system at dekhkan farms' level, improvement of contractual relations and introduction of actually supplied water payment system in Tajikistan.* There is a list of applications from 53 farmers (Dj.Rasul, B.Gafur, Spitamen, Zafarabod and Mastchin districts) for construction of hydro-posts at their own expense and organizing the system of record keeping, payment and contractual relations with the "water supplier" via training, methodical materials and technical appraisal. Since, payment for water is calculated "by volume", it means that volumes less than the WUA level are not taken into account, and all calculations and bills represent the planned volumes considering crop structure and size of planted area, i.e. nobody knows the exact figures of the consumed water. Therefore, in order to use irrigation water effectively the farmers badly need and they are deeply interested in organization of water-metering system.
- *Decrease in costs, caused by inaccurate land treatment, increase in crop productivity and economic efficiency of production in Uzbekistan*. Here the focus is on demonstration fields and attraction of agronomists to work in the WUA. The interest of farmers in water-metering system in Uzbekistan is extremely low, and it is explained by the absence of water charge. However, the experienced farmers, willing to supply water rationally and get higher crop yield, also want to build hydro-posts and measure the used water.
- Analysis of the evaluation results showed, that:
- The informality of meetings concerning farmers' perception and satisfaction was assessed positively by them. So, it would be useful, if next year the project specialists would develop a method and tools regarding evaluation of the farmer' satisfaction and degree of adopted technologies, training, consultations, and disseminated materials and represent their work in scientific form.
- In general, farmers accept almost all project approaches. They also highlight bottlenecks and offer the ways to fix them. In is very important for correcting our steps and improving the feedback. In this, we see the key role of our local partners, who are challenged to implement the new approaches and adjust them to the local needs and conditions.

CHAPTER 5.
EVALUATION OF THE PROJECT RESULTS WITH REGARD TO EFFICIENT USE OF IRRIGATION WATER AND ITS PRODUCTIVITY IN THE DEMONSTRATION FIELDS AND IN THE FARMERS' FIELDS

One of the project goals is the efficient use of irrigation water and increase of its productivity in the private farms through introduction and dissemination of the technologies developed in IWRM-Ferghana Project and recommendations offered by the scientific-research institutes. To reach the project goals, the demonstration fields were set at the project objects, where partners have to apply the technologies and show them to farmers.

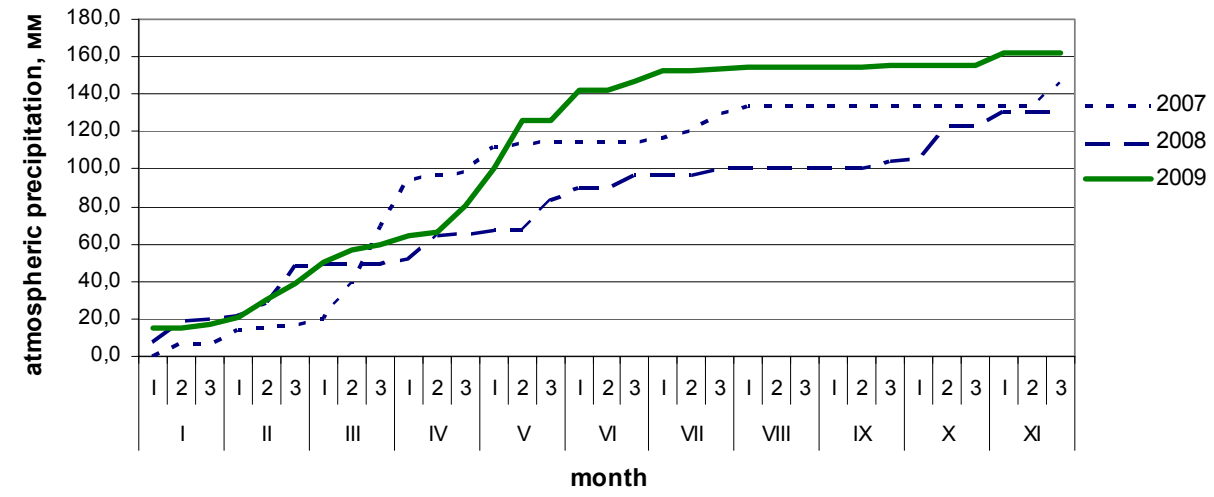
The outcomes of 2009 showed, that not all the proposed provisions in the project document have been settled successfully. And, it's explained both by objective and subjective reasons.

The year of 2009 due to climatic abnormalities turned out to be a difficult one for agricultural production. From March to June inclusive, all provinces of Ferghana Valley were suffered from abundant rainfall accompanied by unusually low

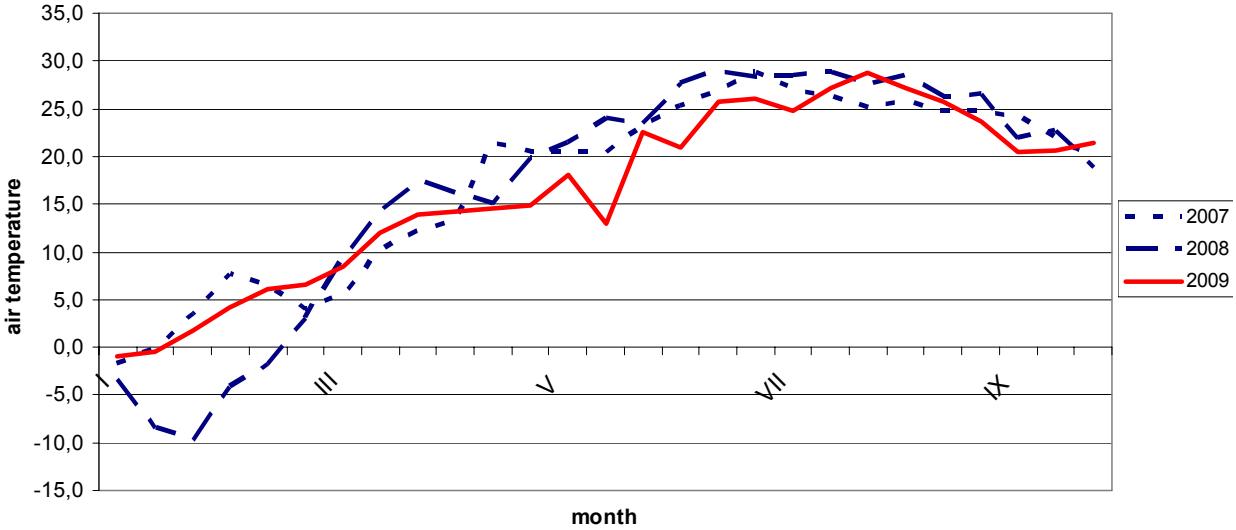
temperatures. According to the data of Fedchenko meteorological station, located in Ferghana Valley, the total rainfall of 2009 was significantly higher versus previous years, and what is important, in May and June the abundant rainfall was accompanied by low temperatures. The graph of climatic data (Graph 5.1) showed that the sum of daily rainfall before May was at the level of mean annual indicators, but since May, it had increased significantly as compared to 2007 and 2008.

The reversed changes had happened to the air temperature. Practically up to the second decade of April 2009 the temperature did not go higher than 15º C, which was quite unfavorable regarding that the soil temperature was even lower. At such temperature, sowing of tilled crops is not recommended. It is well known, that recommended efficient temperature has to be not less than 12-16 º C.

Graph 5.1 Amount of rainfall with cumulative sum



Graph 5.2 Air temperature



Heavy rainfall in May and June as well as prolonged low temperatures has affected not only the irrigation mode but also routine land treatment, which called forth additional measures for soil moisture reduction.

Lack of heat and high soil moisture had their negative impact on the development of cultivated crop, especially on cotton. By the beginning of July, the delay was about 25-30 days. By the middle of July with the decrease in rainfall and increase in air temperature the delay has shorten to 15 days, and only in August the development returned to its normal course, still having a slight (about 10 days) delay.

In this case, most of the farmers had not enough knowledge and experience, which resulted into the wrong choice of irrigation mode. The data from demonstration fields show that some farmers performed the irrigation without taking into consideration the moisture content in soil. The excessive moisture of soil, resulted from abundant rainfall, has been aggravated by needless irrigation. Early in July, the cultivated crops across almost all fields of Ferghana Valley were suffering from excessive moisture, so at that time it was important to give as much heat to the crops as possible to reduce the moisture content in soil. However, most farmers just watered the crops without taking any measures for reducing the moisture content in soil, which entailed the aggravation of the situation. As a result, we can see the application of disproportional irrigation mode at the most part of the fields and over-watering.

It should to be said, that such mistakes we saw not only in the farmers' pilot fields, but in some demonstration sites as well. It indicates that our project partners did not fully understand the importance of consideration of all multiple natural conditions and necessity of adjusting the highest technologies to local conditions.

5.1 Evaluation of the use of irrigation water in the project demonstration fields

Evaluation of the use of irrigation water conducted in the demonstration sites has shown that some farmers used irrigation water taking into consideration climatic conditions of the year, and their irrigation mode was quite even during the year, with the admissible irrigation rates for each condition.

That was the situation in Andijan province, in the demonstration sites of Markhamat, Altynkul and Shakhrikhan districts, where irrigation water was used taking into consideration existing climatic and soil conditions. The first irrigation in Markhamat district was done within 4 days - from 20th to 23d of June, which is 25 – 30 days later versus previous years; the second irrigation was done maintaining the 29-30 days interval between irrigations. Before, up to four irrigations took place within this period. The frequency of irrigations has been reduced due to postponement of the first irrigation and use the reserve of soil moisture between the first and the second irrigations (Table 12).

The moisture reserve was rationally used also in Altynkul district, though, it should be said that it was quite possible to skip one irrigation in both districts – Altynkul and Markhamat. In Altynkul district the first irrigation dated of May 12-17 could be skipped, as at that time, it was still raining heavily and there was enough moisture in soil even for the soils with high water permeability. In Markhamat district, the third and fourth irrigations could be combined. In Shakhrikhon district with the efficient timing of irrigation, the overstated figures of irrigation rates were observed, particularly the third irrigation and the first one, which should be significantly lower than vegetation irrigation.

Table 12: Evaluation of irrigation conducted in the demonstration fields of Andijan, Namangan and Ferghana provinces (cotton).

District	Number of irrigations	Date of irrigation		Average irrigation rate, m^3/h	Irrigation rate, m^3/h (gross)	Drainage losses, m^3/h
		First irrigation	Last irrigation			
Markhamat	5	20-23.06.09	29-31.08.09	868	4338	488
Altynkul	4	12-17.05	21-26.08	1117	4470	610
Shakhrikhon	5	15-17.04	26-27.08	1105	5523	679
Namangan	4	20-24.03	8-12.08	956	3838	309,2
Bogdod	3	24-26.06	04.09.2009	839	2517	324

It should be noted, that the last irrigations in all three provinces were very effective considering the climatic conditions of 2009, and the time of the last irrigation was crucial. The tilled crops, especially cotton, have suffered from low temperatures, abundant rainfall and lack of heat that is why the earlier last irrigation was over; the more chances left to have cotton balls matured (See Table 13).

The evaluation of the results of other demonstration fields showed that some farms have conducted the vegetation irrigation with blunders.

There are signs of ineffective timing for the second and the third irrigations in Naryn district. In the private farm (PF) Abdurakjman Omonov of Pup district, Pakhtaabad district and PF Botyrjon of Furkat district, irrigation rates run up to 1600 m^3/ha at recommended rate of not more than 1000m^3/ha for this type of soil.

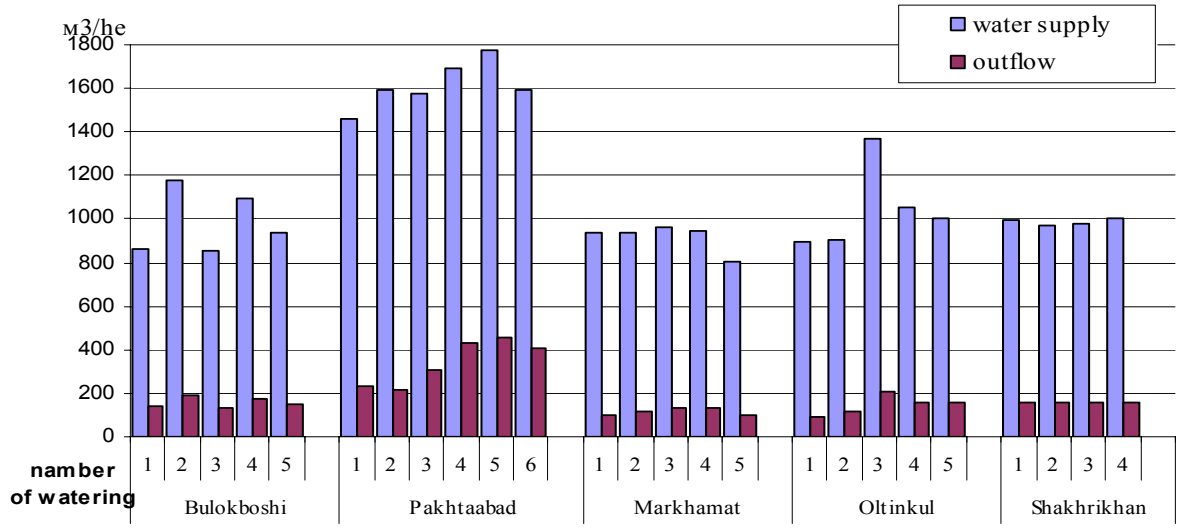
Such high irrigation rates could be assigned to the soils with mean and heavy weighed texture and with necessarily thick covering melkozem with a deep groundwater occurrence. Such type of irrigation can be reasonable for prolonged drawdown of soil moisture, with the inter-irrigation period not less than 25-30 days. Irrigations, done in September are also excessive and not reasonable. Excessive moisture content in soil in September slows down the process of cotton ripening. To ensure a complete opening of cotton balls and full-value yield at this time of the season, it is necessary to reduce the moisture content in soil.

Table 13: Evaluation of the results of vegetation irrigation in the demonstration fields of Ferghana province (cotton)

District	Number of irri-gations	Average irrigation rate, m^3/ha	Mean drainage value per one irrigation	Water supply, m^3/ha (gross)	Irrigated fields drain-age, m^3/ha	% of drai-nage to wa-ter supply	Specific water supply m^3/ha (net)
Kuva	5	1042	90	5208	448	9	4761
Toshlock	5	1167	270	5837	1350	23	4486
Furkat	3	1465	447	4394	1341	31	3052
Oltyarik	4	1217	247	4868	986	20	3882
Bogdod	8	1107	247	8860	1976	22	6883
Bogdod	3	839	108	2517	324	13	2193
Bulakbashi	5	967	129	4837	644	13	4193
Pakhtaabad	5	1370	301	6852	1506	22	5346
Markhamat	5	868	98	4338	488	11	3850
Altynkul	5	894	122	4470	610	14	3860
Shakhrikhon	5	1105	136	5523	679	12	4844
Noryn	5	1001	114	5006	568	11	4438
Pup	7	1199	399	8393	2792,5	33	5601
Namangan	4	959	77	3838	309.2	8	3529

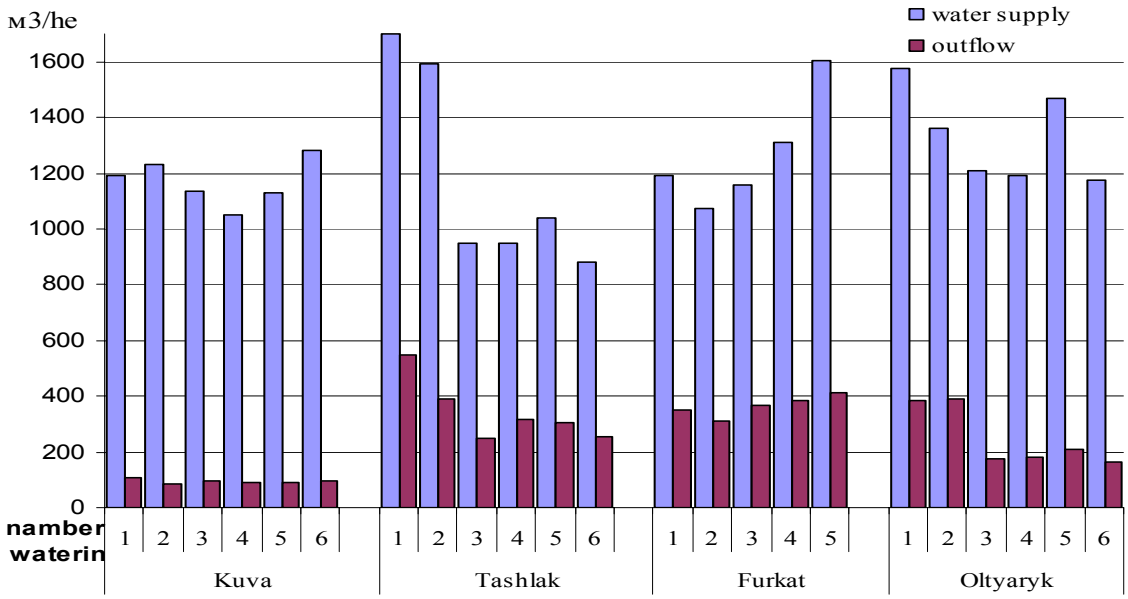
Evaluation of the efficiency of use of irrigation water in consideration of non-productive drainage from the irrigated fields, shows, that drainages make up 8 - 33%.

