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INTEGRATED WATER RESOURCES MANAGEMENT IN FERGHANA VALLEY

The 2004 Follow-up Survey Report

(to the 2003 Baseline Survey of three
pilot WUAs in the Ferghana Valley)

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OCTOBER, 2004

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H 36246 VL

2004 FOLLOW-UP SURVEY REPORT

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INTRODUCTION

The last year survey of 3 pilot WUAs in the Ferghana Valley was conducted to establish a baseline measurement of various dimensions to allow the benchmarking of on-farm irrigation, crop production and other relevant measures over time as well as understand the perceptions of farmer water users with regard to new IWRM, IMT and PIM issues. So this year a similar, though smaller size, follow-up survey was run to verify and refine the last year findings, track any dynamics after one year of continued project interventions and further optimize the baseline data set for any future use. Of a particular interest this year were any changes/dynamics in farmers' views on top water and irrigation management problems, additional support and services required. Besides, other issues analyzed within the last year survey such as yield trends, income composition, the share of produce self-consumed versus that sold, quality of irrigation service delivery were also followed up.

In conducting the first follow-up survey to the baseline one of the last year every effort was made to include 100% of the farmers sampled and interviewed last year. Resultantly, these efforts were quite successful with 55 farmers out of the baseline 60 being re-interviewed in WUA "Akbarabad" and "Kerme-Too Akburasy" which represents 92% of the original sample and 47 in WUA "Zarafshan", or 72% of the original sample. Among those who were not or failed to be contacted for follow-up this year were mainly representatives of huge cooperative farms in Tajik and Uzbek WUAs who either quit their jobs, were dismissed, changed their status or moved completely from the location. So to make the sample complete all of them were replaced by other farm members or neighbor farmers. In addition in WUA "Zarafshan" as a result of continued fragmentation of local cooperative farms some farmers changed their overall farm property status from being a cooperative farm member to an independent owner-cultivator by claiming and finally obtaining their due share in the total farmland of a cooperative and setting up on their own. At least 6 such farmers sampled last year remained in the sample this year but changed their farm property status.

Since no demographic or IWRM-related conceptual questions were asked this time the survey questionnaire was kept much shorter in length consisting of only 48 questions (last year there was a total of 139 questions in the baseline questionnaire).

1. TOP WATER AND IRRIGATION MANAGEMENT PROBLEMS IN THE VALLEY

Initially, polling the respondents about major problems with overall water management, irrigation management and water delivery in the Ferghana Valley was conceived to identify and rank-order the top problem list from the entire Ferghana Valley perspective. However, the answers received from this year survey and the baseline one conducted one year ago clearly suggest that the respondents when setting out their priorities about the most urgent problems definitely referred to the context of their specific locales, and as such those priorities should be viewed as an indication of problems specific to each particular WUA than having a more regional dimension. Anyhow, a frequent exposure of water users in the pilot areas to different processes, meetings, events and discussions related to their newly established WUAs and water problems for the last year since the first baseline survey has undoubtedly induced some meaningful changes in the farmers' perceptions and attitudes.

The scores and the ranks for evaluating and weighing the seriousness of a problem were calculated in pretty much the same way as it was done last year when the farmers were asked to choose from a proposed list three most serious problems and rank them in the order of their importance; thus, the items chosen and ranked 1, 2 or 3 were given reverse values 3 to 1. Then the total score of each such top-chosen item was calculated across all observations to make an overall WUA index for such a top item. The total score which allows rank-ordering the top problems based on their importance can also be used as a measure of confidence with which farmers report their problems: the higher the score the more sure farmers are in pinpointing those problems.

1.1. Top Overall Water Management Problems

The follow-up survey has identified the following farmers' priorities by pilot WUAs set about overall problems in water sector at large:

	2004 Water Management Problems	Akbarabad		Zarafshan		Kerme-Too		Total Score
		Score	Rank	Score	Rank	Score	Rank	
1	Poor water quality for drinking and household use	58	3/26	80	3/32	88	1/39	226
2	Seasonal shortage of water for drinking and household use	38	5/17	101	1/45	40	4/25	179
3	Seasonal shortage of water for kitchen gardens	52	4/24	89	2/48	17	7/10	158
4	Seasonal shortage of water for farms	62	2/25	60	4/36	27	5/14	149
5	Increasing competition for water between farming & other sectors	3	9/3	20	5/13	87	2/38	110
6	Underground water level is rising	68	1/32	-	-	41	3/21	109
7	Poor water quality for farming	14	6/6	2	7/1	23	6/13	39
8	Poor water quality for kitchen gardens	5	7/2					5

The results this year have seen some significant changes in the attitudes as compared to the last year. If one year ago it was *seasonal shortage of water for farms* that scored topmost by a wide margin across all 3 WUAs, this year it was only 4th in Zarafshan and 5th in Kerme-Too Akburasy, while in Akbarabad it was top second. The high confidence and unanimity with which farmers in all 3 WUAs reported this particular problem last year scoring the top points has dwindled this year by half in the Uzbek and Tajik WUAs (from 122-135 down to 60-62 points) and almost to nothing in the Kyrgyz WUA (from 121 to 27 points). Overall, this time round the respondents across all WUAs were more anxious about poor quality and shortage of water for *drinking and household use* than that for farming or kitchen gardening especially in the Tajik and Kyrgyz WUAs. Likely explanation for this significant shift in farmers' views can be that they have grown to better realize that it is rather poor management than the actual shortage of irrigation water that started making more sense for them due to a better awareness from direct exposure and involvement in many WUA processes, meetings, events and issues discussed for the last one year. As a result the priorities did change moving towards more immediate and real problems faced. Thus, the most serious problems by different WUAs this year were as follows: in the Uzbek WUA - the *rising underground water level*, in the Tajik WUA – *seasonal shortage of water for drinking and household use*, while in the Kyrgyz WUA – *poor quality of water for drinking*.

Statistically, some judgments can be also made about the strength or urgency of farmers' concerns with regard to top-chosen water problems. Putting it simply, the bigger the difference in the score between two or more subsequent items in the top list the more serious a higher-scored item is. Based on this assumption, the first 4 top problems in the Uzbek WUA should be taken as more or less equally serious since the difference between top 1st and 4th items is only 16 points:

		2004		2003	
		Score	Count	Score	Rank
1	Underground water level is rising	68	32	41	4
2	Seasonal shortage of water for farms	62	25	122	1
3	Poor water quality for drinking and household use	58	26	34	5
4	Seasonal shortage of water for kitchen gardens	52	24	66	2
5	Seasonal shortage of water for drinking and household use	38	17	25	6
6	Poor water quality for farming	14	6	47	3

In the Tajik WUA there is a clear accentuated concern for lack and quality of drinking water followed by a shortage of irrigation water for kitchen gardens:

		2004		2003	
		Score	Count	Score	Rank
1	Seasonal shortage of water for drinking and household use	101	45	91	3
2	Seasonal shortage of water for kitchen gardens	89	48	120	2
3	Poor water quality for drinking and household use	80	32	11	4
4	Seasonal shortage of water for farms	60	36	135	1
5	Increasing competition for water between farming & other sectors	20	13	3	5

Whereas in the Kyrghyz WUA it is clearly the quality of drinking water, though being sufficient in quantity, as well as increasing competition for water among different sectors that raises major concerns among local water users.

		2004		2003	
		Score	Count	Score	Rank
1	Poor water quality for drinking and household use	88	39	59	2
2	Increasing competition for water between farming & other sectors	87	38	45	3
3	Underground water level is rising	41	21	12	6
4	Seasonal shortage of water for drinking and household use	40	25	59	2
5	Seasonal shortage of water for farms	27	14	121	1

1.2. Top Irrigation Management Problems

The analysis of farmers' priorities set about top problems with irrigation management this year shows strong consistency in the farmers' views suggesting that maintenance problems at all hydraulic levels are still perceived as far more serious than those with water distribution.