Graph 5.3 Irrigated water use in Andijan Province (wheat)

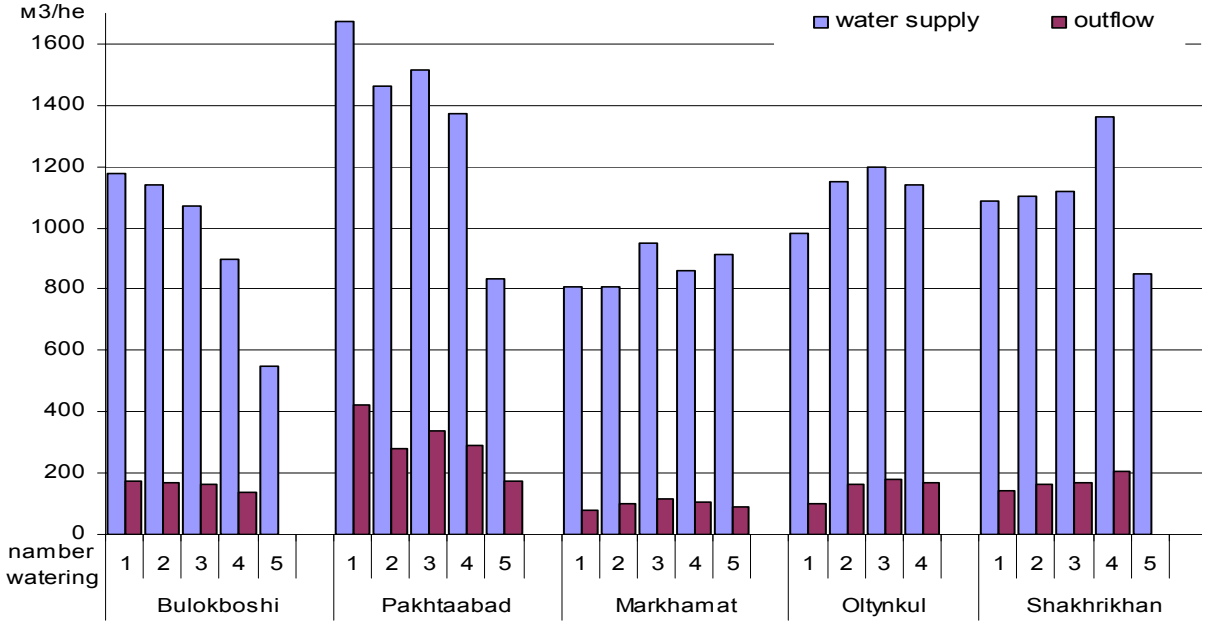


The drainage losses occurred during irrigation with high irrigation rates are insignificant. In most farms the drainage from the irrigated fields reach 30% of irrigation rate at average drainage during vegetation up to 10-15% of irrigation rate.

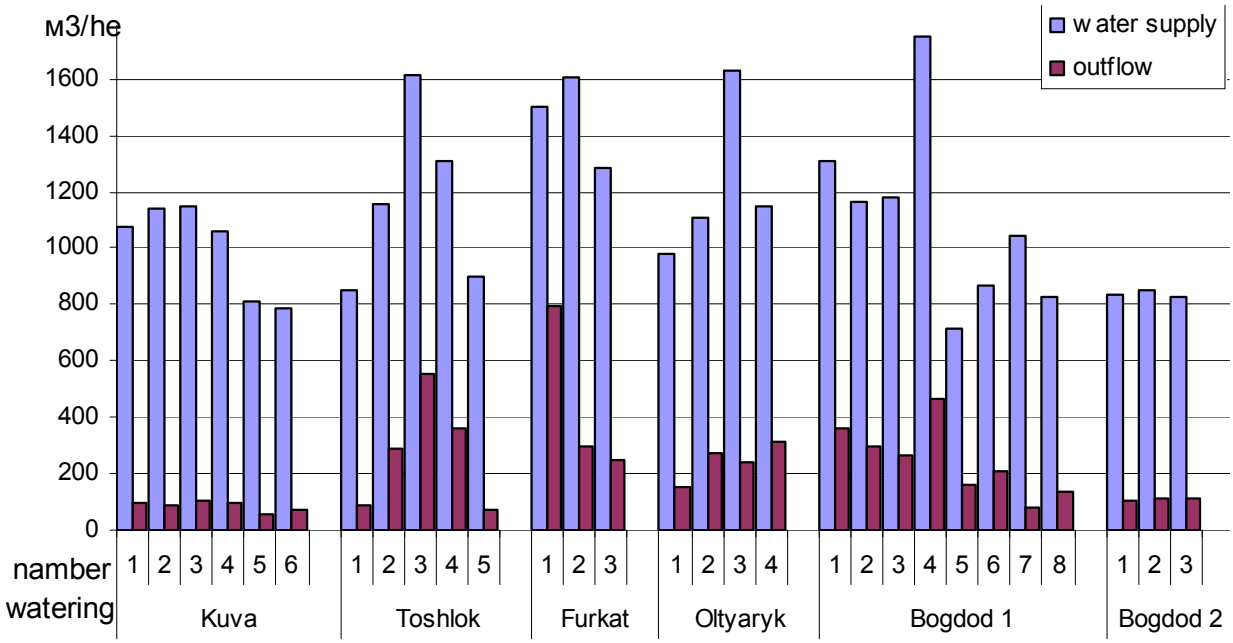
Graph 5.4 Irrigated water use in Fergana Province (wheat)



Graph 5.5 Irrigated water use in Andijan Province (cotton)



Graph 5.6 Irrigated water use in Fergana Province (cotton)



In Sogdiy district, as well as in the demonstration fields of Uzbek part of the project some deviations from standard numbers with regard to irrigation rates and timing were observed during cotton irrigation, though the irrigation rates over a whole period of vegetation were moderate (See Table 14).

In the demonstration field of Dj.Rasul district, the third irrigation has overstated values, but taking into consideration the meliorative conditions of this farm, the irrigation rates have to be much lower. The inter-irrigation period set by this farm is 13-15 days, which is quite acceptable for the fields with high water permeability and big slopes. The fifth irrigation, provided in 6 days after the fourth one at high irrigation rate, can lead to over-watering, so, in this case, it would be better to combine the fifth and the sixth irrigations and provide the one early in September.

In Spitamen district, the irrigation rates in the demonstration field are overstated. Though the soil conditions and covering melkozem allow accepting such volume of irrigation water, these rates are not correspondent to inter-irrigation period, so in this case we can state over-watering of cotton.

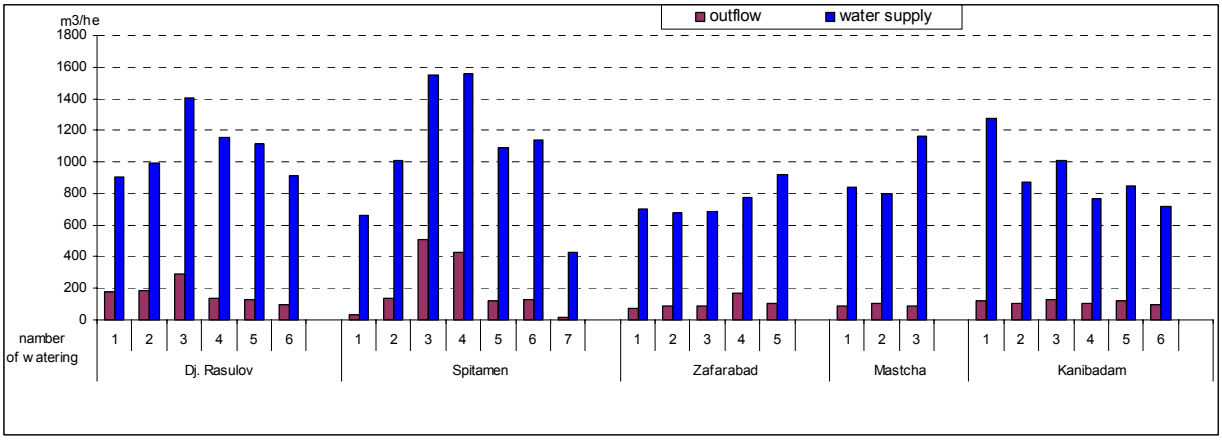
In the demonstration field of Mastchin district, three irrigations took place with inter-irrigation period of more than 30 days, and the irrigation rate was 2803 m^3/ha. Though there were some deviations in irrigation rates in this field, overall, the irrigation mode adopted by farmers together with the project consultants was the most efficient. The irrigation mode applied to this field is justified by high groundwater table, rising during the vegetation period to the level of 0.5 m from the ground surface. Considering the climatic features of the year, it should be said that the irrigation mode applied in Mastchin district was the best for the land areas with high water table.

In general, no serious deviations regarding the irrigation mode and rates were observed in the Tajik part of the project. As for the field losses, we can say, that most of the irrigations have not only remained within the limits of normative values, but in some cases were even lower, indicating a high efficiency of the use of irrigation water in the fields.

Table 14: Evaluation of the use of irrigation water in Sogdiy district, (cotton)

District	Number of irrigations	Average irrigation rate, m^3/ha	Mean drainage value per one irrigation	% of drain-age to water supply	Specific water supply (gross), m^3/ha	Total drain-age, m^3/ha	Specific water supply (net), m^3/ha
Dj.Rasulov	6	1080	170	16	6482	1018	5465
Spitamen	**7**	**1060**	**196**	**18**	**7423**	**1373**	**6050**
Zafarobod	5	752	106	14	3758	530	3228
Mastcha	**3**	**934**	**95**	10	**2803**	**284**	**2519**
Kanibadam	**6**	**914**	**115**	13	**5486**	**688**	**4798**

Graph 5.7 Irrigated water use in Sogd Province (cotton)



However, the evaluation of the field drainage proves that there is a certain regularity (pattern) in its values. The higher irrigation rate is, the greater is the field drainage and vice versa – the lower irrigation rate is - the lower is the drainage. It shows that farmers, taking more irrigation water to the field, keep only that volume that is required by the field and drain the excessive water.

Farmers are not interested in decrease in field drainage (non-productive losses). Such neglecting is typical for the places where a farmer never pays for water supply or water drainage. However, if we will take a situation in Tajikistan we can

see that even high charges for water are not able to stimulate its rational use. In the absence of water-metering devices, a farmer pays for each irrigated hectare and not for the volume of the used water, which encourages him to use as much water as he can get, but to pay only for the irrigated area.

In Osh province of Kyrgyzstan conditions differ from the Uzbek and Tajik parts of the project. Evaluation of the use of irrigation water at pilot objects was done using not only the data from the demonstration fields of private farms, but also the information from the outlets where Groups of Private Farms – Water Users were located.

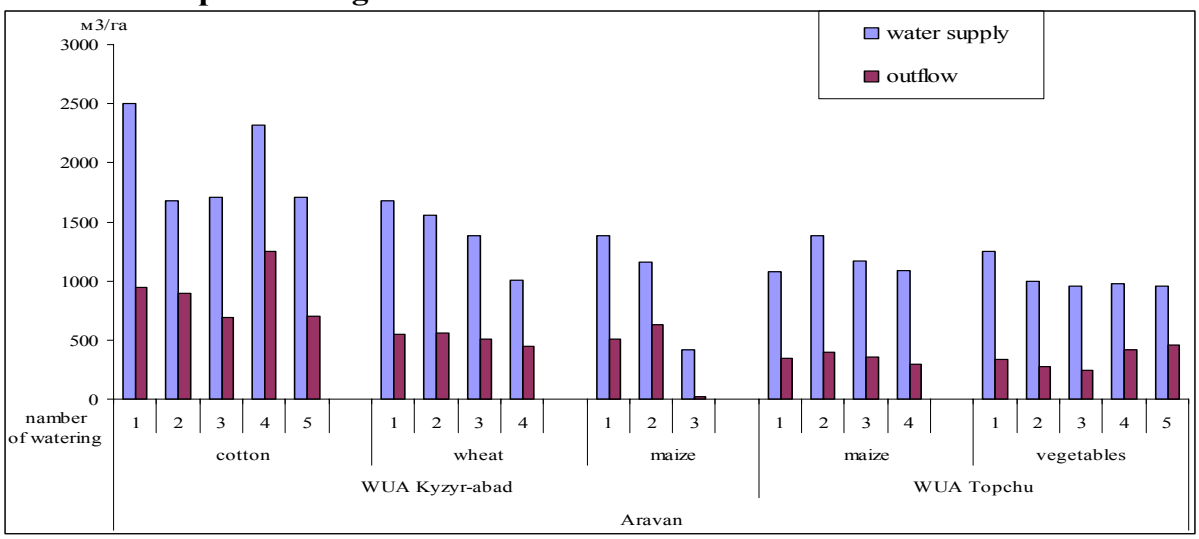
The demonstration sites with small areas for demonstration of effective technologies were located within the pilot outlets, where the water-metering system as well as distribution of irrigation water between farmers has been organized. The system assumes water measuring and payment for the water to the actually used volume. At the beginning of August they started to meter the volume of water supply in the demonstration sites and in the outlets, the water supply for the period prior to August has been restored, according to the WUA data and to the information provided by the farmers. The findings of use of irrigation water in the demonstration sites have been analyzed and certain conclusions drawn.

The results of analysis show that the volume of water supply has different values depending on district and type of crop. In Aravan district, a huge amount of irrigation water has been used for almost all types of crop. For example, the standard water supply rate to cotton fields in this zone is within the limits of 6000 m^3/ ha, but there the volume of used water has reached 10000 m^3/ha. Wheat and maize fields have also been over-watered; as the spring was quite rainy, it turned out that the volume of irrigation water supply has exceeded its possible productive norms by 1.5-2 times.

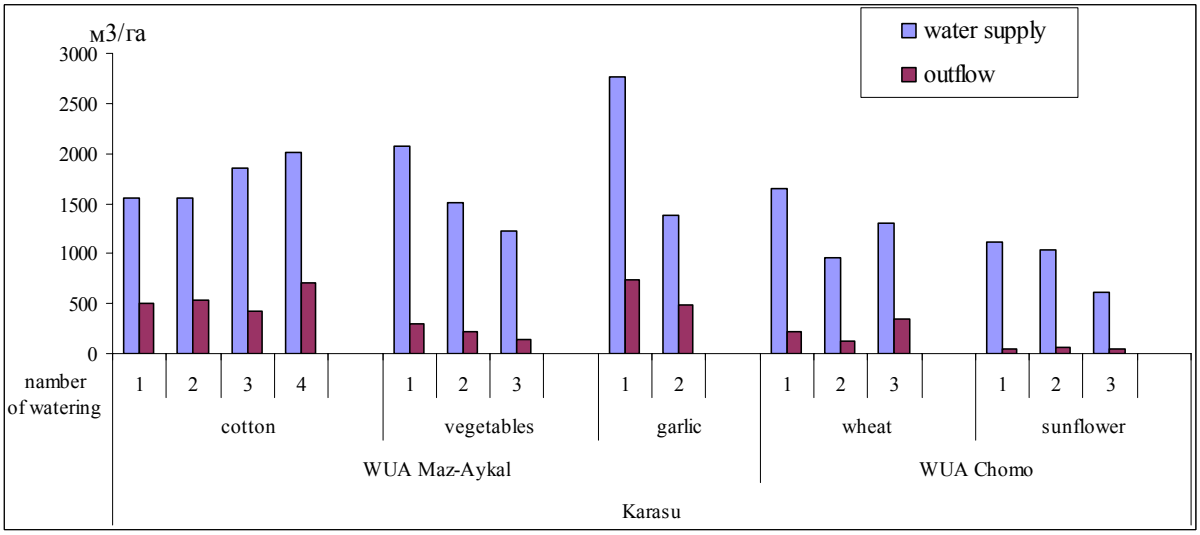
In Karasui district the situation regarding vegetables, wheat and especially sunflower is much better as compared to cotton. Here the water supply values also exceeded the standardized figures by 1500-2000 m^3/ha as compared to the average years. In 2009, there was enough moisture in soil retained up to July, and supply of such huge volume of irrigation water was just needless.