2004 Top Irrigation Management Problems		Akbarabad		Zarafshan		Kerme-Too		Total Score
		Score	Rank	Score	Rank	Score	Rank	
1	Inadequate funds to pay for O&M	107	1	111	1	106	1	324
2	Poor maintenance of watercourse	70	2	98	2	47	3	215
3	Poor maintenance of distributory	36	3	39	4	62	2	137
4	Poor distribution of water along the watercourse	32	5	23	6	26	4	81
5	Poor water distribution along distributory	22	6	30	5	26	5	78
6	Poor water distribution along the main canal	1	9	43	3	7	8	51
7	Inadequate technical guidance about water distribution	20	7	8	7	9	7	37
8	Poor drainage	34	4	-	-	-	-	34
9	Poor maintenance of the main canal	-	-	8	8	19	6	27
10	Water for irrigation has to be pumped	3	8	-	-	-	-	3
11	Drainage canal lacks a dyking structure	1	10	-	-	-	-	1
12	Some farmland is not covered by irrigation system	1	11	-	-	-	-	1

This year the urgency of maintenance problems have become even more evident. However, some significant changes have been found this year in the rankings for the items chosen the topmost last year at each pilot WUA. Thus, *poor water distribution along the distributory canal* by far and large is no longer perceived as the most serious problem in WUA "Akbarabad" scoring the 6th position this year.

	Akbarabad	2004		2003	
		Score	Count	Score	Rank
1	Inadequate funds to pay for O&M	107	47	51	3
2	Poor maintenance of watercourse	70	31	56	2
3	Poor maintenance of distributary	36	17	38	5
4	Poor drainage	34	22	19	7
5	Poor distribution of water along the watercourse	32	16	49	4
6	Poor water distribution along the distributary	22	10	74	1

Same applies to *poor maintenance of distributary canal*, which was the top 1st in WUA “Zarafshan” last year, and only the 4th serious this year:

	Zarafshan	2004		2003	
		Score	Count	Score	Rank
1	Inadequate funds to pay for O&M	111	47	86	3
2	Poor maintenance of watercourse	98	50	94	2
3	Poor water distribution along the main canal	43	24	15	6
4	Poor maintenance of distributary	39	21	100	1
5	Poor water distribution along distributary	30	18	24	4

In WUA “Kerme-Too Akburasy” *poor maintenance of watercourse canal*, the last year’s worst, has got down this year by two positions scoring twice as less:

	Kerme-Too Akburasy	2004		2003	
		Score	Count	Score	Rank
1	Inadequate funds to pay for O&M	106	43	78	2
2	Poor maintenance of distributary	62	30	62	3
3	Poor maintenance of watercourse	47	27	91	1
4	Poor distribution of water along the watercourse	26	14	26	5
5	Poor water distribution along distributary	26	17	9	7
6	Poor maintenance of the main canal	19	10	59	4

All the above problems this year were unanimously and by a wide margin overshadowed across all WUAs by the problem of *inadequate funds to pay for operation and maintenance*. More details on the reasons of it will be discussed in the subsection below on developments in the repairs and maintenance status this year. In terms of hydraulic levels, maintenance problems across all WUAs are perceived as being more severe at the watercourse level than at the distributary or main canal, except the Kyrgyz WUA, where it is perceived to be more of a problem at the distributary level than elsewhere.

1.3. Top Water Delivery Problems

This block of problems related to on-farm water delivery has turned out to be least changed with regard to the priorities set by the farmers last year as compared with the other two sets of problems discussed above.

	2004 Top Water Delivery Problems	Akbarabad		Zarafshan		Kerme-Too		Total Score
		Score	Rank	Score	Rank	Score	Rank	
1	Too much water is wasted	18	5/10	129	1/55	108	1/44	255
2	Farmers don't know how much water to apply to crops	83	2/37	82	2/39	88	2/42	253
3	Cannot predict when water will come and when be cut off	99	1/42	8	6/5	46	3/24	153
4	Not enough water is delivered to the farm	37	3/16	63	3/31	8	8/5	108
5	Water is not distributed fairly among watercourses	2	9/2	50	4/29	19	6/10	71
6	Water is not delivered to the farm on time when needed	25	4/13	16	5/14	11	7/7	52
7	Water is not distributed fairly among farms	16	6/9	8	7/4	27	4/19	51
8	Water is polluted	11	7/7	1	8/1	26	5/15	38
9	Water for irrigation is pumped from drainage canal	3	8/1	-	-	-	-	3

The only change, though a remarkable one, has been observed this year in WUA “Akbarabad” where the farmers have reported this year their *inability to predict when water will come and when it will be cut off* as the most serious problem with water delivery which was only the fifth last year:

		2004		2003	
		Score	Count	Score	Rank
1	Cannot predict when water will come and when be cut off	99	42	30	5
2	Farmers don't know how much water to apply to crops	83	37	105	1
3	Not enough water is delivered to the farm	37	16	89	2
4	Water is not delivered to the farm on time when needed	25	13	47	3
5	Too much water is wasted	18	10	10	6
6	Water is not distributed fairly among farms	16	9	11	7
9	Water is not distributed fairly among watercourses	2	2	40	4

With all the rest remaining pretty much the same as it was last year, respondents in all the 3 WUAs were unanimous about top 2nd problem which is *lack of knowledge how much water to apply to crops*. As for the Tajik and Kyrgyz WUAs it is clearly *huge water losses* which are by far and large perceived as the most serious problem, followed by *not enough water delivered to the farm*. Among other serious problem that are worth noting and peculiar to individual WUAs are *poor timeliness of water supply to the farm* in WUA “Akbarabad”, *unfair water distribution among watercourses* in WUA “Zarafshan” and *unfair water distribution among farms* coupled with *water pollution* in WUA “Kerme-Too Akburasy”.

		2004		2003	
		Score	Count	Score	Rank
1	Too much water is wasted	129	55	114	1
2	Farmers don't know how much water to apply to crops	82	39	78	3
3	Not enough water is delivered to the farm	63	31	86	2
4	Water is not distributed fairly among watercourses	50	29	18	5
5	Water is not delivered to the farm on time when needed	16	14	28	4
6	Cannot predict when water will come and when be cut off	8	5	9	6
7	Water is not distributed fairly among farms	8	4	7	7

		2004		2003	
		Score	Count	Score	Rank
1	Too much water is wasted	108	44	121	1
2	Farmers don't know how much water to apply to crops	88	42	98	2
3	Cannot predict when water will come and when be cut off	46	24	35	3
4	Water is not distributed fairly among farms	27	19	19	5
5	Water is polluted	26	15	18	6
6	Water is not distributed fairly among watercourses	19	10	17	8
7	Water is not delivered to the farm on time when needed	11	7	18	7
8	Not enough water is delivered to the farm	8	5	28	4

2. ADDITIONAL SUPPORT SERVICES REQUIRED BY FARMERS

No major changes have been found in the farmers’ needs for additional support since the last year survey, though some dynamics did take place. In overall, most of the dynamics in farmers’ perceptions here was expected from any training activities and other project interventions accomplished during this period between 2 surveys in the pilot WUAs thus meeting in some way or other the needs put on the wish list last year and giving way to those still unattended to or those getting even further worse for some reasons.

	Farmers-required Support as revisited in 2004	Akbarabad		Zarafshan		Kerme-Too		Total Score
		Score	Rank	Score	Rank	Score	Rank	
1	Provision of quality agricultural inputs at subsidized rates	136	3/43	121	2/45	216	1/51	473
2	Development of agri-business opportunities	10	11/3	80	6/28	206	2/51	296
3	Credits	36	7/14	175	1/53	61	5/21	272
4	Advice about best ways to cultivate crops	173	1/45	28	9/7	59	6/29	260
5	Rehabilitation or upgrading of I&D infrastructure	107	4/44	115	3/35	22	12/12	244
6	Loans at cheap interest for repairs & maintenance of infrastructure	67	5/23	102	4/34	64	4/29	233
7	Crop processing	26	9/10	91	5/29	110	3/41	227
8	Advice about water conservation	166	2/50	26	11/8	26	10/9	218
9	Marketing crops	-	-	69	7/23	33	7/12	102
10	Crop storage	13	10/5	56	8/18	29	8/11	98
11	Legal advice about land and water	33	8/15	27	10/13	27	9/12	87
12	Training in managing the I&D systems	45	6/21	6	12/4	25	11/11	76
13	Freedom to trade	4	12/1	-	-	-	-	4
14	Cleaning of drainage canals provided by the state	4	13/1	-	-	-	-	4

Thus in WUA “Akbarabad” farmers this year have expressed a considerably less demand for *training in managing irrigation and drainage infrastructure* and *legal advice about water and land* as compared to the last year. This suggests that in some extent this demand has likely been met by a comprehensive training program carried out in the inter-survey period which included among other things the support areas mentioned in the wish list. But still the demand for getting various other important expert advice persists as strong as last year: such as on *best ways to cultivate crops* (top 1st) and *water conservation* (top 2nd). At the same time there has been a stunning 5-fold increase in the demand for the *provision of quality agricultural inputs at subsidized rates* as compared to the last year. This is not unusual given the ongoing crop harvesting status in this WUA, which suggests that the local farmers have been under an immense stress this year to control pest invasion with cotton crop having been heavily affected by aphid due to lack of pesticide and other chemicals.