The most effective irrigations, considering the weather conditions, have been done in Uzgen district. Here, for the whole vegetation period only 1018 m^3/ha and 1784 m^3/ha of irrigation water has been used for wheat and maize respectively.

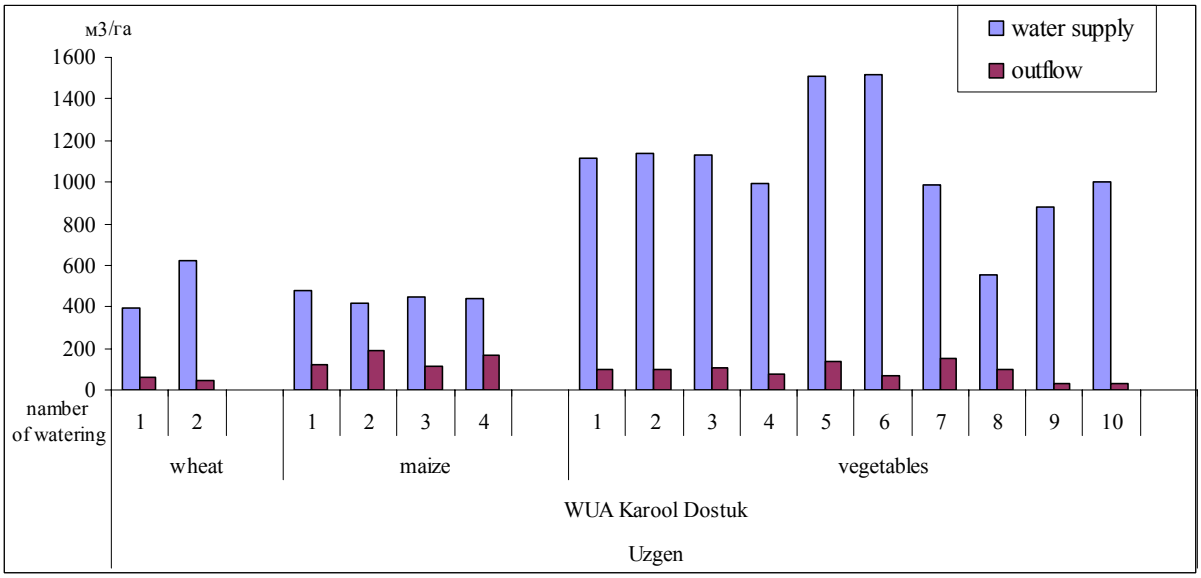
Graph 5.8 Irrigated water use in Osh Province Aravan district



Graph 5.9 Irrigated water use in Osh Province Karasu district



Graph 5.10 Irrigated water use in Osh Province Uzgen district



It should be noted, that at relatively similar climatic and soil-reclamation conditions, the water supply to wheat fields varies significantly between Uzgen district (1018 m^3/ha), Karasui district (3916 m^3/ha) and Aravan district (5626 ^{3}/ha). Why such a big difference in water supply in the same crop? First, it should be noted, that there is a difference in elevation zones between Aravan and Uzgen districts, which determines the volume and mode of irrigations. Uzgen district is located much higher and the air temperature is lower there, than in Aravan district, located closer to the desert-steppe zone. Evaporability in Aravan district is higher, so the need for irrigation water is also higher than in Uzgen district. This explains to some extent the greater volume of water used in Aravan district. However, it should be said that the vegetative period for wheat falls to the winter-spring period – time when there is the lowest evaporability and the highest moisture content in the soil.

Only during the dry years, the demand for irrigation water increases, and requires intensive irrigations start already in March. The year of 2009 was abundant in rainfall and the soil almost did not dry up until July, during such period, zones of Aravan district can succeed with less volumes and number of irrigations.

The difference in water supply rates can also be explained by the abundant year, when almost all areas of the province had plenty of irrigation water, even Aravan district, where there is always a shortage of irrigation water, even in normal years due to the location of this district in the tail section of the channels. If you look at raw data, almost all farms used water excessively. In Ararvan district, irrigation rates reached up to 1980 m3/ha, in Karasuu district - 1600-1700 m3/ha, considering that irrigation rates set for these zones must not go higher than 800-1000 m3/ha. Six farms of thirteen, registerd quite significant drainage from the irrigated fields – from 30 to 45% of total water supplied, with standard rates within 20% (See Table 15).

High drainage volumes are caused by non-standardized supply of irrigation water and wrong choice of irrigation technological schemes. Project performers should pay their attention to these indicators. Most farmers have not only knowledge but also information on existing approaches and technologies that enable efficient use of irrigation water and thereby reduce not only the financial costs, but also increase crop yield.

High efficiency of the use of irrigation water regarding wheat and vegetables in Karasui and Uzgen districts, where drainage from fields were even lower than standard permissible limits, should also be noted. The efficiency of the use of irrigation water in these farms proves once again availability of the existing water saving resources and capabilities of the project that offers technologies, as well as farmers' interest to use them efficiently in agricultural production.

Table 15: Use of irrigation water in the project demonstration fields in the context of crops in Osh province

District	WUA	Crop	Number of irrigations	Average irrigation rate, m^3/ha	Specific water supply, (gross) m^3/ha	Drainage volume m^3/ha	% of drainage to water supply	Water supply, (net) m^3/ha
Aravan	Kyzyr-abad	cotton	5	1981	9905	4491	45	5414
		wheat	4	1407	5626	2060	37	3566
		maize	3	986	2959	1156	39	1803
	Topchu	maize	4	1181	4725	1388	29	3337
		vegetables	5	1028	5142	1725	34	3423
Karasu	Maz-Ikal	cotton	5	1797	8983	2755	31	6226
		vegetables	3	1600	4800	675	14	4129
		garlic	2	2070	4140	1233	30	2907
	Chomo	wheat	3	1305	3916	681	17	3235
		sunflower	3	918	2755	153	6	2602
Uzgen	Karool Dostuk	wheat	2	509	1018	100	10	917
		maize	4	446	1784	596	33	1188
		vegetables	10	1082	10817	904	8	9913

The efficient use of irrigation water provides first, the required volume of water including additional sources of moisture – precipitation, groundwater recharge and moisture reserve in soil. At the same time, an evenness of watering of the irrigated fields is an important factor in the efficient use of irrigation water. However, what is most important – the effective use of irrigation water should provide higher crop yields, which determine the productivity of irrigation water.

5.2 Evaluation of productivity of irrigation water in the project demonstration fields

The evaluation of water productivity and land that has been covered in the project area showed that the majority of farms in all provinces in 2009 reached quite high values (Table 16). In Ferghana province, the productivity values for cotton ranged from 0.48 kg/m^3 in Toshlock district to 1.39 kg/m^3 in Boghdod district. In Boghdod district in Nile farm the yield of 35c/ha was obtained using a small amount of irrigation water - 2517 m^3/ha. This farm has reached a high productivity taking into account the high groundwater table and due to competent setting for the best time and duration of irrigations. This farm was also able to find the right approach in planning irrigation time schedule for cotton, taking into account the difficult conditions of the year (heavy rainfall, resulting in increased soil moisture).

Table 16: valuation of water productivity in the demonstration fields regarding cotton and wheat in pilot districts of Uzbekistan

District	Area, ha	Crop	Specific water supply (gross), m^3/ha	Crop yield, kg/ha	Productivity, kg/m^3
Ferghana province					
Kuva	2	cotton	6020	3700	0,61
Toshlock	2.2	cotton	**5837**	**2800**	**0,48**
Furkat	4.8	cotton	4394	4000	0,91
Oltyaryk	2.5	cotton	4868	3700	0,76
Bogdod	4	cotton	**2517**	**3500**	**1,39**
Kuva	2	wheat	7015	5000	0,71
Toshlock	1.6	wheat	7110	4000	0,56
Furkat	4.5	wheat	6333	4500	0,71
Oltyaryk	4.6	wheat	7983	4800	0,60
Andijan province					
Buloknashi	16.4	cotton	4837	3660	0,76
Pakhtaabad	6.5	cotton	6852	3460	0,50
Markhamat	6	cotton	4338	3800	0,88
Altynkul	14	cotton	4470	3600	0,81
Shakhrikhon	7	cotton	5523	3600	0,65
Buloknashi	14	wheat	4933	4570	0,93
Pakhtaabad	4	wheat	9693	4750	0,49
Markhamat	6	wheat	4591	6500	1,42
Altynkul	12	wheat	5234	6620	1,26
Shakhrikhon	2	wheat	3947	4800	1,22

District	Area, ha	Crop	Specific water supply (gross), m^3/ha	Crop yield, kg/ha	Productivity, kg/m^3
Namangan province					
Noryn	2	cotton	5005.5	3800	0,76
Pup	2	cotton	8393	4200	0,50
Namangan	10	cotton	3838	3750	0,98

Another farm “O. Kosimov” yielded 28.7 c/ha at rate of water supply: 8860 m3/ha (See Table 17). This farm, in contrast to the first one conducted all irrigations that could take place in normal dry years, but with very high rates and in short inter-irrigation periods. Assessing the weather conditions in the period from March to July, we can say confidently that CALL irrigation for cotton in March was needless, the same goes for irrigation in May – both irrigations were superfluous as at that time the soil was still wet, and of course, one superfluous irrigation was held in July and one in August.

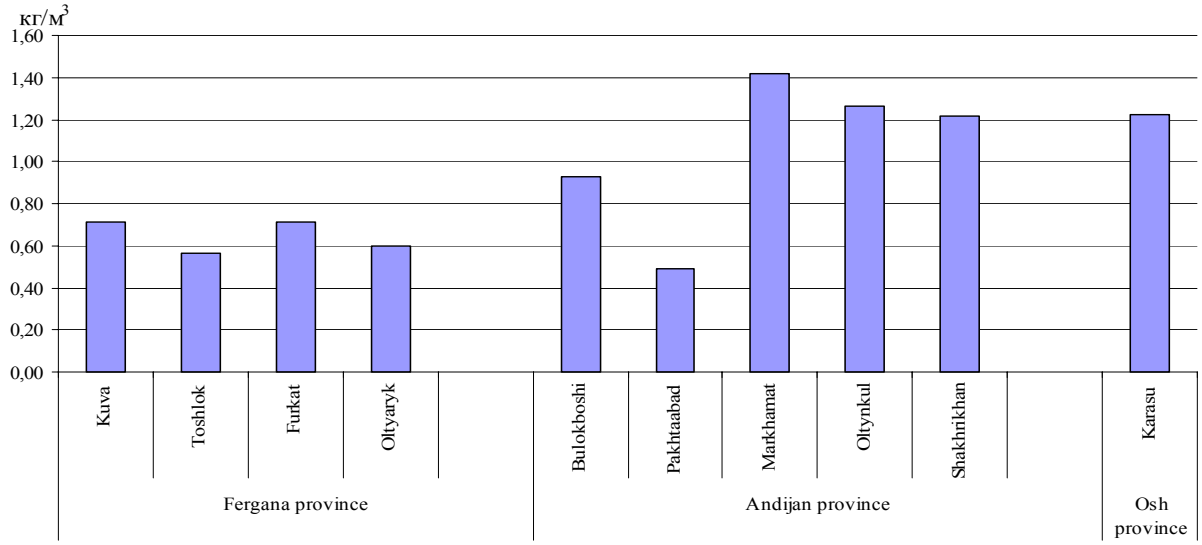
Table 17: Irrigation mode for cotton, crop yield and water productivity in the demonstration fields in Boghdod district of Ferghana province

Name of private farm	Number of irrigations	Date of irrigations	Water supply, m^3/ha (gross)	Drainage, m^3/ha	Crop yield, kg/ha	Productivity, kg/m^3
O. Kasymov	CALL	19-20.03.09	1307	358		
	1	07-08.05.09	1164	299		
	2	13-14.06.09	1184	263		
	3	04-06.07.09	1751	463		
	4	26-27.07.09	717	160		
	5	10-11.08.09	869	210		
	6	20-21.08.09	1043	84		
	7	31.08.2009	825	139		
			8860	**1976**	**2870**	**0.42**
Nilu	1	24-26.06.09	838	101		
	2	30.07-1.08.09	849	111		
	3	04-06.09.09	830	112		
			2517	**324**	**3500**	**1.60**

Comparison of these two farms once again confirms that the excessive irrigation water is not only unprofitable but also harmful. The one who watered the field correctly, he received a high yield, and the one, who has just over-watered his field, received a very low yield and water productivity in his case is one of the lowest.

In Ferghana province, water productivity for wheat is considerably lower than for cotton. In normal years, the values of productivity regarding wheat exceed its value for cotton, as it has higher yield and much less irrigation rate. In Ferghana, province relatively low values of productivity of wheat are explained mainly by high rates of irrigation water and relatively low yield. Irrigation rates are within 7000-7900 m^3/ha at crop yield of 43-50 c/ha. Potential yield of wheat in Ferghana Valley with the right farming practices is more than 132,28 c/ha, and irrigation rates in mean years regarding water content are within the limits of no more than 5000 m^3/ha.

Graph 5.11 Productivity of irrigated water in demonstration fields of the project (wheat)

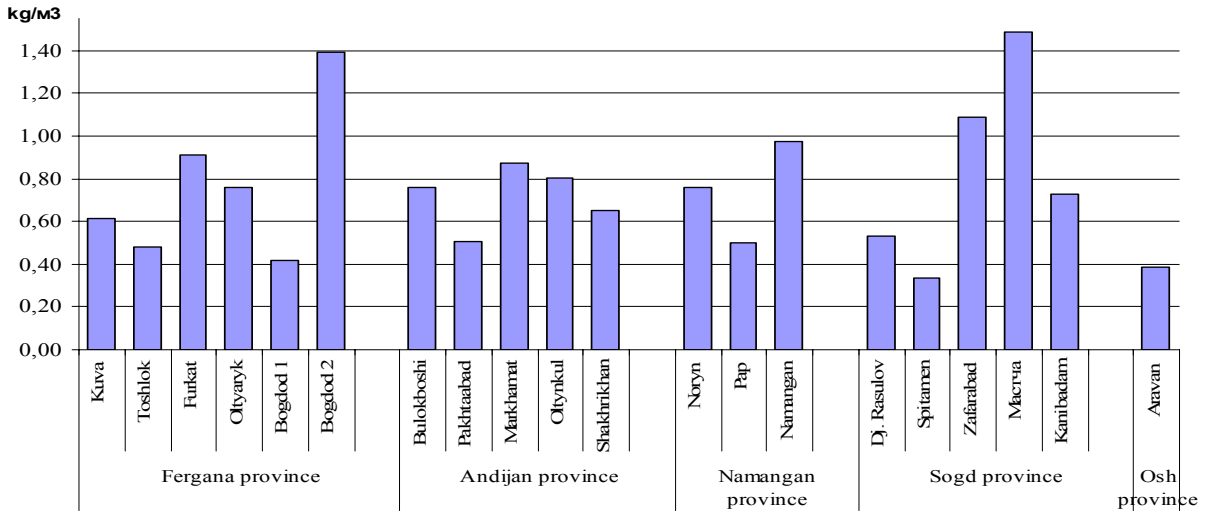


It means that content of moisture in soil was high enough for wheat growth and development. Of course, the irrigations might be necessary in these months as well, but what is clearly seen now is the error in the rates and the timing of irrigations done without taking into account the soil moisture factor and the weather conditions.

In Andijan and Namangan provinces the productivity in the demonstration fields for cotton was from 0.5 to 0.98 kg/m^3, and for wheat - from 0.49 to 1.42. For these areas we can say the same thing that was already said above with regard to Ferghana province. But in Andijan province high yields of wheat were obtained at relatively low irrigation rates, except for one farm in Pakhtaabad district, where irrigation rates were 9693 m^3/ha at crop yield of 47ts/ha. The consistently good results have been received for cotton, although the crop yield is lower here than in Ferghana province regardless relatively close values of the irrigation rates. Average water productivity in the pilot districts of Uzbekistan was – 0.77 kg/m^3 for cotton and – 0.85 kg/m^3 for wheat.

In Sogdiy province mostly high values of productivity have been obtained. In two districts the productivity was more than 1 kg/m^3 and these values were obtained, both due to high crop yield, and through effective use of irrigation water.

Graph 5.12 Productivity of irrigated water in demonstration fields of the project (cotton)



Over 7000 m^3/ha of irrigation water was used just in one farm in Spitamen district and only 24.9ts/ha of crop was yielded. In this case, low productivity in this farm resulted from the incorrect irrigation mode and high irrigation rates. The obtained data shows that in July and August 4 irrigations have been done and two of them were superfluous. Because of these irrigations, the rate has increased by 2500 ^{3}/ha, and besides, high irrigation rates raised the rates up to 1000m^3/ha (See Table 18).