	Akbarabad	2004		2003	
		Score	Count	Score	Rank
1	Advice about best ways to cultivate crops	173	45	160	2
2	Advice about water conservation	166	50	222	1
3	Provision of quality agricultural inputs at subsidized rates	136	43	19	8
4	Rehabilitation or upgrading of I&D infrastructure	107	44	88	5
5	Loans at cheap interest for repairs & maintenance of infrastructure	67	23	62	6
6	Training in managing the I&D systems	45	21	116	4
7	Credits	36	14	32	7
8	Legal advice about land and water	33	15	128	3
9	Crop processing	26	10	5	11
10	Crop storage	13	5	17	9
11	Development of agri-business opportunities	10	3	14	10
12	Marketing crops	-	-	4	12

Likewise in WUA “Zarafshan” the local farmers’ zest for *training and other advisory support* being relatively low last year, has further decreased by almost half from an aggregate of 169 points in 2003 for the last 4 bottom items to 87, which can also be viewed as a result of the training events held in this WUA during the past period. Remarkable is a hike in the demand among the respondents for various post-harvest crop facilities such as *crop storage, processing and marketing* which has aggregately increased 8-fold (from 26 points in 2003 to 216 in 2004) as well as that for the *rehabilitation and upgrading of irrigation and drainage infrastructure* having scored 5 times more this year moving from 9th to 3rd position. Nevertheless, no changes have

taken place in farmers' attitudes with regard to the top 2 items. They have remained to be *provision of credits* and *quality agricultural inputs at subsidized rates*.

		Zarafshan		2004		2003	
		Score	Count	Score	Rank		
1	Credits	175	53	193	1		
2	Provision of quality agricultural inputs at subsidized rates	121	45	187	2		
3	Rehabilitation or upgrading of I&D infrastructure	115	35	22	9		
4	Loans at cheap interest for repairs & maintenance of infrastructure	102	34	157	3		
5	Crop processing	91	29	18	10		
6	Development of agri-business opportunities	80	28	144	4		
7	Marketing crops	69	23	3	12		
8	Crop storage	56	18	5	11		
9	Advice about best ways to cultivate crops	28	7	36	7		
10	Legal advice about land and water	27	13	53	5		
11	Advice about water conservation	26	8	30	8		
12	Training in managing the I&D systems	6	4	50	6		

Priorities set by the Kyrgyz farmers about additional support remained for the most part of it unchanged showing the same pattern for the strength of the demand for particular advisory support and training to decrease (items 9 through 11 in the table below) seemingly for the same reasons as explained above for 2 previous WUAs. As for the top 2 items required by almost all Kyrgyz farmers – *provision of quality agricultural inputs at subsidized rates* and *development of agri-business opportunities* - remaining unchanged from the last year they have shown an even stronger urgency and farmers' confidence when prioritizing them as compared to any other needs expressed:

		Kerme-Too Akburasy		2004		2003	
		Score	Count	Score	Rank		
1	Provision of quality agricultural inputs at subsidized rates	216	51	210	1		
2	Development of agri-business opportunities	206	51	118	2		
3	Crop processing	110	41	80	5		
4	Loans at cheap interest for repairs & maintenance of infrastructure	64	29	92	3		
5	Credits	61	21	81	4		
6	Advice about best ways to cultivate crops	59	29	71	7		
7	Marketing crops	33	12	26	11		
8	Crop storage	29	11	42	8		
9	Legal advice about land and water	27	12	37	9		
10	Advice about water conservation	26	9	75	6		
11	Training in managing the I&D systems	25	11	30	10		
12	Rehabilitation or upgrading of I&D infrastructure	22	12	5	12		

3. REPAIRS AND MAINTENANCE STATUS

Given the last year findings suggesting that farmers in the Uzbek and Tajik WUAs had far less repairs and maintenance problems than in the Kyrgyz WUA with the best maintenance performance and very few reported maintenance problems found in the Uzbek WUA both for the watercourse and distributary levels, this year has revealed somewhat unexpected results for WUA "Akabrabad" and WUA "Zarafshan". The number of farmers who reported any repairs or maintenance problems at their watercourses unattended to in the Uzbek WUA more than doubled, while in the Tajik WUA more than tripled. More than doubled also was the number of those in WUA "Akbarabad" who reported same for the distributary canal. The pattern for both watercourse and distributary levels in the Kyrgyz WUA has remained unchanged

compared to the last year while for the distributary level in the Tajik WUA slightly improved.

% of those who reported any maintenance or repairs required but left unattended to		Akbarabad		Zarafshan		Kerme-Too	
		2003	2002	2003	2002	2003	2002
For watercourse	Yes	44%	17%	76%	21%	63%	62%
	Total valid responses	59	60	38	57	35	47
For distributary	Yes	31%	12%	68%	76%	50%	50%
	Total valid responses	54	57	28	51	30	42

Somewhat deeper inquiry into the reasons for obviously far more deteriorated maintenance status this year in the Uzbek and Tajik WUAs shows that a lion's share of all the required and unattended-to measures refers to periodic maintenance and repairs which takes from the farmers more than just mere labor contribution into the canal cleaning. This perfectly explains why the respondents in these WUAs when asked about the most serious problems in irrigation management as discussed above have referred to *inadequate funds to pay for operation and maintenance* as the topmost serious. The answers in the table above also suggest that there might be some gruesome implications on the maintenance of a watercourse canal if a distributary canal is not properly maintained. Bearing in mind that among the co-founders of both the Uzbek and Tajik WUAs there were local district water management organizations which were made as such against their commitment to ensure funding of the operation and maintenance of the secondary canals within the normal needs, it makes one to think that this commitment in the Tajik WUA was fairly fulfilled while in the Uzbek WUA completely failed. Main failures with periodic repairs at the distributary level in the Uzbek WUA included *repairs of the water control structure at the inlet of the distributary canal* (top 1st), *lining of the canal* (top 2nd), *installation of measurement devices* (top 3rd) and *repairs of canalettes* (top 4th). In the Tajik WUA the top 2 periodic maintenance failures as reported by the respondents included the failure to build a flow regulating structure and that to line the canal. As for the Kyrgyz WUA the maintenance and repairs status here has considerably improved since last survey for both watercourse and distributary levels showing more than 2-fold decrease in failures when addressing required maintenance and repairs needs.

WUA		Routine WC Maintenance		Periodic WC Repairs		Routine DC Maintenance		Periodic DC Repairs	
		2003	2002	2003	2002	2003	2002	2003	2002
Akbarabad	N (Counts)	8(20)	5(7)	21(36)	8(7)	4(7)	1(1)	12(38)	6(9)
	Score	75	40	225	55	29	5	155	39
Zarafshan	N (Counts)	1 (1)	12 (20)	20(57)	10(5)	3(5)	35(61)	15(31)	23(30)
	Score	4	110	250	65	19	261	140	125
Kerme-Too Akburasy	N (Counts)	12 (26)	27(52)	17(30)	28(33)	7(15)	21(35)	12(24)	19(34)
	Score	95	241	134	291	55	114	105	144

NOTE: *N* is the number of respondents who cited any unaddressed needs
Counts is the actual number of all unaddressed maintenance or repairs needs as cited by *N*
WC is for a watercourse canal; *DC* is for a distributary canal

At the same time the number of those in WUA "Akbarabad" who reported any unaddressed maintenance needs of both routine and periodic nature at the watercourse level has considerably jumped up, especially for periodic needs (4-fold increase). It is also very likely that considerable accumulation of *periodic maintenance* needs at one's watercourse may result in a decreased farmers' motivation to attend to their seasonal watercourse cleaning routine (*routine maintenance*). Though, in WUA "Zarafshan" just the opposite was true: despite almost a 4-fold increase in failures to attend to periodic needs there was almost nobody but one farmer to have reported any failure in performing routine needs at the watercourse level.