Evaluation of water productivity in the demonstration sites in Osh province, carried out according to the water supply and crop data, shows that its value in five out of eight farms ranged from 0.6 to 2.6 kg/m^3. It should be mentioned, that these values were obtained, both through the effective use of irrigation water, and due to obtaining of high crop yield. Low values of productivity of cotton in Aravan district were obtained mainly due to supply of high rate of irrigation water. The same can be observed regarding vegetables in Aravan and Uzgen districts (Table 19).

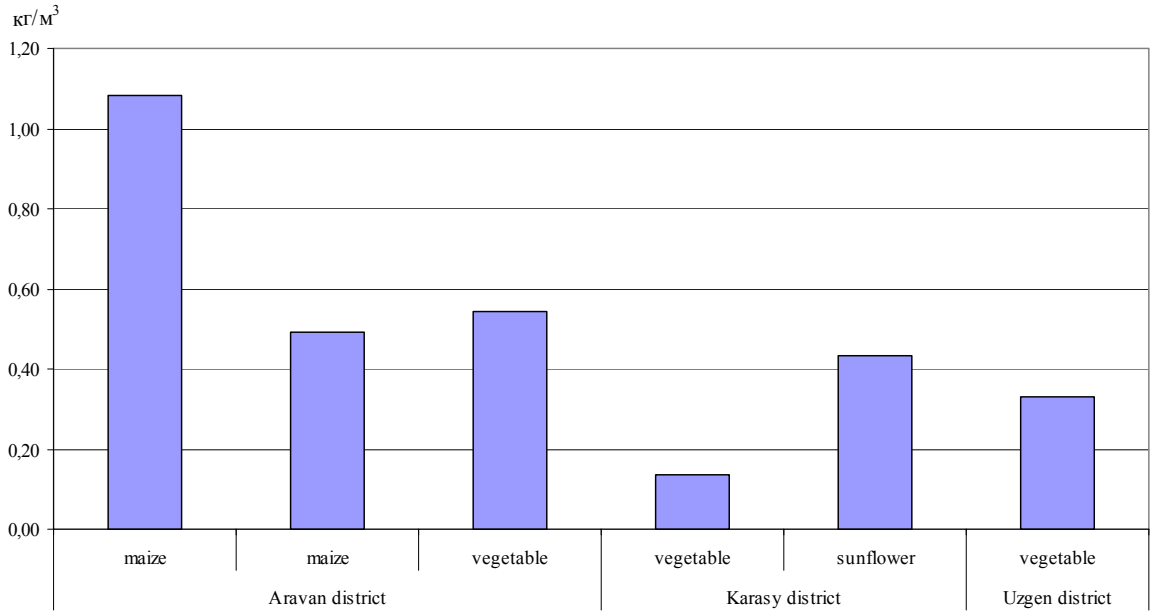
Table 18: Evaluation of water productivity in the demonstration fields regarding cotton and wheat in Sogdiy province in Tajikistan

District	Area, ha	Crop	Specific water supply, (gross), m^3/ha	Crop yield, kg/ha	Productivity, kg/m^3
Sogdiy Province					
Dj.Rasulov	4.2	cotton	6482	3440	0,53
Spitamen	2	cotton	7423	2490	0,34
Zafarabad	2	cotton	3758	4100	1,09
Mastcha	2	cotton	2803	4160	1,48
Kanibadam	1	cotton	5486	4000	0,73

Table 19: Evaluation of water productivity in the demonstration fields regarding various crops in pilot districts in Kyrgyzstan.

District	Name of WUA	Area of DF, ha	Crop	Specific water supply (gross), m^3/ha	Crop yield, kg/ha	Productivity, kg/m^3
Aravan	Kyzyr-abad	0.22	cotton	9905	3840	0.39
		0.34	wheat	5626	3200	0.57
		0.34	maize	2959	3200	0.68
	Topchu	0.4	maize	4725	2320	0.45
		0.12	vegetables	5142	2800	0.31
Karasu	Chomo	1.9	wheat	3916	4790	1.74
		1.9	sunflower	2755	1189	1.17
Uzgen	Karool Dostuk	0.4	wheat	1018	4650	2.61
		0.76	maize	1784	6800	0.63
		0.24	vegetables	10817	3580	0.32

Graph 5.12 Productivity of irrigated water in demonstration fields for different crops in Osh Province



The results of evaluation of irrigation water efficiency and productivity in the demonstration sites of the project showed that not all the objectives proposed by the project have been solved successfully. The main drawback, which can be traced through the evaluation of the results, is that virtually all the partners of the three states have not fully understood the goals and objectives of the project, not fully mastered the proposed technologies and not yet succeed in developing of that only working strategy, which would enable them to manage the implementation process.

Existing strategies and operating principles applicable to demonstration sites are only available in OshSKS, but even there the demonstration of adopted techno-ogies should be improved, as almost all trainers working in the demonstration sites are still not sufficiently prepared. The same is true for the provincial performers also.

5.3 Evaluation of the efficiency of the use of irrigation water and its productivity with regard to private farms

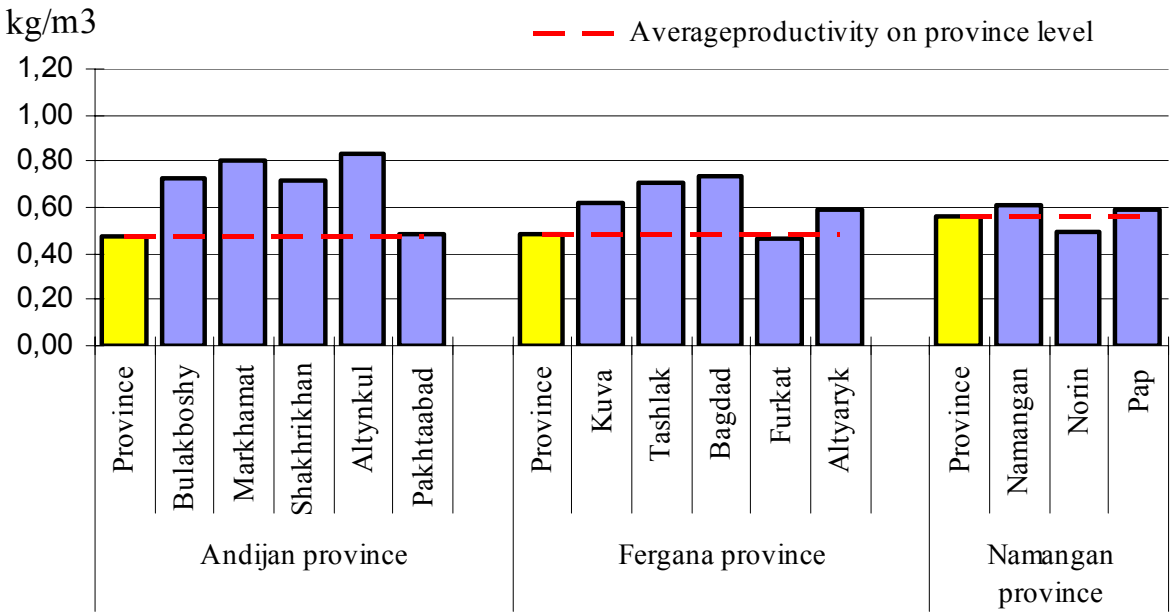
The result of productivity and efficiency of the use of irrigation water is - the result of consulting and dissemination work of each partner and mainly of the trainers of disseminating organizations. That basic information on farmer fields that was obtained is a reflection of effective trainers' work. We must say that in this part of the specific project objectives we got more positive results than in demonstration sites. It would seem to be quite the contrary, but given that we are working with

the certain individuals at the production level and with the individual farmers, it seems to be easier to train the farmer on sophisticated technologies, than reach some great results at the level of production and demonstration plot yourself.

In the Uzbek part, 13 WUA and 155 private farms with the irrigated area of 7249.4 hectares were covered by the project. Productivity of irrigation water for cotton for private farms amounted from 0.46 kg/m3 to 0.98 kg/m^3 in Ferghana province, and from 0.47 kg/m^3 to 1.04 kg/m^3 in Andijan province.

In Andijan province, the productivity indicators for private farms with regard to the average rates of water productivity for ***cotton*** differ by districts. In Marhamat and Altynkul districts, the productivity values in all farms exceed its value over the province. In Pakhtaabad district, the productivity indicators of all private farms are lower than average province indicators by almost 0.3 kg/m^3. With relatively the same cotton yields, ranging from 33 to 36 kg/ha in different districts farmers used different volumes of irrigation water. In Bulakbashi district to obtain the crop yield of 34-35 kg/ha irrigation water was used at the rate of 3600-4700 m^3/ha and in Marhamat district to obtain the crop yield of 35-38ts/ha water was used at the rate of 3400-3700 m^3/ha. In Altynkul district to obtain the same yield - more than 7000m^3/ha of irrigation water was used.

Graph 5.13 Comparison of productivity of irrigated water with average value of WP of the province in Uzbekistan (cotton)

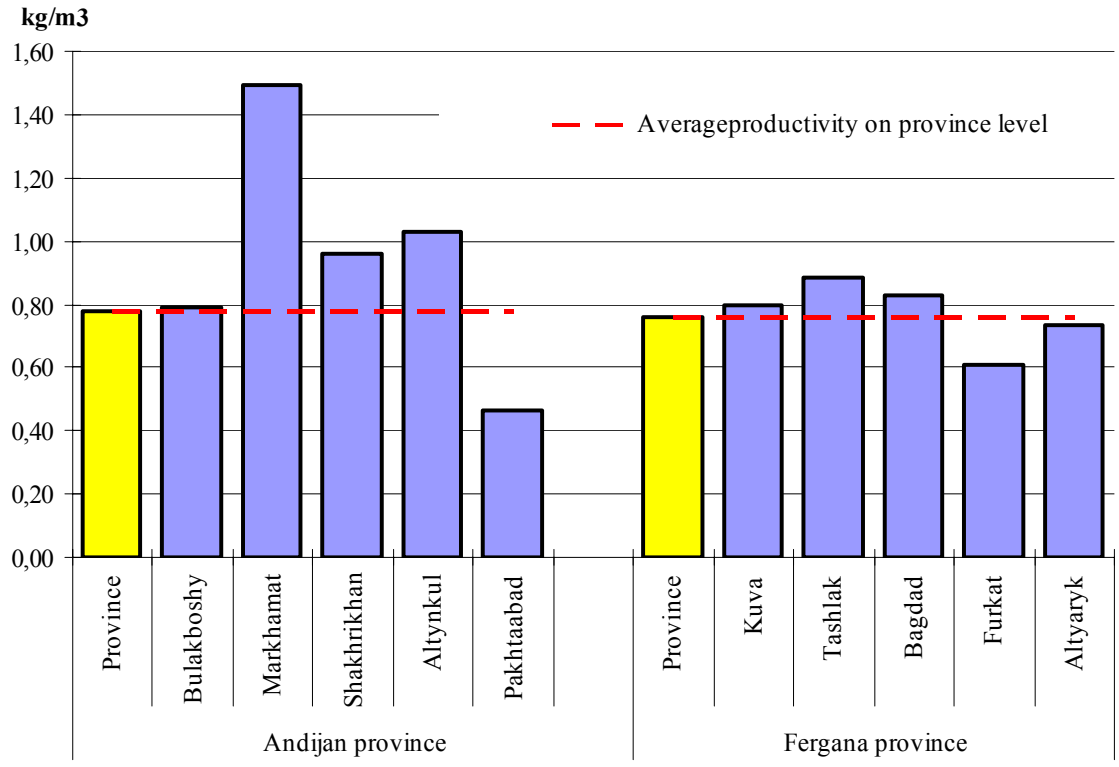


Different irrigation rates were applied in farms of five areas in Ferghana province despite relatively similar values of crop yields in these farms. In Kuvin district they were within the limits of 5000 m^3/ha and higher, and in Furkat district - more than 7000 m^3/ha. In the Boghdod district with the same values of the crop yield the volume of used water was within 3000 m^3/ha.

As for ***wheat*** in Andijan province, only in Marhamat district, farmers have used irrigation water within 3700 m^3/ha-4000 m^3/ha during vegetation period. These rate values are close to the required ones (3000-3500 m^3/ha) and consistent with prevailing weather conditions in 2009. With all this, the crop yield ranged from 50 to 65 c^3/ha.

Farmers in Altynkul district have ontained the same crop yield, but with the irrigation rate of more than 5000 m^3/ha. In Pakhtaabad district more than 8000 m^3/ha, of irrigation water has been used, and grain yield amounted to 45-47 c^3/ha. Therefore, it is obvious that large volumes of irrigation water do not add to crop yield, but on the contrary, in many cases they led to decrease in yield. The use of irrigation water in Ferghana province only confirms this statement. In Tashlock and Boghdod districts the cotton yield amounted to 30-33 tons per hectare with the irrigation rates within the limits of 3000 m^3/ha. In Kuvin, Altyaryk and Furkat districts the same yield was obtained with the irrigation rates within the limits of 5000-6000 m^3/ha.

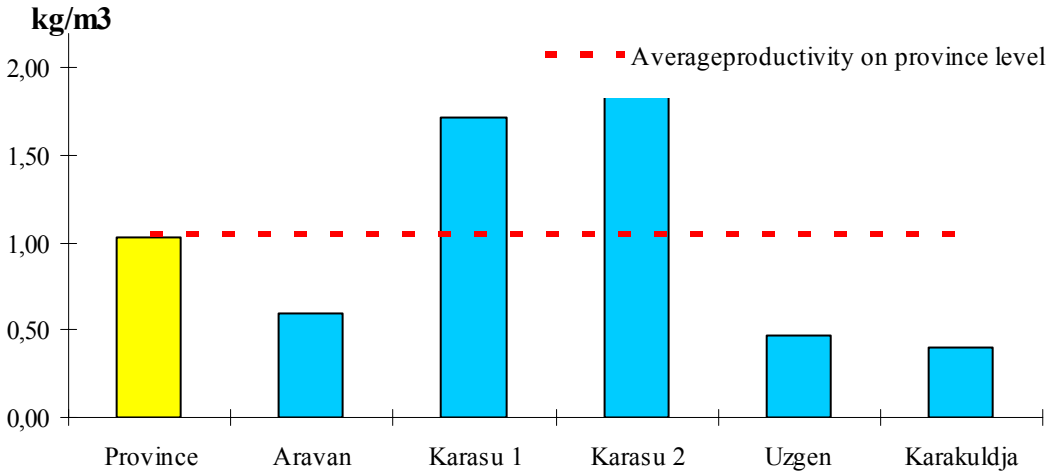
Graph 5.14 Comparison of productivity of irrigated water with average value of WP of the province in Uzbekistan (wheat)



Evaluation and analysis of the use of irrigation water and its productivity regarding the private farms in Osh province showed that farmers have not yet fully understood the irrigation water rates, and those irrigation rates obtained by our "cotton partners" in Aravan district speak for themselves. There is a lot of inconsi-

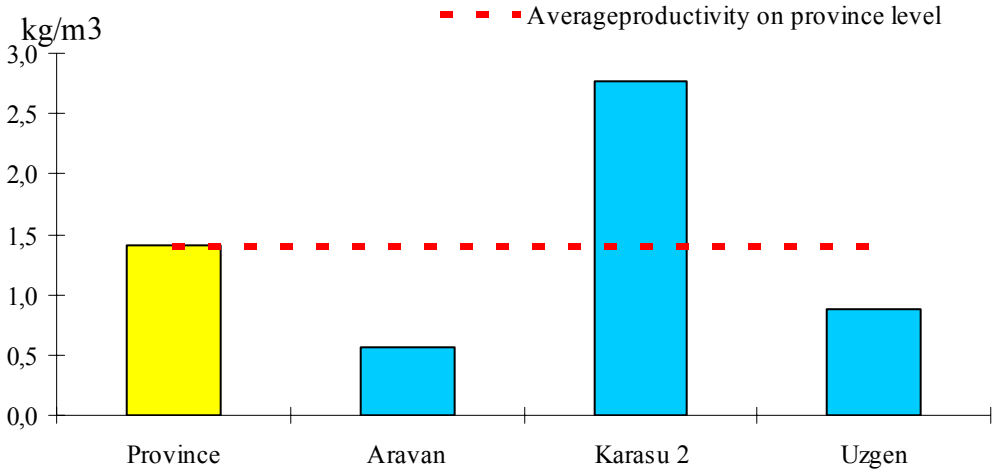
stency in these rates. In terms of specific values the irrigation rates of some farms range from 6500 - 8400 m^3/ha up to 13000 -16000 m^3/ha. The exception is only two farms which have used irrigation water within the limits of 5000 m^3/ha. And one of them is the OshSKS demonstration field.

Graph 5.15 Comparison of productivity of irrigated water with average value of WP of the province in Kyrgyzstan (wheat)



In Karasuu district farmers used irrigation water for wheat actually in that volume this crop required in 2009, considering the heavy rainfall. The irrigation rate was mostly within the limits of 2000 to 3500 m^3/ha. The obtained crop yield was quite good, mostly about 40 kg/ha, some farms have harvested more than 60c/ha. We would like to hope that this is the result of the efficient work of the consultants, who provide regular consultations to the farmers of this district.

Graph 5.16 Comparison of productivity of irrigated water with average value of WP of the province in Kyrgyzstan (maize)



Why such a situation develops and whether it can be improved? Farms, we referred to, are located in the area covered by the project and they are located within the outlets, which since August adopted the newly set water-metering system and transferred to the new payment mode (not per hectare, but for the used volume). Though the farms are in the project zone, they have just begun to receive consultations on the effective use of irrigation water. Since August, when water apportionment took place, the farmers received the water according to their applications. Still not yet understanding the meaning of rationing of irrigation water, farmers do not realize how much they overstate it. Only the result expressed in figures and payment for the used volume will give the first impulse in their minds regarding the volume of use as well as required and allowable rates (See Tables 20 and 21).

Table 20: Productivity of the use of irrigation water in private farms, located around polygons in Aravan district (2009)

№	Name of private farms	Area, ha	Crop yield, c/ha	Irrigation rate, m3/ha	Productivity, kg/m3
		Cotton			
1	Tabaldiev Zakir	0.24	32	13680	0.23
2	Omurzakov Arzybay	0.36	33	8160	0.40
3	Kudayberdyev Rakhman	0.72	36	4752	0.76
4	**Toktorov Muktarali**	**0.22**	**38.4**	**5414**	**0.71**
5	Gaparov Tajimamat	0.5	37	7327	0.51
6	Abdimajitov Mamasadyk	0.12	37	16416	0.23
7	Tashmatov Talysh	0.86	34	6932	0.49
8	Takabaev Alym	0.3	36	6570	0.55
9	Tashmatov Ergesh	0.96	35	6660	0.53
10	Gapparov Aytmamat	0.72	35	12553	0.28
11	Sadyrov Kalyk	0.34	37	9619	0.38
12	Takabaev Alym	0.3	36	6840	0.53
13	Murzaev Turdumamat	0.72	35	7322	0.48
14	Osmonov Ashirali	0.8	35	8468	0.41
15	Abdrakhmanov Kamaldyn	0.5	37	8468	0.44
16	Borubaev Burkan	0.5	35	9331	0.38

In the Kyrgyz part of the project, the performers, guided by the selected strategy, deliberately let the farmers to use that water they used to take. At the same time, consultants and trainers tried to explain the farmers the concept of irrigation mode and provide specific knowledge on water needs for each crop and on technological scheme of irrigation. Provincial performers logically considered that according to the offered approach, the farmer himself should come to the choice of using less water volumes and applying more efficient irrigation schemes. He should not be

forced, *he has to see the difference himself and make his own decision, and all this must be done gradually with the help of trainers' consultations and outlet leaders.*

Table 21: Productivity of the use of irrigation water in private farms, located around polygons in Karasui district -1 (2009)

№	Name of private farms	Area, ha	Crop yield, c/ha	Irrigation rate, m3/ha	Productivity, kg/m3
wheat					
1	Bektirov Kochkor	1.0	42.0	2534	1.7
2	Taylakov Almanbet	1.0	37	2076	1.8
3	Sagynbaev Asan	0.88	39.8	2158	1.8
4	K.Kh.Jamabek	1	41	2357	1.7
5	Koychumanov Kylych	1	46	3092	1.5
6	Kalyev Abdyrakhman	0.73	22.6	3602	0.6
7	Dunaev Osmon	1	48	2194	2.2
8	Ergeshev Kanybek	0.5	49	2617	1.9
9	Jeenbekov Orzbek	0.7	44	2206	2.0
10	Yusupov Abdumitalip	0.8	42	2127	2.0
11	Beknazarov Uson	0.7	45	2277	2.0
12	Isratsilov Abdrakhman	0.5	38	3123	1.2
13	Amatov Ergeshbay	1	38	2185	1.7
14	Murzabaev Payzilda	0.3	42	5037	0.8
15	Abdullaev Ravshan	0.7	39.3	1923	2.0
16	Ergeshev Abduvali	0.8	41	2631	1.6
17	Maksutov Asatylla	1	34.8	1166	3.0
18	Kulasanov Abdysattar	0.7	38.6	2545	1.5
19	Sharipova Gulsun	0.4	67	3487	1.9
20	Ergesheva Maaram	0.2	71	3792	1.9
21	Avazov Abdukerim	0.3	61	3605	1.7

Finally, it should be noted that farmers had not yet fully aware of the importance of rationed use of irrigation water. In spite of receiving the consultations and advices from the trainers of dissemination organizations, they still do not comprehend all the aspects of complex technologies and are not fully used the received advices. That is why; in most cases, we see overestimated irrigation rates and low values of productivity. However, it must be said that the main goal has been achieved – today there is an understanding of importance of the offered technologies and an intention to use them. So, we can say that farmer had changed his attitude to water; he realized that water, like electricity, can be metered and used economically. And this is one of the major achievements of the project in 2009.

5.4 Agro-economic indicators of the project demonstration sites

Because of monitoring, all physical and financial expenses of farms of each demonstration site (from plowing to harvesting and sale) were identified and analyzed thoroughly. Depending on volume of agricultural works and their costs all expenses connected with the land treatment operations are calculated in the national currency of the country in which the farm is located. To compare the performance in the demonstration fields, located in different countries, the financial data was turned into U.S. dollars according to the average annual rate, which at that period in 2009 was as follows: 1 USD = 1523 Uzbek Soum; 1 USD – 4.36 Tajik Somoni.

Agro-economic indicators of district polygons (See Tables 22-24) allow us to estimate the current efficiency of agricultural production in general and to analyze the differences among polygons regarding individual elements in value terms in Uzbekistan.

First, it should be noted that the value of gross output, which is directly connected with the obtained yield is noticeably different with certain polygons. Thus, in Andijan province the greatest revenue from the sold crop was obtained in PF "I. Akiyev - $958 per hectare deducting variable costs, at the lowest variable cost $ 655 per ha, and the smallest gain was obtained in PF “Mirzaakhmad ota” - 345 $ / ha, with the lowest yields and high costs. With the average gross production

(average of all polygons) equal to $ 1.326 per hectare, the average cost of agricultural production in all pilot polygons were $ 770 per hectare. The highest net profit for cotton has been received at the polygon of Bulakbashi district (PF "I. Akiyev") - $ 899 per hectare, the lowest income has been received in Pakhtaabad district (PF "Mirzaakhmad ota ") - $ 311 / ha. The average net profit for polygons of Andijan province was $ 468 per hectare.

Table 22: Agro-economic indicators of the project demonstration fields in Andijan province

Indicators	Unit	Name of Private Farm				
		Bulakbashi district, PF *"I.Akiev"*	**Markhamat district, PF *"Mirzoakhmad Sakhovati"***	**Altynkul district, PF *"Bakht Imkon Rivozh"***	**Pakhtaabad district, PF *"Mirzoakhmad ota "***	**Shakhrikhan district, PF *"Dilshoda"***
Variable costs	$/ ha	655	768	748	905	777
Crop yield	t/ ha	3,66	3.8	3.6	3.46	3.61
Gross product	$/ ha	1612	1372	1194	1250	1202
Profit	$/ ha	958	605	446	345	425
Fixed charges	$/ ha	59	47	81	34	75
Net profit	$/ ha	899	558	365	311	350

Table 23: Agro-economic indicators of the project demonstration fields in Ferghana province

Indicators	Unit	Name of Private Farm					
		Bagdod district, PF *"Nilu"*	**Bagdod district, PF *"Kosymov Otabek "***	**Kuvin district, PF *"Kakhramon Davlat Sakhovati"***	**Oltyaryk district, PF *"I.Ortykov"***	**Tashlock district, PF *"Sobyrota"***	**Furkat district, PF *"Botyrjon"***
Variable costs	$ /ha	486	674	1014	752	752	554
Crop yield	t/ ha	3.52	3	3.7	4	3	4
Gross product	$/ ha	1390	894	1646	1099	1005	1339
Profit	$/ ha	904	219	632	347	253	785
Fixed charges	$/ ha	55	30	39	53	66	62
Net profit	$/ ha	849	190	593	294	187	723

In Ferghana province (See Table 24 and 25) the highest gross product of sold crop of cotton has been received in PF "Kakhramon Davlat Sakhovat" - 1646 $ / ha, the smallest gross product - in PF "Kosimov Otabek - 894 $ / ha. The highest cost of agricultural production was registered in PF "Kakhramon Dawlat Sahovat" - 1014 $ / ha, and the lowest one - in PF "Nilu" - $ 486 per hectare, with the largest net profit for cotton - $ 849 per hectare. The minimum net profit gained in PF "Sobir ota" was $ 187 / ha.

In cultivation of winter wheat, the highest net profit obtained at polygon " Kakhramon Davlat Sakhovat" was $ 160 per hectare (at a cost of agricultural production - $482/ha), and the lowest profit was stated in PF "Botirjon" – here the net profit was only $ 60/ha. PF "Botirjon" has received less income only due to low sale price ($ 124 ha) for wheat and high fixed costs amounted to $ 77 ha, while in PF "Kakhramon Davlat Sakhovat" the figures were $ 136 per hectare and $ 34/ha, respectively.

That was the first year in the project for Namangan province; so that is why only three districts have been selected there, though in the future we plan to expand the scope of activities. In Namangan province (Table 24) the highest gross product was obtained in PF "Khamrovali Omonov" - $1565 /ha, while the lowest was obtained in PF "Durdona Gairat" - $1384 / ha and in PF "Nabijon ota" - $1384 / ha. The highest cost of agricultural production was registered in PF "Durdona Gairat" - $694/ ha. The highest net profit for cotton was obtained in PF "Khamrovali Omonov" - $950/ ha and the least - in PF "Durdona Gairat" - $609/ha.

Table 24: Agro-economic indicators of the project demonstration fields in Namangan province

Indicators	Unit	Name of Private Farm		
		Namangan district, PF *"Nabyjon ota"*	Pup district, PF *"Khamrovali Omonov"*	Naryn district, PF *"Durdona Gayrat"*
Variable costs	$/ ha	562	565	694
Crop yield	t/ ha	3.75	4.20	3.8
Gross product	$/ ha	1384	1565	1384
Profit	$/ ha	822	999	690
Fixed charges	$/ ha	64	49	80
Net profit	$/ ha	758	950	609

Observing the polygons of Sogdiy province (See Table 25) one can see the high value of gross product in PF "Buri Kurmas" - $1996/ha and the lowest in PF "Shark" - $1174/ha. Costs of agricultural production in PF "Khimoyatbonu" - $902/ha were marked as the highest, and the lowest level of costs was registered in PF "Buri Kurmas" - $631/ha. According to the data, presented in the Table, the

highest net profit was registered in PF “Buri Kurmas” – $ 1000/ha, and the least net profit - in PF "Shark” - $324/ha.

Crop yield The data on crop yield in the demonstration fields is of practical interest as it is the final indicator of agriculture activities. In the year of 2009, all cotton fields (with the exception of farm "Shark") demonstrated quite high production rates - the yield of raw cotton amounted to 30.0 c3/ ha (PF "K. Otabek") and to 42,0 kg / ha (PF " Kh. Omonov "). In PF "Shark" the low crop yield (24.9 c^3/ha) can be explained by the fact that the farmer used the seeds of fine-stapled cotton, which for its full development requires high temperatures and a longer (30 - 40 days) vegetative period. Despite the fact that the yield of this variety is 25 - 30% less than stratified varieties, the total revenue from the sold products exceeded the profits received from mean-stapled varieties, thus increasing profitability of the farmer.

Table 25: Agro-economic indicators of the project demonstration fields in Sogdiy province

Indicators	Unit	Name of Private Farm				
		Zafarabad district, PF “*Navbakhor*”	**Mastchin district, PF “*Amakdjon*”**	**Kanibadam district, PF “*Khimoyatbonu*”**	**Dj.Rasulov district, PF “Buri Kurmas”**	**Spitamen district, PF “*Shark*”**
Variable costs	$/ha	766	740	902	631	676
Crop yield	t/ ha	4.1	4.2	4	3.44	2.49
Gross product	$/ ha	1645	1670	1767	1996	1174
Profit	$/ ha	880	931	865	1365	498
Fixed charges	$/ ha	177	121.40	148	366	174
Net profit	$/ ha	702	809	717	1000	324

5.4.1 Assessment of costs of agricultural production by its individual components

The combined data, presented in graphs 5.4.1 – 5.4.5, allows you to make a comparative analysis of the variable costs in the demonstration fields in percentage.

Mechanized labor. In all three countries, the average cost of mechanized works used for cotton growing in farms amounted to 21.8% in relation to variable costs,

though in several demonstration fields the deviations from the average indicator were quite significant. The lowest cost of using farm machines was registered in the farm "Amakdzhon" (9.7%) in Sogdiy province in Mastchin district and the reasons for insufficient use of tractors were different. In the first case, it was due to worn out equipment, and in the second, it was caused by the shortage of rented equipment and replacement of some mechanized operations with manual labor. The high level of mechanization of field work is marked in PF "Shark" of Spitamen district (32.7%) and in PF "Dilshoda" (28.4%). Relatively low cost of mechanized labor was registered in the fields with winter wheat (2.45%). The highest cost of mechanized labor was registered in Andijan province, the value of which reaches by some farms 25-27% of the amount of variable costs. In Ferghana and Namangan provinces, the cost is within 15%.

Manual labor. In almost all countries, the highest costs fall to the share of manual labor. In Uzbekistan, in PF "Durdona Gairat" of Naryn district in Namangan province the cost of manual work amounted to 55.9%, where due to low mechanization of cotton growing the seasonal workers are attracted on regular basis. Somewhat different reasons of intensive use of manual labor in the field were presented in PF "Mirzaahmad ota", where cotton was grown under foils - this technology is known as one of the high-cost, as major work on seeding and fertilizing is done manually. However, in this farm it resulted into good crop yield and high productivity of water.

Low cost of manual labor in PF "Shark" of Spitamen district is explained by high level of mechanized operations in this farm. Low cost of manual labor in cultivation of winter wheat (10.4-14.6%) is connected with the specific technology

of that crop cultivation. In general, it should be recognized that the extensive use of manual labor caused not only by the level of mechanized operations, but also by the quality conditions of the fields: the degree of infestation of crops with weeds, diseases and pests.

Seeds. The recommended seeding rate for middle-grade cotton varieties is 30-35 kg/ha for glabrous seeds and 50-60 kg/ha for pubescent seeds. However, in all cotton-growing farms the recommended rates were exceeded significantly. That was particularly noticeable in PF "Amakdzhon" and "Khimoyatbonu". As farmers explained that was a kind of secure measure against poor seed quality, which they get from the seed-stock, so in case of low germination of seeds or loss during transportation, adverse weather conditions, flaws in the planting, they are secured by enough quantity of sowing material.

Chemical weed and pest killers. In farms, the processing of crops was aimed mainly at the destruction of foci of spider mites, aphids and cotton worms and at the seed treatment of winter wheat. The cost of chemicals in cotton-growing farms ranged from 9.0% (PF "Amakdzhon") to 0.6 % (PF "Sobir ota), which was connected with the number of field units affected by pests as well as with availability of effective (i.e. expensive) chemical substances to farmers. In seven farms they applied a local homemade substance ISO (a mixture of laundry soap, tobacco leaves and alkalis), which restrains the spread of aphids in the crop. In farms "Botirjon", "IA Akiyev" and "Amakzhdon" the biological means of plant protection - Trichogramma and Gabrobrakon were successfully used against the cotton cutworm.

Mineral fertilizers. Number of fertilizers applied to nineteen demonstration cotton fields ranged from 7.7% (PF "Nilu") to 37% («Khamrovali Omonov"). This is the total amount, expressed in pomace, which is in the opinion of farmers sufficient, but slightly lower than the rates recommended for obtaining high yields. This is explained by the fact that low quantity of the applied fertilizers is connected with the limited provision of fertilizers and the lack of them in the market. There is a clear link between the amount of fertilizers and the crop yield, but we should not forget that the level of crop productivity depends on many other factors too. Crop yield is influenced not only by the total amount of used fertilizers, but also by their composition (the content of such macro-elements as nitrogen (N), phosphorus (P) and potassium (K)).