	Routine maintenance needs unattended to	Akbarabad		Zarafshan		Kerme-Too	
		Score	Rank	Score	Rank	Score	Rank
1	Removal of vegetation along the canal bank	34/8	5			43/12	2
2	Removal of silt from inside the watercourse	24/6	6	4/1	6	43/11	2
8	Maintenance of the water control structure at the WC inlet	17/6	7			9/3	4
Total Score for Routine Maintenance		75 (25%)		4 (2%)		95 (40%)	
Periodic maintenance needs unattended to							
3	Straightening the canal	36/9	4	24/6	3	81/17	1
4	Repairs of measurement devices	5/2	9	13/4	4		
5	Installation of measurement devices	87/21	1	8/2	5	8/2	5
6	Lining of the watercourse with cement	38/9	3	83/20	2	41/10	3
7	Repairs of the water control structure at the WC inlet	39/11	2	24/5	3	4/1	6
9	Repairs of canalettes	15/4	8				
10	Building a flow regulating structure			98/20	1		
11	Drainage canal needed excavator cleaning	5/1	9				
Total Score for Periodic Maintenance		225 (75%)		250 (98%)		134 (60%)	
Periodic-to-Routine Ratio		3		60		1.5	

3.1. Trends for labor contribution into canal cleaning by pilot WUAs

To learn more about local ways for labor contribution into canal maintenance the farmers were asked how many times they participated in the canal cleaning events upon completion, before the start and in the course of the vegetative season with regard to their main watercourse and distributory canals as well as village watercourses and drainage canals. The replies across WUAs suggest that in the Uzbek WUA almost all those interviewed cleaned their main land watercourse and distributory canals as well as their backyard garden watercourses *3 times a year - upon completion, before the start and in the course of the vegetative season*. Almost all Tajik farmers reported that they normally cleaned their main land and village watercourse canals *twice a year - during and before the start of vegetative season*, with about 13-20% of local farmers also reporting contribution into cleaning their distributory canals. . As for the Kyrgyz WUA, most local farmers normally cleaned their canals (main watercourse and distributory canals and village watercourse) *once a year before the start of a vegetative season*, with less than 50% of all those interviewed reporting having cleaned their main plot and village watercourses also during the vegetative season

Number of hashars participated (relative to the vegetative season) to clean	Akbarabad			Zarafshan			Kerme-Too			
	after	during	before	after	during	before	after	during	Before	
Main plot watercourse	1	70%	37%	72%	100%	98%	100%	100%	89%	71%
	2	21%	30%	25%		2%			7%	16%
	3	9%	26%	3%					4%	12%
	4		5%							1%
	7		2%							
Total	N=56	N=57	N=57	N=4	N=52	N=56	N=2	N=27	N=51	
Village watercourse	1	80%	50%	82%	80%	100%	100%	75%	86%	92%
	2	18%	45%	12%	20%			25%	14%	4%
	3	2%	3%	4%						4%
	4		2%							
	7			2%						
Total	N=55	N=56	N=56	N=5	N=58	N=59	N=4	N=22	N=44	
Distributory canal	1	84%	70%	91%	100%	100%	100%		80%	59%
	2	13%	17%	9%						26%
	3	3%	6%							13%
	4		5%							
	5		2%						20%	2%
Total	N=45	N=47	N=44	N=1	N=8	N=12		N=5	N=39	
Drainage canal	1		100%	100%			100%			
	2	100%								
Total	N=1	N=1	N=2			N=1				

4. CROP YIELD TRENDS IN 2003 AND 2004

Average crop yields for the main crops by WUAs reveal different trends in 2003. In WUA “Akbarabad” cotton yields dropped by 18% against the 2002 level, while those for wheat increased by 7%. Nevertheless, cotton yields in this particular WUA shouldn't be taken as bad at all given that 2003 in Uzbekistan was a record low year for cotton in the last 10 years due to colder weather conditions and heavy rainfalls during spring time resulting in heavy crop damages: in overall, there was a 2-week delay in the crop ripening with huge rain-damaged cotton areas having to be replanted all over the country). At the same time with average wheat yields in Uzbekistan in 2003 having dropped from 3.7 MT/ha in 2002 to 3.48 MT/ha (or by 6%), not only did they improve in WUA “Akbarabad” they were much higher (by healthy 1.1 ton per each hectare) than it was on average nationally. In the Tajik WUA cotton yields remained unchanged while those for wheat were 4% higher than in 2002. In the Kyrgyz WUA crop yields were higher by 19% for wheat, by 50% for corn and sunflower, by 12% for tomato, by 87% for capsicum.

In metric tons / ha	Akbarabad		Zarafshan		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
<i>Cotton</i>	2.7	3.3	2.2	2.2	-	-
<i>Wheat</i>	4.6	4.3	2.7	2.6	3.8	3.2
<i>Corn</i>	-	-	-	-	6.0	4.0
<i>Tomato</i>	-	-	-	-	19	17
<i>Capsicum</i>	-	-	-	-	11.2	6.0
<i>Sunflower</i>	-	-	-	-	2.7	1.8

Based on the survey replies set in the table below average crop yields for this year (2004) continued or are expected to continue to be more or less at the same level as last year:

What was the yield trend for your main crop	WUA of Respondent			
	Akbarabad	Zarafshon	Kerme-Too	
in 2003 compared to 2002	Lower	37%	12%	3%
	Same	41%	13%	63%
	Higher	22%	75%	34%
Total Responses		54	60	59
in 2004 compared to 2003	Lower	33%	8%	3%
	Same	27%	20%	61%
	Higher	40%	72%	36%
Total Responses		58	60	59

5. QUALITY OF IRRIGATION SERVICE IN 2003

Some questions in the baseline survey last year were designed to verify the quality of irrigation service. This year they were used again to find out any dynamics between the year preceding WUA establishment and last year when WUAs first started their formal operations. When answered, those questions provide with three main variables allowing making some judgment about the quality of irrigation service in terms of its adequacy and timeliness. In particular, the variables of interest included the number of irrigations requested (1), those actually received (2) and those received on time (3). Thus, the ratio of (2) to (1) would define water adequacy while that of (3) to (2) timeliness of water delivery.

5.1. Adequacy of Water Deliveries

Comparing this year findings with those from the last year survey reveals that the adequacy of water deliveries in 2003, when WUAs started operating, in both vegetative and non-vegetative seasons has steadily improved. This was true for both main land holdings and kitchen gardens across all 3 WUAs. Especially remarkable the improvement was found in WUA “Zarafshan” where the number of those who enjoyed complete or almost complete adequacy (90-100%) in the 2003 vegetative season has doubled compared to 2002 for main land holdings as well as considerably improved for kitchen gardens. Although the response rate for the question about the number of irrigations requested was in overall a little bit higher than the year before, it seems that if asked in a little bit different way from what it is now the response rate could have been better. Instead of asking people how many irrigations they requested for the season it seems like being better to ask them how many times they wanted to irrigate their fields during the season, because the word “request” itself might be confusing for water users given some answers when a farmer, for example, reports 2 irrigations requested, 5 irrigations actually received, of which 3 were on time, which means that there should have been at least 3 irrigations requested instead of 2.

Water adequacy in <i>2003 vegetative season</i>	WUA of respondent					
	Akbarabad		Zarafshan		Kerme-Too	
	2003	2002	2003	2002	2003	2002
< 90%	4%	6%	8%	57%	25%	40%
90 – 100%	78%	94%	86%	43%	46%	50%
> 100%	18%	-	6%	-	29%	10%
Total Valid Responses	N=46	N=48	N=36	N=30	N=28	N=20

Also improved water adequacy was found in the off-season for main land holdings in all 3 WUAs:

Water adequacy in <i>2003-04 off-season</i>	WUA of respondent					
	Akbarabad		Zarafshan		Kerme-Too	
	2003	2002	2003	2002	2003	2002
≤ 50%	6%	3%	3%	3%	6%	15%
51-79%	4%	11%	3%	15%		
80-89%			3%		6%	
90-100%	83%	86%	91%	82%	82%	85%
> 100%	7%				6%	
Total Valid Responses	N=48	N=44	N=37	N=40	N=17	N=13

As for *kitchen gardens* as already mentioned above there was also visible improvement in the adequacy of water supplied:

Water adequacy for <i>kitchen gardens in 2003</i>	WUA of respondent					
	Akbarabad		Zarafshan		Kerme-Too	
	2003	2002	2003	2002	2003	2002
< 90%	3%	6%	20%	37%	8%	33%
90 -100%	83%	90%	80%	56%	54%	50%
> 100%	14%	4%	-	7%	38%	17%
Total Valid Responses	N=47	N=49	N=44	N=32	N=13	N=6

5.2. Timeliness of Water Deliveries

Unfortunately, improved water adequacy alone while meeting satisfactorily water demands in volumetric terms is not yet enough to guarantee farmers a good irrigation

service. There is also right timing of water supply that matters a lot in irrigated agriculture. And that is where problems as suggested by the follow-up survey results continued to get worse in 2 WUAs – “Zarafshan” and “Kerme-Too Akburasy”. In the both latter WUAs the timeliness of irrigation service for main land holdings has shown a visible downward trend compared to 2002. As for WUA “Akbarabad” the number of those who enjoyed timely service in 2003 considerably improved from the preceding year from 40% to 71%.