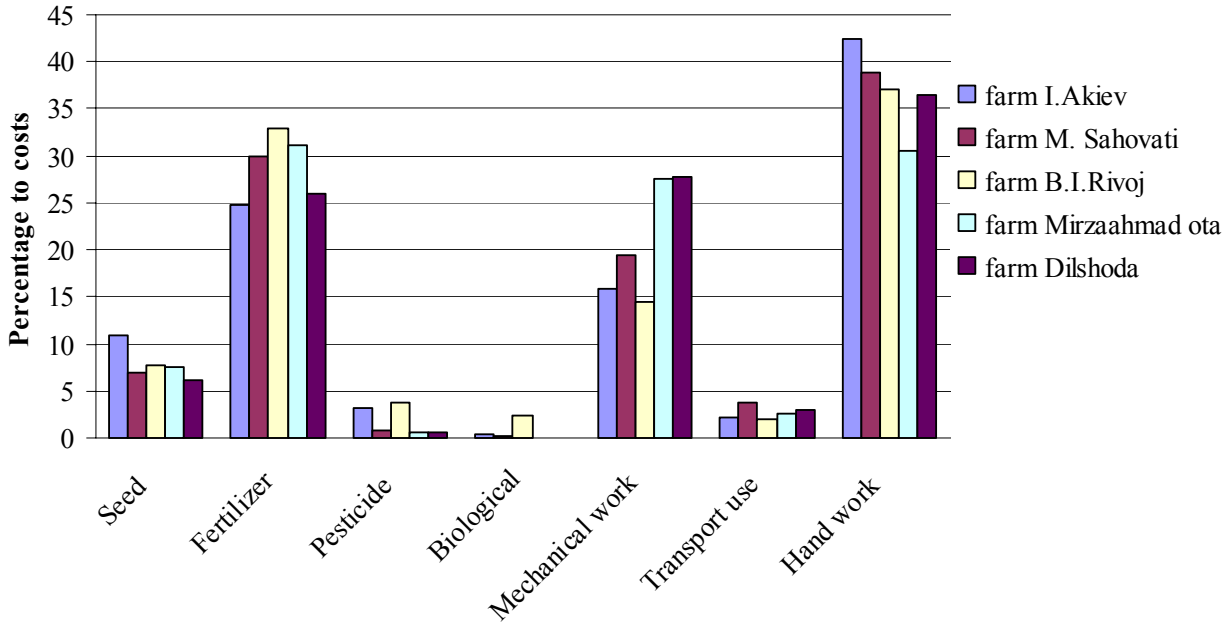
Transportation. These costs include transportation of harvest and the delivery of seeds, fertilizers and fuel to the field, and in some cases transportation of seasonal workers. The results showed that the highest transportation costs were registered in PF "Kakhramon Davlat Sahovat"; and the lowest - in PF " Shark ", which was mainly related with the size of the demonstration fields, the volume of grown product and the distance to the place of delivery of agricultural raw materials. Low transport costs were recorded in the wheat-grown farms, and that was related with the small-sized areas of the demonstration fields.

Foils. In the farm "Abdurahmon ota" cotton is cultivated with the use of polyethylene film, the cost of which was 64 kg/ha. In the other demonstration fields, crops were grown in open ground.

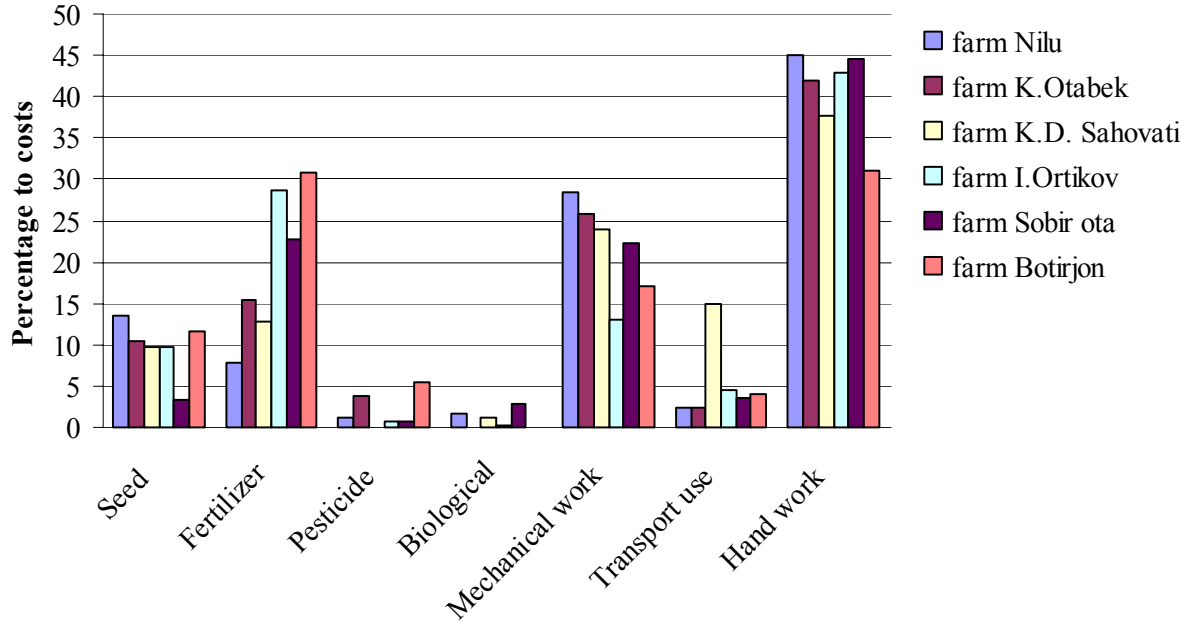
Water. There is no direct payment for water in the Republic of Uzbekistan, therefore, we can estimate water related costs only with regard to the farms in Tajikistan. The cost of water depends on the volume of irrigation water supplied to the field and the pricing set for that type of water. In Tajikistan, the water costs in the farms ranged from 1.2% in PF "Amakdzhon" to 6.7% in PF "Buri Kurmas", this was identified by the set water price during certain months of the growing season and the volume of used water.

Fixed costs. Size of the fixed costs is specified by the rate of land tax (it varies by country), payments for electricity, taxes to the WUA, etc. In Uzbekistan, the costs of this item were ($66/ha). The highest fixed costs were recorded in Tajikistan ($ 366/ha).

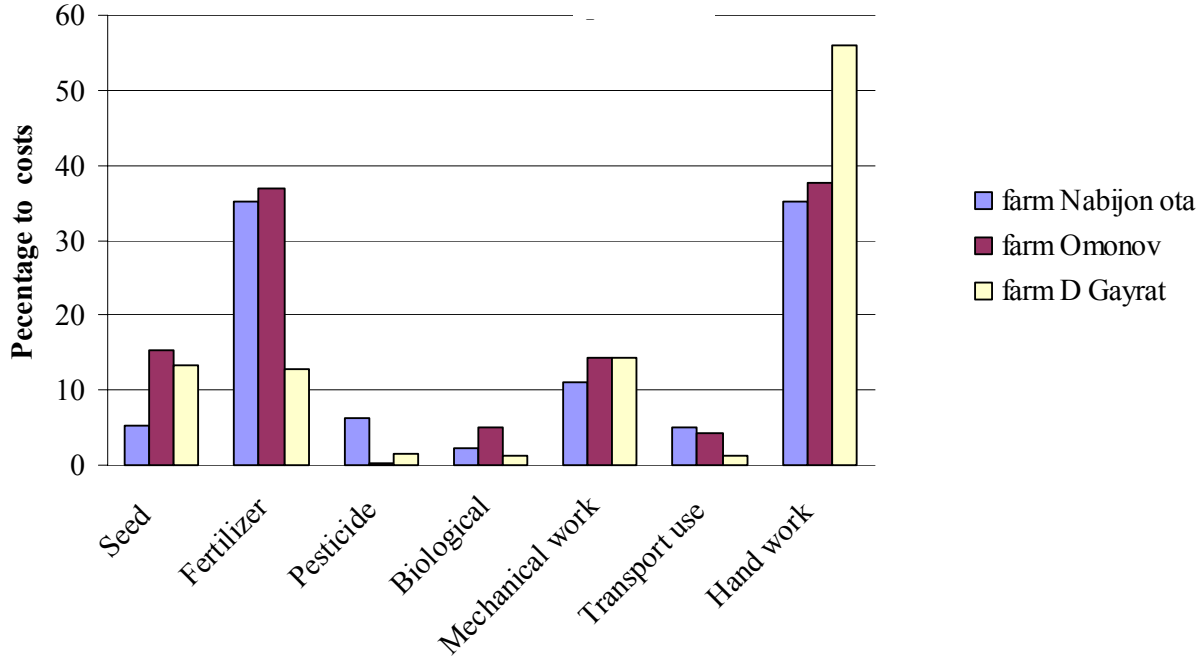
Graph 5.17 Costs of agricultural production of cotton of demonstration fields in Andijan



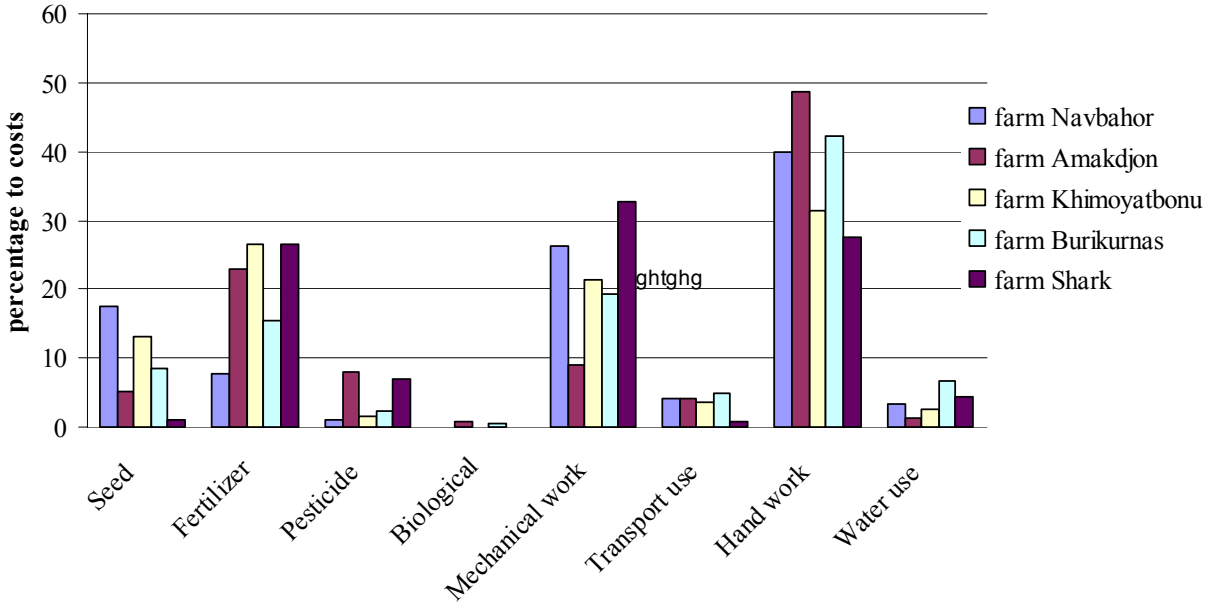
Graph 5.18 Costs of agricultural production of cotton of demonstration fields in Ferghana province



Graph 5.19 Costs of agricultural production of cotton of demonstration fields in Namangan province



Graph 5.17 Costs of agricultural production of cotton of demonstration fields in Sughd province



CONCLUSIONS

Finally, it should be noted that farmers had not yet fully aware of the importance of the rationed use of irrigation water. Despite receiving the consultations and advices from the trainers of dissemination organizations, they still do not comprehend all the aspects of complex technologies and do not fully use the received advices. That is why; in most cases, we see overestimated irrigation rates and low values of productivity. However, it must be said that the main goal has been achieved – today there is an understanding of importance of the offered technologies and an intention to use them. And we can say that farmer had changed his attitude to water, he realized that water, like electricity, can be metered and used economically. And this is one of the major achievements of the project in 2009.

By the results of the first year of the project, we can draw the following conlusions:

1. Key interests of farmers, revealing the specific priorities and strategic actions for partners have been identified in all three countries;
2. At the same time it must be said that the partners in each country taking into account the social, structural and water-resources conditions in the agriultural production should pay serious attention to the improvement and refinement of working strategies with farmers and strengthen the mechanism of interaction between them;
3. Provincial performers do not fully understand the fundamental principles and objectives of the project, and this deprives them of the opportunity to leverage their capacity to achieve the objectives of the project;
4. Analysis of the results showed that the advisory work done to the farmers, yields certain positive results, but they are not quite apparent;
5. In most cases, farmers accept the consultations, they need it and in some places, they are themselves looking for the specialists who could provide them with consultations.
6. Farmers willingly take the bulletins, but how far they use them is still a question and to find this out, it is necessary to develop a monitoring technique, able to trace the results of the consulting efforts and dissemination of the technologies.

7. Farmers support the involvement of experienced and acknowledged agro-omists in the WUA staff. Unfortunately, this practice is not implemented everywhere, i.e. there is no WUA - in Kanibadam, Spitamen and Mastchin districts, despite this, farmers draw the attention to their necessity and utility.
8. There is a high interest among Kyrgyz farmers to establishing of the water-metering system, transition to payment system by actually used volume, creating of Private Farm Groups (users of one outlet), improvement of contractual relations and efficient water use at field level in Kyrgyzstan.
9. In Tajikistan, establishing of the water-metering system at the level of Dekhkan Farms, improvement of contractual relationships and the intro-uction of payment system by actually used volume was the linchpin for the development of the next steps aimed at increase in efficiency and prouctivity of the use of irrigation water. There is a list of applications from 53 farmers for construction of gauging stations (hydro-posts) at their own expense and establishing the water-metering system, payment and contractual relations with the “water supplier” via training, methodical materials and technical appraisal.
10. In Uzbekistan and Tajikistan, the Information Centers should strengthen the work raising their competent level in work with farmers, development of methods for monitoring of the farms, counseling and training of farmers.
11. The provincial group should hold different trainings for the provincial performers of partner organizations on a regular basis throughout the year proiding the opportunity to discuss the training strategy of the project's tasks and objectives.

APPENDIXES

Appendix I.

Organization of the demonstration fields of WPI-PL project in Kyrgyzstan, Tajikistan and Uzbekistan

Reg.	District	Name of WUA	Area, ha	Demo fields	Area, ha	Crop structure				Type of water-metering device	Observer
						cotton	wheat	maize	other		
SOGDIY	Dj.Rasulov	Madaniyat	29	Buri Kurmas	9.2	4.2	0	5	0	Inlet 2ВЧ-25 Outlet ВТ-90	Daliev Kh.
	Spitamen	n/a	13	Shark	2	2	0	0	0	Inlet ВЧ-50 Outlet ВТ-90	Ochilov Sh.
	ОО ИАК		**42**		**11.2**	**6.2**	**0**	**5**	**0**		
	Zafarabad	Kanz	11	Navbakhor	1	1	0	0	0	Inlet ВЧ-50 Outlet ВТ-90	Djumaev S.
	Mastcha	n/a	45	Amakchon	2	2	0	0	0	Inlet ВЧ-50 Outlet ВТ-90	Zievadinov Z.
	Kanibadam	n/a	2.49	Khymoyatbonu	1	1	0	0	0	Inlet ВЧ-50 Outlet ВТ-90	Mansurov O
	ОО Zarzamin		**58.49**		**4**	**4**	**0**	**0**	**0**		
	Total	**5**	**100.49**	**5**	**15.2**	**10.2**	**0**	**5**	**0**	**10**	**5**
OSH	Aravan	Kyzyr-abad	0.56	Kyzyr-abad	0.56	0.22	0.34	0	0	Inlet ЛС-30 Outlet ВТ	Taktarov M
		Topchu	0.52	Topchu	0.52	0	0	0.40	0.12	Inlet ВЧ-25 Outlet ВТ	Tolabekov A

Reg.	District	Name of WUA	Area, ha	Demo fields	Area, ha	Crop structure				Type of water-metering device	Observer
						cotton	wheat	maize	other		
	Karasu	Maz-Aikal	1.35	Maz-Aikal	0.70	0.40	0	0	0.30	Inlet ВЧ-25 Outlet ВТ	Abdusattarov A
		Chomo	1.90	Chomo	1.90	0	1.90	0	0	Inlet ЛС-30 Outlet ВТ	Kyrgyzbaeva A
	Uzgen	Karool Dostuk	1.40	Karool Dostuk	1.40	0	0.40	0.76	0.24	Inlet ВЧ-25 Outlet ВТ	Madaliev M.
	Karakulzja	October	0.50	October	0.50	0	0	0	0.50	Inlet ВТ Outlet ВТ	Jusubaliev S.
	Total	**6**	**6.23**	**6**	**5.58**	**0.62**	**2.64**	**1.16**	**1.16**	**12**	**6**

App. I. Continuation

Reg	District	Name of DF	Area, ha	Demo fields	Area, ha	Crop structure				Type of water-metering device	Observer
						cotton	wheat	Resowing of maize	other		
FERGHANA	Bogdod	Kushtegyrmon hydrotechnigi	41	Kosymov Otabek	3	3	0	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Ruziev B.
			47	Nilu	4	4	0	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Ruziev B
	Kuva	Tolmazor chashmasi	63.5	Kakhramon Davlat Sakhovati	4	2	2	2	0	Inlet ВЧ-50 Outlet ВЧ-25	Akhmedov J.
	Toshlock	K.Umarov mirob	41.7	Ergash ota	1.6	0	1.6	0	1.5	Inlet ВЧ-50 Outlet ВЧ-25	Nishonov A.
			33.5	Sobyr ota	2.2	2.2	0	0	0	Inlet ВЧ-50 Outlet ВЧ-25	Nishonov A.
	Furkat	Kukonlik Bustonboy O.	26.5	Botyrjon	4.5	0	4.5	4.5	0	Inlet ВЧ-50 Outlet ВЧ-25	
	Oltyaryk	Povulgon	93.8	I.Ortykov	7.1	2.5	4.6	4	0	Inlet ВЧ-50	Mamadjanov R.

Reg	District	Name of DF	Area, ha	Demo fields	Area, ha	Crop structure				Type of water-metering device	Observer
						cotton	wheat	Resowing of maize	other		
		oby-khayot								Outlet ВЧ-50	
	Total	**7**	**347**	7	**26.4**	**13.7**	**12.7**	**10.5**	**1.5**	**14**	**7**
ANDIJAN	Buloknashi	S.Kasymov	37.8	I.Akiev	30.4	16.4	14	0	0	Inlet ЛС-40 Outlet ВЧ-50	
	Pakhtaabad	Bakhodyrjon Usmonov	36.9	Abdurakhmon ota	10.5	6.5	4	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Mamadaliev M.
	Markhamat	Tomchi kuli	47.7	Mirzoakhmad Sakhovati	12	6	6	0	0	Inlet ЛС-50 Outlet ЛС-30	Mirzakhmedov R.
	Altynkul	Zilol Toshkent suvi	149.9	Bakht Imkon Rivozh	26	14	12	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Ismoilov F.
	Shakhrikhon	Shakhrikhon ok kalmok	43.4	Dilshoda	9	7	2	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Aliaskarov R.
	Total	**5**	**315.70**	5	**87.9**	**49.9**	**38**	**0**	**0**	**10**	**5**
NAMANGAN	Noryn	Uzbekistan	31.1	Durdona Gayrat	2	2	0	0	0	Inlet ВЧ-50 Outlet ВЧ-50	Ergashev R.
	Pup	Syrdaryo-Orom	29.7	Kh. Omonov	2	2	0	0	0	Yartsev	
	Namangan	Idjodkor	68.6	Nabyjon ota	10	10	0	0	0	Inlet Ярц-40 Outlet ВЧ-50	Aminova S.
	Total	**3**	**129.40**	3	**14**	**14**	**0**	**0**	**0**	**6**	**3**
	Total of Uzbekistan		**792.1**		**128.3**	**77.6**	**50.7**	**10.5**	**1.5**		

Appendix II

Trainings and seminars conducted by partners of the Kyrgyz National team in 2009

№	Date	Topic of trainings - seminars	Number of participants
ZOKI			
1	4.04.2009	The overall situation of water resources in Kyrgyzstan. The concept of irrigation methods and factors of irrigation. Hydromodulos zoning and crop irrigation mode. Creating a water management plan in WUA and in private farms. Organization of water-metering system, methods of water measurement, selection of type of water-metering devices and location for its installation.	24
2	5.06.2009	Determination of the required water flow in the field, choice of optimal volume of water for each furrow and the optimal length of the furrows, depending on land's slope and soil areas. Water- physical properties of soil. Training on methodology. Methods and approaches for training farmers.	21
3	15.08.2009	Mechanism of efficient use of irrigation water in private farms with small areas ("Sokolok" method). Methods of uniform distribution of water in the furrows (this training was conducted in the demonstration field by the specialist from KyrgNII (Kyrgyz Scientific-Research Institute)).	23
4.	17.09.2009	Types of pests and diseases in agricultural crops. Terms of appearance of various pests by crops and the phases of their development. Practical demonstration of pests. Biological methods of pests and diseases control in agricultural crops.	20
5.	3.11.2009	Justification of water use, crop requirements for water and irrigation modes. Zoning. Methods for identification of the crop irrigation timing. Filling the tables with records of irrigation water, metered in the field with overflows. What is the flow and volume of irrigation water? Methods of transfer of water consumption by volume.	20
Osh WUA SRU			
1	29.07.2009	Training on "Mechanism of efficient use of irrigation water in private farms with small areas" for farmers and outlet leaders was held on the basis of drainage canal WUA "Maz-Aykal" in	35

№	Date	Topic of trainings - seminars	Number of participants
		Karasu district.	
2	30.07.2009	Training on "Mechanism of efficient use of irrigation water in private farms with small areas" for farmers and outlet leaders was held on the basis of drainage canal WUA "Kyzyr-Abad" in Aravan district	31
3	31.07.2009	Training on "Mechanism of efficient use of irrigation water in private farms with small areas" for farmers and outlet leaders was held on the basis of drainage canal WUA "Karool-Dostuk" in Uzgen district.	37
Osh RAS			
1-6	10.06 - 24.06.2009	Village "Kyzyr-Abad" and village "Jany-Abad" of Aravan district, village "Zhylkeldi" and "Otuz Adyr" of Karasu district, village "Karool of Uzgen district, village "Oktyabr" of Karakulzhin district. Training for farmers to familiarize with the project "Improving water productivity at field level": the goals and objectives of the project, dissemination of innovative irrigation technologies. Training on the topic: "Implementation of new agricultural technologies".	162

Apppendix II (continued…)

Schedule of trainings and number of participants

№	Topic of Training	Date of training	Number of trainings prepared by the Information Center						Out of project		NII	Nat. Cord. & reg. water	CECI	Total
			IAC			OO "Zar-Zamin"			Zar-Za-in	IAK				
			B.Gafur	Dj.Rasul	Spitamen	Mastch	Zafarabad	Kanibadam						
1	Pest control	13.06.2009	1	2	1	1	1	1	10	1	0	1	5	24
2	Organizing the working day in the field. Crop irrigation mode	16.07.2009	1	2	2	1	1	2	7	0	0	0	3	19
3	The need of major agricultural crops in irrigation water and the choice of optimal technological scheme of irrigation	31.07.2009	1	2	2	1	1	1	7	0	2	0	2	19
4	Construction of water-measuring devices. Measuring of water flow in the gutter channels and closed irrigation networks. Irrigation flowsheet. Water-physical properties of soils	14.08.2009	1	2	1	0	1	1	0	1	0	1	2	10
5	Hydro-modulus. Creating a water management plan.	28.08.2009	1	2	2	1	1	2	10	0	0	1	1	21
6	Procedure of calculating of payment	24.09.2009	1	2	2	1	1	1	7	0	0	1	0	16

	for the use of irrigation water and water users' accountability												
7	WUA structure and objectives, relationship with DF (F). Principal articles of Water Code of Tajikistan	08.10.2009	1	2	2	1	1	2	8	0	0	0	1	18
8	Principal articles of Land Code of Tajikistan. Objects of drainage reclamation. The drainage effect on soil and yield of crops. Methods and means of drainage. Drainage system. Control of groundwater level. Procedure of certification of water-measuring devices.	30.10.2009	1	2	2	1	1	1	8	0	1	1	0	18
9	The main articles of the Law on the DF (F) of RT. Reclamation of saline soil. Measures aimed at prevention of salinization. Determination of flushing rates. Vertical drainage.	12.11.2009	1	2	2	1	1	2	0	6	0	0	2	17
Total:			**9**	**18**	**16**	**9**	**9**	**13**	**57**	**7**	**3**	**5**	**16**	**162**

Apppendix II (continued…)

List of trainings conducted by the Uzbek partners in the framework of project «WPI-PL» in 2009

№	Date	Location	Topic of Training	Number of participants
Trainings done by the Information Center for trainers				
1	Aug, 5	Andijan IC	Aims and objectives of the project, discussion of an action plan for 2009. Role of advisory service in increasing the water and land productivity. Monitoring forms and their application. "Methodology for monitoring of various aspects: irrigation and irrigation technology, phenology, agro-economic indicators, and others." "Methods of visual assessment of the irrigated field". "Advisory Service for farmers on increasing the profits"	14
2	Aug, 15	Ferghana BISA	Role of advisory service in increasing the water and land productivity. Organization of water-metering system, methods of water measurement, selection of type of water-metering devices and location for its installation. "Monitoring forms and their application." Combating pests and diseases of crops, land treatment actions, defoliation and testing of cotton	14
3	Aug, 17	TRAINING CENTER Andijan BISA	Role of advisory service in increasing the water and land productivity. Organization of water-metering system, methods of water measurement, selection of type of water-metering devices and location for its installation. "Monitoring forms and their application." Combating pests and diseases of crops, land treatment actions, defoliation and testing of cotton	20
4	Aug, 27	Namangan BISA	"Creating a water management plan in PF"." Crop irrigation mode, identification of rates and timing for irrigation". "Monitoring forms and their application."." Combating pests and diseases of crops", "Weeds control", "Needs of main crops in irrigation water by development stages". "Water-physical properties of soil and identification methods"	19
5	Sep, 5	Ferghana BISA	"Crop irrigation mode based on hydro-modulus zoning". "Creating a water management plan, distributions of water limit" "Land treatment in cultivation of winter wheat". "Water-physical properties of soil and identification methods".	19

№	Date	Location	Topic of Training	Number of participants
6	Sep, 9	Andijan BISA TRAINING CENTER	"Creating a water management plan, distributions of water limit", "Recommendation on choice of technological scheme of irrigation", "Winter wheat sowing and land treatment", "Water-physical properties of soil and identification methods".	20
7	Nov,17	Ferghana BISA	Advisory Service for farmers on increasing the profits. Land treatment during winter-spring period.	19
8	Nov, 20	Namangan BISA	Advisory Service for farmers on increasing the profits. Land treatment during winter-spring period.	20
9	Nov, 27	Andijan BISA TRAINING CENTER	Advisory Service for farmers on increasing the profits. Land treatment during winter-spring period.	21
10	Dec,16	Ferghana BISA	Irrigation works and terms of the development stages of winter wheat. Water saving method and conditions for its application.	19
11	Dec, 22	Namangan BISA	Irrigation works and terms of the development stages of winter wheat. Water saving method and conditions for its application.	20
12	Dec, 23	Andijan BISA TRAINING CENTER	Irrigation works and terms of the development stages of winter wheat. Water saving method and conditions for its application.	21
Trainings, done by BISA Ferghana disseminators				
1	Aug, 9	Ferghana BISA TRAINING CENTER	Selection, organization and monitoring of the demonstration plot. Crop irrigation mode, identification of rates and timing for irrigation. Methods of visual assessment of the irrigated fields in farms. Control of pests; weeds and their control. Creating of a water management plan for private farms. Selection of the technological scheme of irrigation. Monitoring forms and their application. Water-metering in farms and the choice of water-metering devices. Trip to WUA "Tolmozor chashmasi" PF "Kakhramon Davlat Sahovat" of Kuvin district for practical training	28
Trainings, done by BISA Namangan disseminators				
1	Aug, 20	Pup district WUA "Syrdaryo Obravon"	Selection of the technological scheme of irrigation. Monitoring forms and their application, Water-metering in farms and the choice of water-metering devices. Trip to PF "Khamroali Omonov" for practical training.	22
2	Sep, 25	Pup district WUA "Syrdaryo Obravon"	Methods of visual assessment of the irrigated fields in farms, Crop irrigation mode, identification of rates and timing for irrigation, Creating of a water management plan for private farms, Control of	23

№	Date	Location	Topic of Training	Number of participants
			pests; weeds and their control, trip to polygon of PF “Khamroali Omonov”.	
3	Oct, 15	Pup district WUA "Syrdaryo Obravon"	Needs of main crops in irrigation water by development stages. Water-physical properties of soil and identification methods. Land treatment. Defoliation and testing of cotton.	25
Trainings, done by BISA Andijan disseminators				
1	May, 7	Andijan BISA TRAINING CENTER	Selection of the technological scheme of irrigation, Monitoring forms and their application, Water-metering in farms and the choice of water-metering devices, Trip to Altynkul polygon for practical training	18
2	Aug, 22	Andijan BISA TRAINING CENTER	Methods of visual assessment of the irrigated fields in farms, Crop irrigation mode, identification of rates and timing for irrigation, Creating of a water management plan for private farms, Control of pests; weeds and their control, trip to WUA “Zylol Tashkent suvi” and visit to farmers’ school and polygon of PF "Bakht Imkon rivozh.	20
3	Dec, 18	Andijan BISA TRAINING CENTER	Training seminar for farmers and field specialists of “PPV” project polygons of districts of Andijan province.	18
4	Dec, 25	Pakhtaabad district WUA “B.Usmanov”	Training seminar for farmers and field specialists of “PPV” project polygons of Pakhtaabad district of Andijan province.	22
5	Dec, 26	Shakhrikhon district WUA “Shakhrikhon Okkalmok”	Training seminar for farmers and field specialists of “PPV” project polygons of Shakhrikhon district of Andijan province.	20

Appendix III

Advisory work logging in Jabbar Rasulov district in PF "Buri Kurmas" in DF- 5, 2 ha, under cotton

DF observer: Daliev Kh. Consultant-agronomist: Isomutdinov S.

Date	Revealed problem	Recommendation	Agronomist	Signature
12.05.2009	Root rot of cotton	Conducting cultivation twice in 6-7 days to warm the soil	Isomutdinov	
5.06.2009	A slow rate of cotton growth	Feeding with organic fertilizer	Isomutdinov	
10.06.2009	Contamination of crops with cotton pests (aphids)— 10%	Application of biological control measures. Release of golden-eyes at the rate of 3000 units per 1 ha	Isomutdinov	
18.06.2009	The beginning phase of budding	Irrigation for 12-16 hours (irrigation jet should not blur the furrow, over furrow irrigation)	Isomutdinov	
06.07.2009	Mass flowering	Irrigation for 12-16 hours (irrigation jet should not blur the furrow, over furrow irrigation). Feeding with ammonium nitrate -250 kg/ha	Isomutdinov	
18.07.2009	Ovary formation (balls)	Release of gabrodragon and trichogram at the rate of 250-300 pcs/ha	Isomutdinov	
23.07.2009	Number of sympodial branches 14-15pcs	Stamping with removal of the tops beyond the field	Isomutdinov	
11.08.2009	Mass cotton fruitification	Conducting of irrigation to each furrow, duration 22-24 hours	Isomutdinov	
25.08.2009	Irrigation delay, dry furrows (cracking)	Conducting of irrigation, duration 34-36 hours	Isomutdinov	

Date	Revealed problem	Recommendation	Agronomist	Signature
11.09.2009	Slowdown of balls opening	Conducting of defoliation. Augron-extra, 200-250 g/ha, working liquid consumption 300 - 350 l/ha, or magnesium chlorate 7-8 l/ha. at300-350 l of water.	Isomutdinov	

Appendix III (continued …)

Advisory work logging in Spitamen district in PF "Shark"
in DF- 2 ha, under cotton

DF observer: Ochilov SH Consultant-agronomist: Isomutdinov S.