Timeliness in <i>2003 vegetative season</i>	WUA of respondent					
	Akbarabad		Zarafshon		Kerme-Too	
	2003	2002	2003	2002	2003	2002
Never	-	2%	-	2%	-	2%
≤ 50%	5%	4%	2%	6%	6%	4%
51-79%	7%	38%	30%	17%	23%	25%
80-89%	17%	16%	49%	50%	16%	-
90-100%	71%	40%	19%	25%	55%	69%
Total Valid Responses	N=55	N=50	N=43	N=52	N=51	N=55

Results from the last year baseline survey allowed hypothesizing that the timeliness of irrigation service if being poor during the vegetative season considerably improves in the off-season because of a seemingly less water demand and abundant water in the canals during winter time. The results from this year survey suggest it is not always the case. While still being true for the Uzbek and Kyrgyz WUAs, the timeliness of service in the Tajik WUA in 2003 turned out to be a complete disaster with only 24% of those who could completely enjoy timely service compared to 96% in the year before resulting in 4-fold drop.

Timeliness in <i>2003-04 off-season</i>	WUA of respondent					
	Akbarabad		Zarafshon		Kerme-Too	
	2003	2002	2003	2002	2003	2002
Never	-	-	-	-	8%	35%
≤ 50%	6%		20%		16%	-
51-79%	10%	19%	56%	4%	-	3%
90-100%	84%	81%	24%	96%	76%	62%
Total Valid Responses	N=50	N=37	N=45	N=27	N=25	N=34

The same trend was found with the timeliness of water deliveries to kitchen gardens in these 3 WUAs, where the number of those who fully enjoyed timely service considerably increased in the Uzbek and Kyrgyz WUAs and just incredibly dropped down to 10% of the respondents in the Tajik WUA. Anyway this outcome was quite expected given the attitudes towards kitchen gardens in this particular WUA when they are supplied water only after the water needs of local cooperative and other farms are fully met. And since the timeliness for farms was also very poor in 2003 (irrigation time schedules of only 19% of all local respondents were fully met) this was not at all an unusual result.

Timeliness for kitchen gardens in 2003	WUA of respondent					
	Akbarabad		Zarafshon		Kerme-Too	
	2003	2002	2003	2002	2003	2002
≤ 50%	7%	10%	11%	7%	6%	3%
51-79%	7%	15%	33%	21%	22%	7%
80-90%	12%	8%	46%	20%	3%	2%
100%	74%	62%	10%	32%	69%	55%
Total Valid Responses	N=57	N=57	N=57	N=56	N=49	N=40

5.3. Stability of Water Level in a Watercourse

As for the stability of water level in one's watercourse during the vegetative season no major changes were observed in 2003 compared to 2002 in the Uzbek and Kyrgyz WUAs, while in the Tajik WUA the situation improved for 20% of the sampled farmers though there was still nobody as in the previous year who would always enjoy stability and constancy in water level.

Was water level in watercourse while irrigating in the 2003 veg. season stable and constant?	Akbarabad		Zarafshon		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
Always	32%	4%	-	-	29%	42%
Most of the time	27%	55%	89%	68%	62%	46%
Only some of the time	29%	39%	11%	32%	9%	12%
Never	12%	2%	-	-	-	-
Total	N=56	N=51	N=56	N=59	N=56	N=59

Satisfaction of the respondents with water level in the off-season of 2003-04 as compared to the year before in WUA Akbarabad remained almost the same, in WUA 'Zarafshan' considerably improved by about 45%, while in the Kyrgyz WUA decreased by 20%.

Was water level in watercourse while irrigating in the off-season. stable and constant?	Akbarabad		Zarafshon		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
Always	52%	18%	-	3%	17%	24%
Most of the time	28%	67%	81%	31%	38%	48%
Only some of the time	15%	14%	19%	61%	41%	21%
Never	6%	2%	-	5%	3%	6%
Total	N=54	N=51	N=54	N=59	N=29	N=33

At the level of village watercourse supplying water to household backyard gardens the pattern of farmers' satisfaction with water level was more or less the same compared to one year before with most significant improvements occurring in the Tajik WUA where the number of those who enjoyed stability in water level increased by 27%.

Was water level in the village watercourse while irrigating last year stable and constant?	Akbarabad		Zarafshon		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
Always	39%	4%	-	-	31%	42%
Most of the time	27%	57%	87%	60%	43%	40%
Only some of the time	19%	39%	12%	33%	20%	7%
Never	15%	-	1%	7%	6%	11%
Total	N=59	N=56	N=60	N=59	N=51	N=46

Among the main reasons for lack of stability in water level in their watercourses those interviewed in the Uzbek WUA mostly referred to the presence of too many water users and lack of discipline and order when distributing water followed by water thefts, while in the Tajik WUA it was mainly lack of water in the water source (which is normally beyond the WUA gates) that was blamed.

6. WATER DISPUTES

Analysis of the water disputes trend by the study WUAs shows that there have been little changes in overall since 2002 in the Uzbek and Tajik WUAs, while in the Kyrghyz WUA there was an overall 13% increase in 2003 in the number of disputes compared to 2002:

<i>Are you aware of any water disputes at your watercourse during the year?</i>	Akbarabad		Zarafshon		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
Yes	29%	33%	33%	36%	44%	31%
No	71%	67%	67%	64%	56%	69%
Total	N=55	N=60	N=55	N=58	N=48	N=54

Especially remarkable was the change in the Kyrghyz WUA if seen by different canal reaches: the number of disputes reported by the tail-enders in this WUA increased by about 25% both along distributary and watercourse canals compared to the previous year.

<i>Are you aware of any water disputes at your watercourse?</i>	Location of WC along DC						Location of fields along WC						Total			
	Head		Middle		Tail		Head		Middle		Tail				Alone	
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Yes	25%	22%	44%	30%	64%	38%	25%	14%	45%	43%	56%	31%	-	-	44%	31%
Total	N=16	N=9	N=18	N=20	N=14	N=24	N=8	N=14	N=22	N=23	N=16	N=16	N=2	N=0	N=48	N=54

In addition, analysis of water disputes by different canal reaches also suggests that even with the total number of disputes in a WUA remaining at the same level as in the previous year, their number by different canal reaches might take a completely reverse pattern decreasing in the tail-end and growing in the head. With all other things being equal this is likely to occur due to an improved head-tail equity in water distribution because of a less room left for the upstream water users to abuse rights of those in the downstream resulting in a somewhat better control, discipline, consciousness or cooperation of water users. So it might well be the case that when a majority of farmers along one canal choose to distribute water on a somewhat fairer basis than before those in the upstream tend to resist such a new arrangement deprived of their former privileges to know no limits when irrigating their fields.

7. HOUSEHOLD INCOME COMPOSITION

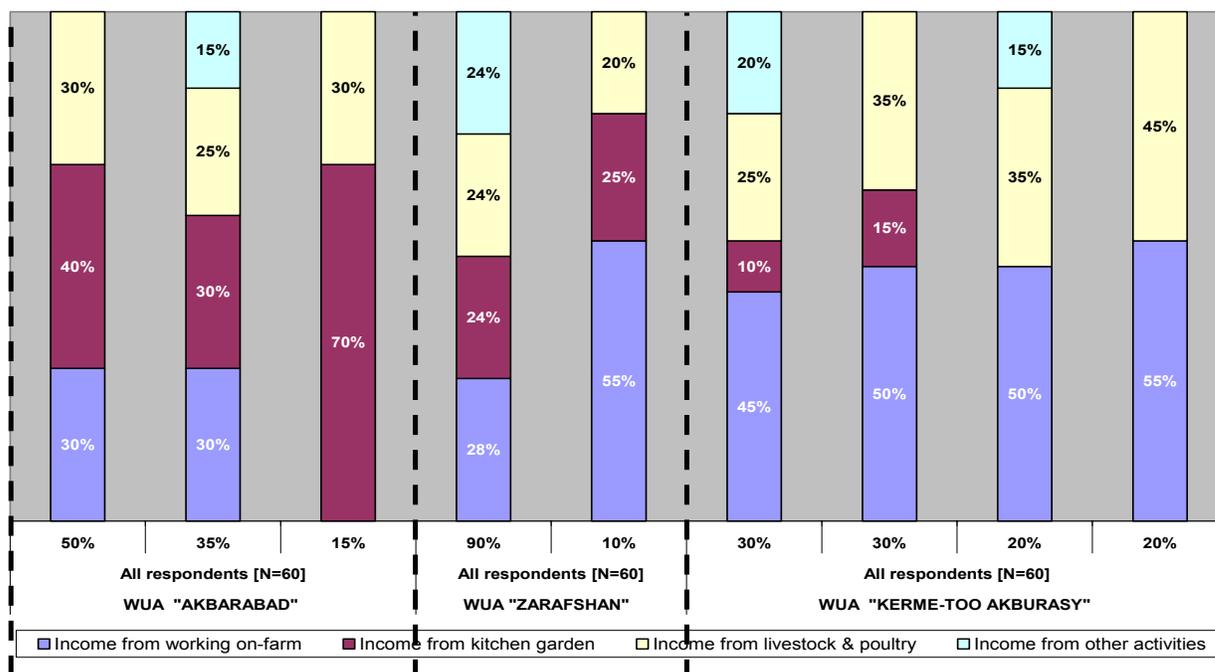
Data collected from the last year baseline survey allowed some generalizations about the composition and approximate size of annual household income from agricultural activities by farmer type, by pilot WUAs. In particular, it was found out that farmer households had 3 main sources of agricultural income including proceeds from their primary occupation of producing crops on their main land holdings or getting remuneration package (in kind and cash payments) from farming on cooperative farms, proceeds from backyard gardens and those from grazing livestock. Remarkable was the role of backyard gardens in overall farmer household economics as the main source of subsistence and additional income especially in case of large cooperative farms (shirkats) in Uzbekistan, where the livelihoods of such farm households by far and large rely not on their primary occupations where they get a mix of wages paid in kind and cash, but rather on their subsistence production of basic foods from working their

backyard gardens, grazing livestock and petty trade of any surplus produced. Thus, according to the initial baseline survey, while individual private farmers both in Kyrgyzstan and Uzbekistan earned most of their yearly income (about 80%) from their primary farm operations, more than 50% of yearly income by Uzbek shirkat farmers was earned from cultivating their backyard gardens.

To further refine these findings and tap on any income earned from sources other than agriculture, thus getting somewhat a better picture of what farmers really earn throughout the year, the sampled farmers were asked to break down their overall yearly income by various income sources including any other activities from outside agriculture provided that their total income is 100%.

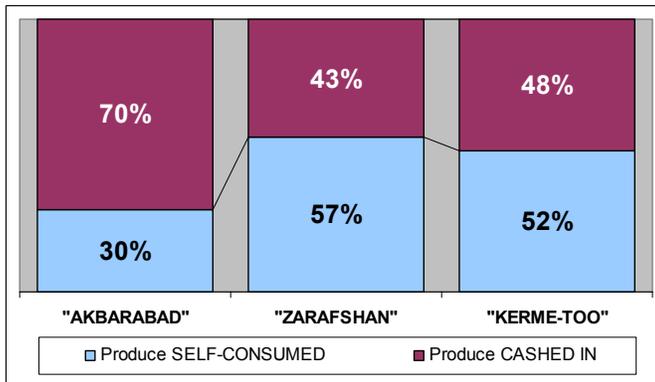
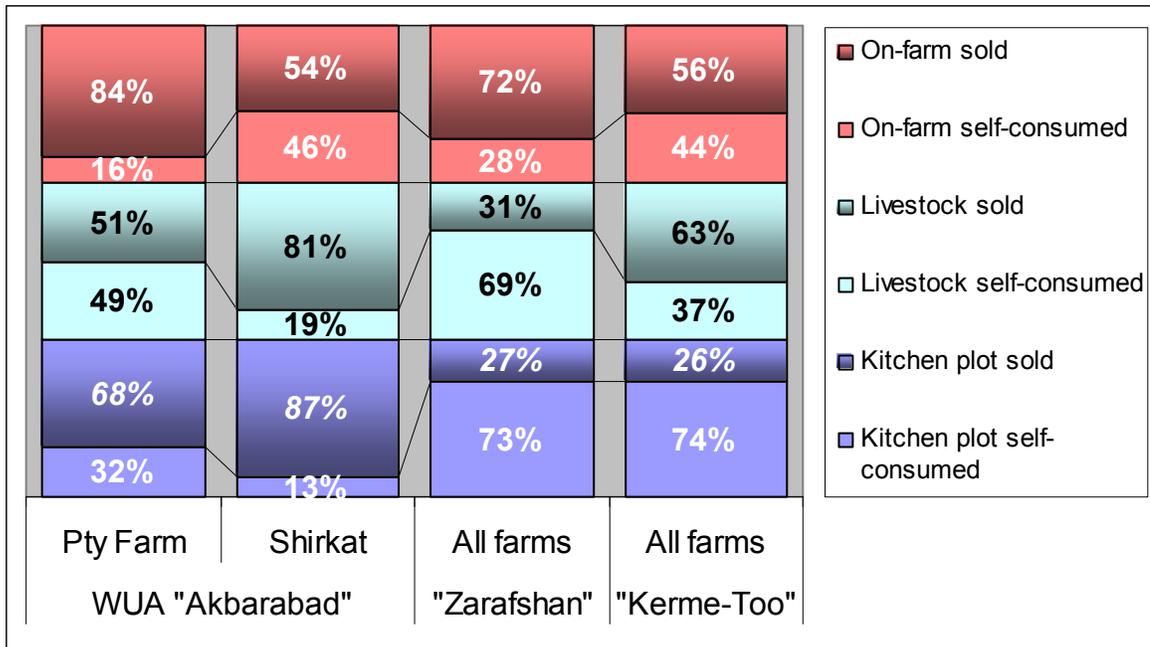
This year findings, confirming, that agriculture by far and large was the main source of an overall farmer household income, have allowed some adjustments into the income composition following the last year survey by taking into account this year also other sources of income earned outside agriculture. Thus, by the number of income sources all households in the study areas can be divided into those earning from at least two up to four different sources. Those with 2 sources of income, being most probably the poorest households, earned exclusively from agriculture either by working their kitchen gardens and keeping livestock/poultry as is the case with the Uzbek WUA, or producing crops on their main land parcels and grazing livestock/poultry as in the Kyrgyz WUA; while those who had 3 and more sources of income were most likely also to earn from other activities outside agriculture. Remarkably that almost all households in the Tajik WUA - except a tiny 10% of the sample who had 3 income sources - had 4 different sources contributing to their aggregate family income with that from outside agriculture constituting almost a quarter (24%). In the Uzbek and Kyrgyz WUAs the share of households earning from non-agricultural activities was found, correspondingly, at 35% and 50% of the total sample with the non-agricultural income amounting to an average of 15% in the Uzbek WUA and 15 to 20% in the Kyrgyz WUA. The Kyrgyz WUA was the only one where significant share of those with 3 different sources of income had one of them earned from outside agriculture (20% of the sample), whereas in the Uzbek and Tajik WUA normally only those who had 4 different sources had one of them earned from non-agricultural activities. This suggests that, the households, having somebody working outside agriculture, are more likely to be better-off economically than those without. At the same time, also more likely is that not every household can afford somebody of its members to work outside agriculture due to the limited employment opportunities anywhere outside agriculture in their rural areas and additional financial costs implied when sending a family member to work in the city. There is also an interesting pattern found across all WUAs that the households from more private and individual farming systems such as proprietary farms versus shirkat farms in the Uzbek WUA, private cooperatives versus collective farms in the Tajik WUA and sole family private farms versus joint family private farms in the Kyrgyz WUA are on average bigger in size by about 1.2 to 1.3 times or 20-30% which can also serve as a relative indication of the wellbeing status of a household in favor of the households affiliated with more private and more individual farm systems. Just contrary to the conventional view holding that it is normally the bigger families that are likely to be most poor, this finding suggests that poverty actually is a restricting factor for poorer households to grow and have bigger family size, which otherwise would have been preferred culturally and traditionally.