Date	Revealed problem	Recommendation	Agronomist	Sig-nature
25.04.2009	Delay in sowing of cotton	Accelerated furrow cutting and manual sowing of cotton seeds	Isomutdinov	
5.06.2009	Uneven sprout, there are up to 25% of faults	Replanting of cotton seeds with their preliminary wetting up to the seeds germination	Isomutdinov	
10.06.2009	High soil moisture, risk of root rot occurrence	Conducting the cultivation with three tips; the distance between them is not more than 35 cm	Isomutdinov	
18.06.2009	Beginning of cotton aphids occurrence, 10% contamination	Treatment with BI-58 pesticide at the rate of 2.0 kg/ha	Isomutdinov	
4.07.2009	Withering of cotton leaves (plasmolysis)	Irrigation at the rate of 800-850 m3/ha each other furrow	Isomutdinov	
21.07.2009	light green color of leaves, sprout starvation	Feeding with nitrogen-phosphorus-potassium containing mineral fertilizer	Isomutdinov	
25.07.2009	Occurrence of spider mite, 10% of the area,	Continuous crop treatment with Neoron at the rate of 2.0 kg/ha. Consumption of	Isomutdinov	

Date	Revealed problem	Recommendation	Agronomist	Sig-nature
	discoloration of leaves (red)	working solution is 300-350l.		
09.08.2009	Massive fruit formation phase, risk of fruit abscission	Irrigation at the rate of 900 - 1000 m^3/ha, duration should not exceed 24 hours.	Isomutdinov	
29.08.2009	The bottom of irrigation furrow is dry; the field is choking up with tall weeds	Irrigation of each other furrows, duration should not exceed 30 -36 hours, weeding.	Isomutdinov	
10.09.2009	Slowdown of balls opening	Conducting of defoliation, Magnesium chlorate 7- 8 kg/ha per 300-350 liters of water.	Isomutdinov	

Appendix IV

List of installed water-metering devices (WMD) in farms

№	Name of PF	Type (WMD)	Date of installation (WMD)	Area of PF, ha	Execution
I. OS Irrigation-and-Agricultural Consulting					
Djjabar Rasulov district					
1	Buri Kurmas	Chipoletti 25		29	2 pcs
2	Ok Aryk	Sniiri 04	08.09.09	43	installed
3	Sugdien	Fixed bed	15.09.09	23	installed
4	Boymirzo	Sniiri 04	30.09.09	24	installed
5	Bobokhon	Sniiri 05	23.09.09	13	before 30.10.09
6	Kygyzbobo	Sniiri 04	21.09.09	22	before 30.10.09
7	Pakhtachi	Sniiri 05	19.09.09	28	installed
8	Chorvodor	Flume network	08.09.09	20	calibrated
9	Zarkor	Flume network	08.09.09	86	calibrated
10	Khazratali	Flume network	08.09.09	10	calibrated
11	Sardor	Flume network	08.09.09	8	calibrated
12	Abdullo	Flume network	08.09.09	10	calibrated
13	Nuravshon	Flume network	08.09.09	10	calibrated
14	Bobo Botyr	Sniiri 04	25.09.09	11,5	installed
Spitamen district					
15	Ok Oltyn	Sniiri 04	16.09.09	68	installed
16	Shark-DF	Sniiri 04	18.09.09	8,33	installed
17	Pakhtakor 2007	Sniiri 04	27.09.09	37	installed

№	Name of PF	Type (WMD)	Date of installation (WMD)	Area of PF, ha	Execution
18	A.Abdurakhmanov	Sniiri 04	29.09.09	29	installed
19	Barchinoy Khozhi	Sniiri 04	01.10.09	59	installed
20	Ay Dust	Sniiri 04	03.10.09	20	before 30.10.09
21	Nurobod	Sniiri 04	05.10.09	36,8	before 30.10.09
22	Abduvakhob Sarkor	Sniiri 04	07.10.09	41	before 30.10.09
23	Bozorov	Sniiri 04	09.10.09	70	installed
24	Kyzyl Nishon	Sniiri 04	11.10.09	15	
25	Oksu	Sniiri 04	13.10.09	19,5	
26	Kamolot	Sniiri 04	15.10.09	50	
27	Yangiobod	Sniiri 04	Not plaaned	46	installed
B.Gafur district					
28	A.Khaydarov	Sniiri 04	17.10.09	79	installed
29	S. Akhmadjanov	Sniiri 04	19.10.09	39	
30	A. Kayumov	Sniiri 04	21.10.09	88	
II. 00 Zar-Zamin					
Zafarabad district					
31	Tochikul 1,2	Sniiri 04	25.08.2009	8,5	installed
32	Azamat-4	Sniiri 02	20.11.2009 27.11.2009	10	
33	Orzu	Sniiri 04	22.09.2009 27.11.2009	50	installed
34	Navbakhor	Chipoletti -50	22.09.2009 27.11.2009	11	installed with TH violation
35	Etikod 1,2	Sniiri 04	22.09.2009	20	installed

№	Name of PF	Type (WMD)	Date of installation (WMD)	Area of PF, ha	Execution
36	Murodi	Chipoletti	25.08.2009		
Mastchin district					
37	Amakchon-2 DF	Chipoletti-50		62	installed with TH violation
38	Payrav	Flume		4,5	calibrated
39	Kyshovarz -1	Flume		46	calibrated
40	Nur-2	Sniiri		31	installed
41	Dusti - 2	Flume		21	calibrated
Kanibadam district					
42	N.Karoboev Navbakhor	Flume ЛР-100,ЛР-60	22.09.2009	191	calibrated
43	Zarbdor	Flume ЛР-80,ЛР-60	22.09.2009	241	calibrated
44	Dusti	Flume ЛР-60	22.09.2009	233	calibrated
45	Bakhor	Flume ЛР-60	22.09.2009	148	calibrated
46	Zafar	Flume ЛР-60	22.09.2009	168	calibrated
47	A.Kodyrov	Flume ЛР-60	22.09.2009	252	calibrated
48	Omad	ВЧ-75	21.09.2009	43	calibrated
49	Sada -1	Flume ЛР-60	21.09.2009	57,5	calibrated
50	Galaba -60	Sniiri	21.09.2009	40	
51	Khimoyatbonu - DF	Chipoletti-50, ЛР-0	22.09.2009	2,5	installed
52	Dilovar	Flume ЛР-60	22.09.2009	1,4	calibrated
53	Bakhodur	ВЧ-50	22.09.2009	7	

Appendix V

The results of work implemented by the performers of all three countries

Tajikistan, Sogdian province

During the visit of dekhkan farm "Amakdzhon" in Mastchin district, a trainer of Zar-Zamin Company has conducted training for farmers and field trainers. The representatives of CECI and a representative of the national manager also took part in this training. The topic of training dealt with water-metering and irrigation mode issues. After the training, there was a conversation with farmers, which shows that farmers are mainly interested in water-metering system and practically not interested in other issues, connected with the irrigation mode. And it's understandable, they have no idea about water measurability and rationed water supply. At the same time, though, the farmers expressed their interest in water-metering system; no one from the project performers had proposed them anything. Trainings are held, without taking into account the farmers' opinion – do they need them at that time? So, it is not known how many of these trainings will be useful. Situation in Zafarabad district is about the same. Here, because of the regular water shortages, farmers are vitally interested in timely receipt of a sufficient volume of irrigation water. They all know that representatives of the WUA service operation and Rayvodkhoz (water-resource management of district level); overstate the payment for water significantly, taking as a basis the pay-per-hectare payment scheme, rather than per volume, It is clear that for these areas, the urgent problem to be solved is the timely delivery of water and realistic payment for it. Without addressing these two important questions, farmers are unlikely to listen to the consultants on other issues. If we do not get a farmer's confidence, he will never listen to us. Moreover, today, we can deserve his trust only through assistance in solving his current problems. As for Mastchin and Zafarabad districts, I do not see any big problems here. The current problems can be solved within the framework of our project, the only thing you need is to understand clearly what to do.

Topics of trainings for farmers must reflect the needs of farmers at a given time and their failures at a given time. By means of our advisory and training sessions, we have to give the farmer that knowledge through which he could improve the productivity of land and water.

There is a paragraph on definition of consulting strategy, education and training in the project document. As I have mentioned earlier, no one had any approach and nobody even thought about it. This approach has been implemented partially by

CECI and Irrigation-and-Agricultural Consulting in Jabbar Rasulov and Spitamen districts, but the trainings on selection of the construction site for water-metering system, technological schemes of irrigation, fertilizing etc. should not be held at the height of the vegetation, because it is too late. We must work ahead, to stay one-step ahead, anticipating the problems of farmers.

Assessment of current situation and identifying farmers' problems is the main objective of the project, based on which each performer, and especially the leaders of the performing organizations and national managers should build their strategy of advisory work and project activities, because our ultimate goal is the improvement of land and water productivity.

Unfortunately, neither the leaders of project performing organizations, nor the national manager have not seriously reacted to the project objectives, as there is no strategy for the implementation of the project works. I would like to remind that this project is practical, and we must give the farmer a real help. We must have a workable strategy for our actions. Therefore, as it became clear from the interviews with farmers, the only way to work with farmers successfully is to set a water-metering system, which means not just construction of water-metering devices, but organization of the comprehend system of water measuring among all farmers, who are in the area of demonstration sites. This includes ensuring of payment for water by actually used volume.

This question was worked through for conditions of Kyrgyzstan, but now it is obvious that it is acceptable for Tajikistan too.

I believe that implementation of the main project provisions stage-by-stage would be true and reasonable. The first step is organization of water-metering system and payment for actually used water; this will provide us with farmers' trust and an opportunity to work with them successfully further.

To organize a water-metering system we need:

1) To build water-metering devices at the expense of farmers (they are agreed);

2) To prepare all the documentation for works on reception and transition of irrigation water, on water supply, on signing the contracts between the farmer and irrigation water delivery service, etc.

3) To legalize in water management bodies of province and district level (oblvodkhoz and rayvodkhozs) the documentation on transition to payment for actually used volume of water for all farmers located in the project demonstration sites, who built water-metering devices;

4) To organize training courses for farmers using their own water-measuring devices as example with practical exercises on metering the received irrigation water;

5) To review methods of training, giving more time to practical exercises;

The water-metering system set in the farms located within the area of each demonstration plot (7-8 or more PF in each district) should be used as an example for demonstration to other farmers and promotion of different technologies for efficient use of irrigation water. Fortunately, the farmers themselves want to work with us, we need only to help them to settle their problems.

The second step of our actions should also be guided by the needs of farmers. I do not see any problems here either. If approach the question of organization of water-metering system thoroughly then the next farmers' question of interest will be – How to reduce drainage from irrigated fields so that not to pay for excessive water? *(this is not just my idea, I was asked about this during my conversation with farmers)*. In order to reduce drainage from the irrigated fields we should improve the technological scheme of irrigation through studying the field of each farmer, and then to develop and propose an optimal scheme of irrigation.

I think that after gaining the knowledge on water-measuring system and realization it in their fields, farmers will start thinking about reasonable irrigation rates, and that will be the third step of our actions. Priority of implementation of all these steps depends on the performers, on their serious attitude to this work, which I have not seen so far. Almost all people work formally - just to report nicely.

Kyrgyzstan, Osh province

In Kyrgyzstan, the first trip was organized to Aravan district. I woud like to note that thanks to persistence, seriousness and creativity of the polygon trainer Abdushakurov Abdukhamid, we saw that there is a mutual understanding and complementary relations between OSHSKS trainer and leader of outlet of the WUA Support Division. Using demonstration plot, equipped with the water-metering devices as an example, the OSHSKS trainer managed to arouse interest among farmers in the efficient use of water they receive from the outlet leader. Specification of the cost of water supplied to the furrow should be based on the demonstration field, which also belongs to the outlet water users group. This facilitates the work of the outlet leader in the distribution of water between the farmers depending on the number of the furrows they have. The demo field trainer has managed together with KyrgyzNIIGIM (Scientific-Research Institute) to develop a system of measuring water flow in the furrows for each farmer's field, depending on the slope of the field and taking into account the mechanical composition of soil.

Unfortunately, that was the only example of creative and effective work of the trainers. As for the other sites, the trainers there worked well and showed similar results, but they were not so good as the ones of trainer from Aravn district. **The**

work of trainer in Aravan district should be taken as an example and used for training the other trainers and that was the OSHSKS leaders agreed with.

The farmers' interest in the transition to new payment scheme and their willingness to work with the outlet leaders' provides the grounds for increase in the number of outlets for each pilot channel selected in the WUA.

In this connection, the head of the WUA Support Division Mr.Baish should equip with water-metering devices all outlets in all selected channels before the beginning of winter crops irrigation (you have enough equipment money to do this), and prepare the farmers in terms of proposed technologies. It is also necessary to organize and conduct the training for outlet leaders selected by farmers. The trainings have to cover the following:

- Water-metering system at the outlet level, composing of acceptance-transfer report of irrigation water to be supplied with the WUA outlet;
- Drawing and signing the contracts on behalf of farmers for water receiving and providing the payment for water metered by actually used volume;
- Distribution of water among farmers.

The selected channels should be the pilot and demonstrational ones for greater coverage of the farmers' lands. Then, if we were able to draw the interest of other channels' farmers, we have to build water-measuring devices at the expense of farmers themselves. Then, with the help of our consultants and outlet leaders to teach the new methods of use of irrigation water to the farmers encouraging them to accept the efficient irrigation methods, thus improving water and land productivity. However, the trainers have to work with the farmers located outside the selected channels too. This work applies to both OSHSKS and the WUA Support Division. The specialists from District Office of the WUA Support Division work in this Division also, so they have to apply all their efforts to help the farmers, whose fields are not covered by the pilot channels.

What kind of job they should perform? While all this is very clearly spelled out in the project document and annual action plan, I feel that it is necessary to recall it again and show specifically what they should do:

1. To determine the soil-reclamation conditions of private farms;
2. To determine the structure of sown areas, cultivated by farmers;
3. To organize water allocation between the farmers' lands, to settle conflicts between farmers at water distribution;
4. To settle problems in obtaining water from WUA (how they get it, based on what contracts, how big is the required volume for each irrigation and total volume for vegetation period);
5. To explain how to pay for water - on the basis of what documents and settlement;

6. To clarify the amount of payment for water (to provide data for that year and the last two or three years)

Uzbekistan: Ferghana, Andijan and Namangan province

The situation in Uzbekistan with regard to implementation of the project is no better, and I would say even worse than in Tajikistan and Kyrgyzstan. It seems that everyone is busy with the construction of gauging stations (hydro-posts) in the demonstration sites (with some serious defects, by the way) rather than taking steps for increasing water productivity for farmers. The main goal of the project is vague, what is the major task of advisory work with farmers? All efforts aimed at implementing the project demonstration sites. I would like to remind all the performers and the national manager for Uzbekistan that we have finished to use demonstration sites to identify and assess the current situation already in 2004. The demonstration sites today are just a proving ground to demonstrate the effectiveness of technologies when working with farmers of not only adjacent to the demonstration field farms, but for the whole WUA, which was selected as a pilot agency for dissemination of technologies and advisory work with farmers regarding improvement of their fields increasing their water and land productivity. With this purpose, under the WUA in each selected district, we take a project specialist (preferably a professional agronomist), who, together with trainer should work with all of the farmers and the WUA.

Now what we really have: in Ferghana province, instead of the WUA specialist the heads of rayvodkhoz have been employed and already been paid for three months. No one, including chiefs of rayvodkhoz themselves can explain what they should do. Further, I wonder how much the advisory work of the WUA director can handle those who were assigned to Andijan province.

When you visit the farmer's field, located near the demonstration farm, it appears that this year no one had been to this field before I came. I understand that if the trainer and provincial specialists will not do what they are supposed to do, then National Manager won't do this work either, which means that this work will be done by the Provincial Manager on technical issues. So it was done by me in the presence of provincial performers and polygon trainer, so they can finally understand what should be done in the farmer's field.

I think, today it is urgent and necessary to restore the entire picture of the development of crops of cotton and wheat in all farms selected by the WUA, what exactly should be done:

1. The specialists of the Information Center (M. Mirzaliyev, Khabibullo Umarov, I. Ganiev, A. Akhunov) have to begin their work with the trainers of Ferghana, Andijan and Namangan provinces regarding advisory work with farmers, based on the principle - "Do as I do."

2. Based on the evaluation forms of culture proposed by the provincial manager we have to assess the development of cotton and wheat, from plowing to harvesting.
3. Send the forms to all farmers and teach them to work with them.
4. Every manager of the WUA and polygon have to analyze the results of these forms themselves, the specialists of the Information Center have to provide ongoing assistance to the trainers until they will be able to work and assess the material independently.
5. Trainers together with the provincial performers have to restore all irrigation data by each farm under the WUA, through interviews and expert evaluation of supply channels.
6. Provincial performers for Ferghana and Andijan provinces have to attract agronomists previously worked with IWRM to the work in the WUA.

An individual request to Mr. Zh. Kazbekov: Please, provide provincial performers in Ferghana and Andijan with a list of professional agronomists and organize their work with the selected WUA.

Project Manager

Sh.Sh. Mukhamedjanov.

Page makeup and design: D. Abdurakhmanov
(Scientific-Information Center)

B-11, Karasu-4, Tashkent, 100 187, Republic of Uzbekistan
Tel. (998 71) 265 92 95, 266 41 96, 265 09 57
Fax (998 71) 265 27 97
E mail: dukh@icwc-aral.uz; dukh@rol.uz;
shukhrat_m@icwc-aral.uz

www.icwc-aral.uz