Livestock and poultry is found to be the most common source of income earned by all sampled households across all WUAs and farmer types contributing 20% to 45% to the overall gross income (cashed-in + self-consumed):



By farmer types, in the Uzbek WUA the households representing proprietary farms equally belonged to those with 4 and 3 income sources; only a quarter of shirkat households had 4 sources with the remaining majority having normally 3 sources (only from agriculture). Households in the Tajik WUA regardless of their farm systems seem to be more uniform and equal in their well-being status with the vast majority (90%) earning from 4 different sources including that from outside agriculture. In the Kyrgyz WUA the affiliation with any of the 2 available here farm property systems had hardly any impact on the number of income sources earned by an individual household, spreading equally between all farmer types.

To obtain more insights on the household income composition and get more precise approximation of the total value produced by farmers from all farming activities concerned the sampled farmers this year were asked to distinguish the share for each specific agricultural produce they make throughout the year between self-consumed and sold. Based on the farmers' replies the chart below depicts the percent distribution for each of the 3 agricultural sources of income between sold (cashed-in) and self-consumed. Since farm members from Uzbek shirkats and Tajik private cooperatives don't own their on-farm production the value that they receive in compensation for working on-farm in cash was taken as on-farm produce sold and the one in kind as produce self-consumed. In addition it was found out that in the Tajik WUA farm members sell a part of what they receive in-kind for cash, so the in-kind part cashed in was also added to the on-farm value sold:



Households in the study WUAs reveal different patterns as to how they dispose of their aggregate agricultural value produced or earned from 3 farming sources - on-farm activities, backyard gardens and keeping livestock and poultry. Thus, farmer households in the Uzbek WUA on average self-consume 30% (32% by those from proprietary farms and 26% by shirkat farmers) while selling for cash 70% of their aggregate value produced (68% and 74% by private and shirkat farmers, respectively).

In the Tajik and Kyrgyz WUAs the share self-consumed to that sold is more or less equal - 57% to 43%, and 52 to 48%, respectively. This allows the conclusion that Uzbek farmers turn into cash much bigger share of what they aggregately produce than the farmers in the Tajik and Kyrgyz WUAs (70% versus less than 50%). However, the estimates of additional income earned from agricultural activities based on the last year survey and this year results suggest that much bigger share of the produce sold for cash compared to what is left for self-consumption doesn't necessarily mean that a household is better-off. The table below combines the estimates from the last year survey for disposable income earned from all available agricultural sources and this year estimates for an approximate value of agricultural produce self-consumed. The figures confirm that proprietary farmers from the Uzbek WUA are far ahead in well-being compared to any other farmer type across all the study WUAs earning thrice more than the shirkat farmers and twice more than the farmers in the Tajik and Kyrgyz WUAs.

Estimated Household Agri-Income	Akbarabad [N=60]			Zarafshan [N=60]			Kerme-Too Aburasy [N=60]		
	Cashed income	Value self-consumed	Total	Cashed income	Value self-consumed	Total	Cashed income	Value self-consumed	Total
Yearly averages (\$)	1069	458	1527	497	659	1156	497	538	1036
Monthly averages (\$)	89	38	127	41	55	96	41	45	86
%	70%	30%	100%	43%	57%	100%	48%	52%	100%
Proprietary Farm (\$)	1478	695	2173						
Monthly averages (\$)	123	58	181						
%	68%	32%	100%						
Shirkat Farm (\$)	558	196	754						
Monthly averages (\$)	46	16	63						
%	74%	26%	100%						

The follow-up survey this year has also found out that 90% of the sampled farmers in the Tajik WUA, 35% in the Uzbek WUA and 50% in the Kyrgyz WUA earned additional income from outside agriculture. Given this, the aggregate income estimates for those who also earned from outside agriculture will be as follows

Estimated Household Total Income	Akbarabad [N=35%]			Zarafshan [N=90%]			Kerme-Too Aburasi [N=50%]		
	Agri - income	Other Income	Total	Agri - income	Other income	Total	Agri - income	Other income	Total
Yearly averages (\$)	1527	269	1796	1156	365	1512	1036	227	1263
Monthly averages (\$)	127	22	150	96	30	126	86	22	105
%	85%	15%	100%	76%	24%	100%	82%	18%	100%
Proprietary Farm (\$)	2173	383	2556						
Monthly averages (\$)	181	32	213						
%	85%	15%	100%						
Shirkat Farm (\$)	754	133	887						
Monthly averages (\$)	63	11	74						
%	85%	15%	100%						

The above figures translate into the following gross per-capita income estimates for those who earned from both agricultural and non-agricultural sources:

Estimated per-capita income of those better-off	Yearly Gross Income	Daily Gross Income	Average HH Size	Yearly per-capita income	Daily per-capita income	Those in work age	Yearly per capita of those in work age	Monthly earnings by each in work age	Daily per-capita of those in work age	No of dependent HH members
Akbarabad [N=21]	\$1796	\$4.92	6.9	\$260	\$ 0.71	4.0	\$449	\$37	\$ 1.23	2.9
- Pty Farm [N=16]	\$2556	\$7.00	7.8	\$328	\$ 0.90	4.7	\$544	\$45	\$ 1.49	3.1
- Shirkat [N=5]	\$ 887	\$2.43	6.1	\$145	\$ 0.40	3.8	\$233	\$19	\$ 0.64	2.3
Zarafshan [N=54]	\$1512	\$4.14	7.6	\$199	\$ 0.55	4.4	\$344	\$29	\$ 0.94	3.2
Kerme-Too [N=30]	\$1263	\$3.46	7.2	\$175	\$ 0.48	4.2	\$301	\$25	\$ 0.82	3.0

While for those who earned only from agriculture the per-capita incomes are estimated as follows:

Estimated per-capita income of those worse-off	Yearly Gross Income	Daily Gross Income	Average household size	Yearly per-capita income	Daily per-capita income	Those in work age	Yearly per capita of those in work age	Monthly earnings by each in work age	Daily per-capita of those in work age	No of dependent members
Akbarabad [N=35]	1527	\$4.18	6.9	\$221	\$0.60	4.0	\$382	\$32	\$1.05	2.9
- Pty Farm [N=17]	2173	\$5.95	7.8	\$279	\$0.76	4.7	\$462	\$38	\$1.27	3.1
- Shirkat [N=18]	754	\$2.10	6.1	\$124	\$0.34	3.8	\$198	\$16	\$0.54	2.3
Zarafshan [N=6]	1156	\$3.17	7.6	\$152	\$0.42	4.4	\$304	\$25	\$0.83	3.2
Kerme-Too [N=30]	1036	\$2.84	7.2	\$144	\$0.39	4.2	\$247	\$21	\$0.68	3.0

SUMMARY

Frequent exposure of the water users in the pilot areas to different processes, meetings, events and discussions related to their newly established WUAs and water problems for the last year since the first baseline survey has undoubtedly induced some meaningful changes in the farmers' perceptions and attitudes. As a result the farmers' priorities have started to be moving towards more immediate and real problems faced.

- With regard to **overall water management** this year problems with water for drinking and household use have become more urgent than those with irrigation water especially in the Tajik and Kyrgyz WUA, where *seasonal shortage* and *poor quality of water for drinking and household use* were reported as being the most serious, while in the Uzbek WUA it was the *rising underground water level* reported as such.
- Farmers' priorities set about the top **problems with irrigation management** this year suggest that maintenance problems at all hydraulic levels are still perceived as far more serious than those with water distribution. Though this year all such problems were unanimously and by a wide margin overshadowed across all WUAs by *inadequate funds to pay for operation and maintenance*
- The top list of on-farm water delivery problems, in general, remaining pretty much the same as in the previous year had one remarkable change in the Uzbek WUA, where the farmers have reported this year their *inability to predict when water will come and when it will be cut off* as the most serious problem which was only the fifth last year.
- Most dynamics in the farmers' perceptions of the needs for additional support has resulted from training activities and other project interventions accomplished during the period between 2 surveys in the pilot WUAs thus meeting in some way or other the needs put on the wish list last year and giving way to those still unattended to or those getting even further worse for some reasons.
- Given the last year findings suggesting that farmers in the Uzbek and Tajik WUAs had far less repairs and maintenance problems than in the Kyrgyz WUA with the best maintenance performance and very few reported maintenance problems found in the Uzbek WUA both for the watercourse and distributary levels, this year has revealed somewhat unexpected results for WUA "Akabrabad" and WUA "Zarafshan". The number of farmers who reported any repairs or maintenance problems at their watercourses unattended to in the Uzbek WUA more than doubled, while in the Tajik WUA more than tripled. More than doubled also was the number of those in WUA "Akbarabad" who reported same for the distributary canal.
- Somewhat deeper inquiry into the reasons for obviously far more deteriorated maintenance status this year in the Uzbek and Tajik WUAs shows that a lion's share of all the required and unattended-to measures refers to periodic maintenance and repairs which takes from the farmers more than just mere labor contribution into the canal cleaning. This perfectly explains why the respondents in these WUAs when asked about the most serious problems in irrigation management as discussed above have referred to *inadequate funds to pay for operation and maintenance* as the topmost serious.

- The canal cleaning routine across the study WUAs suggests that in the Uzbek WUA almost all those interviewed cleaned their main land watercourse and distributary canals as well as their backyard garden watercourses *3 times a year - upon completion, before the start and in the course of the vegetative season*, almost all those in the Tajik WUA - *twice a year - during and before the start of vegetative season*; and those in the Kyrgyz WUA - *once a year before the start of a vegetative season* with less than 50% of all those interviewed reporting having cleaned their main plot and village watercourses also during the vegetative season.
- Based on the survey replies average crop yields for this year (2004) continued to be more or less at the same level as last year
- Comparing this year findings with those from the last year survey reveals that the adequacy of water deliveries in 2003, when WUAs started operating, in both vegetative and non-vegetative seasons has steadily improved. This was true for both main land holdings and kitchen gardens across all 3 WUAs. Also improved water adequacy was found for kitchen gardens and in the off-season for main land holdings in all 3 WUAs.
- In the Tajik and Kyrgyz WUA the timeliness of irrigation service for main land holdings has shown a visible downward trend compared to 2002. As for WUA “Akbarabad” the number of those who enjoyed timely service in 2003 considerably improved from 40% to 71%. The same trend was found with the timeliness of water deliveries to kitchen gardens in these 3 WUAs, where the number of those who fully enjoyed timely service considerably increased in the Uzbek and Kyrgyz WUAs and just incredibly dropped down to 10% of the respondents in the Tajik WUA.
- No major changes were observed in the Uzbek and Kyrgyz WUAs with regard to stability of water level by watercourses during the vegetative season in 2003 compared to 2002, while in the Tajik WUA the situation improved for 20% of the sampled farmers.
- At the level of village watercourse supplying water to household backyard gardens the pattern of farmers’ satisfaction with water level was more or less the same compared to one year before with most significant improvements occurring in the Tajik WUA where the number of those who enjoyed stability in water level increased by 27%.
- Among the main reasons for lack of stability in water level in their watercourses those interviewed in the Uzbek WUA mostly referred to the presence of too many water users and lack of discipline and order when distributing water followed by water thefts, while in the Tajik WUA it was mainly lack of water in the water source (which is normally beyond the WUA gates) that was blamed.
- Analysis of the water disputes trend by the study WUAs shows that there have been little changes in overall since 2002 in the Uzbek and Tajik WUAs, while in the Kyrgyz WUA there was an overall 13% increase in 2003 in the number of disputes compared to 2002.

- By the number of income sources all households in the study areas can be divided into those earning from at least two up to four different sources. Those with 2 sources of income, being most probably the poorest households, earned exclusively from agriculture either by working their kitchen gardens and keeping livestock/poultry, or producing crops on their main land parcels and grazing livestock/poultry; while those who had 3 and more sources of income were most likely also to earn from other activities outside agriculture.
- An interesting pattern found across all WUAs is that the households from more private and individual farming systems such as proprietary farms versus shirkat farms in the Uzbek WUA, private cooperatives versus collective farms in the Tajik WUA and sole family private farms versus joint family private farms in the Kyrghyz WUA are on average bigger in size by about 1.2 to 1.3 times or 20-30% which can also serve as a relative indication of the wellbeing status of a household in favor of the households affiliated with more private and more individual farm systems.
- Livestock and poultry is found to be the most common source of income earned by all sampled households across all WUAs and farmer types contributing 20% to 45% to the overall gross income (cashed-in + self-consumed):
- Households in the study WUAs reveal different patterns as to how they dispose of their aggregate agricultural value produced or earned from 3 farming sources - on-farm activities, backyard gardens and keeping livestock and poultry. Uzbek farmers turn into cash much bigger share of what they aggregately produce than the farmers in the Tajik and Kyrghyz WUAs (70% versus less than 50%). However, the estimates of additional income earned from agricultural activities based on the last year survey and this year results suggest that much bigger share of the produce sold for cash compared to what is left for self-consumption doesn't necessarily mean that a household is better-off.
- The follow-up survey estimates confirm that proprietary farmers from the Uzbek WUA are far ahead in well-being compared to any other farmer type across all the study WUAs earning thrice more than the shirkat farmers and twice more than the farmers in the Tajik and Kyrghyz WUAs.

BIBLIOGRAPHY

M.Yakubov, B.Matyakubov. 2004. *The Baseline Survey of 3 pilot WUAs in the Ferghana Valley*. IWRM-Ferghana Project. Tashkent. Uzbekistan. International Water Management Institute

MISCELLANEOUS TABLES

Are you aware of any water disputes at your village watercourse?	Akbarabad		Zarafshon		Kerme-Too Akburasy	
	2003	2002	2003	2002	2003	2002
Yes	27%	Na	30%	Na	30%	Na
No	73%	Na	70%	Na	70%	Na
Total	N=55	Na	N=56	Na	N=47	Na

WUA Akbarabad Are you aware of any water disputes at your watercourse?	Location of WC along DC						Location of fields along WC						Total			
	Head		Middle		Tail		Head		Middle		Tail				Alone	
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Yes	18%	9%	32%	24%	38%	56%	31%	21%	12%	31%	43%	37%	-	100%	29%	32%
Total	N=11	N=11	N=28	N=21	N=13	N=18	N=13	N=14	N=16	N=16	N=23	N=19	N=2	N=1	N=55	N=50

WUA Zarafshan Are you aware of any water disputes at your watercourse?	Location of WC along DC						Location of fields along WC						Total			
	Head		Middle		Tail		Head		Middle		Tail				Alone	
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Yes	21%	40%	21%	18%	59%	56%	20%	19%	37%	37%	29%	47%		50%	33%	36%
Total	N=24	N=20	N=14	N=22	N=17	N=16	N=10	N=16	N=38	N=19	N=7	N=19	N=0	N=4	N=55	N=58

If yes, how many disputes?	WUA of respondent		
	Akbarabad	Zarafshon	Kerme-Too
1	1	10	4
2	9	6	7
3	1	1	3
4			2
5	2	1	4
6	1		
7	2		
8			1
Total	16 (52)	18 (30)	21 (63)

Number of hashars participated to clean	Akbarabad			Zarafshan			Kerme-Too			
	after	during	before	after	during	before	after	during	before	
Main watercourse	1	39	21	41	4	51	56	2	24	36
	2	12	17	14		1			2	8
	3	5	15	2					1	6
	4		3							1
	7		1							
Total	56	57	57	4	52	56	2	27	51	
Village watercourse	1	44	28	46	4	58	59	3	19	40
	2	10	25	7	1			1	3	2
	3	1	2	2						2
	4		1							
	7			1						
Total	55	56	56	5	58	59	4	22	44	
Distributory	1	38	33	40	1	8	12		4	23
	2	6	8	4						10
	3	1	3							5
	4		2							
	5		1						1	1
Total	45	47	44	1	8	12		5	39	
Drainage canal	1		1	2			1			
	2	1								
Total	1	1	2			1				

Number of farmers participated in hashars	Akbarabad			Zarafshan			Kerme-Too		
	after	during	before	after	during	before	after	during	before
Main watercourse	56	57	57	4	52	56	2	27	51
Village watercourse	55	56	56	5	58	59	4	22	44
Distributory	45	47	44	1	8	12		5	39
Drainage canal	1	1	2						

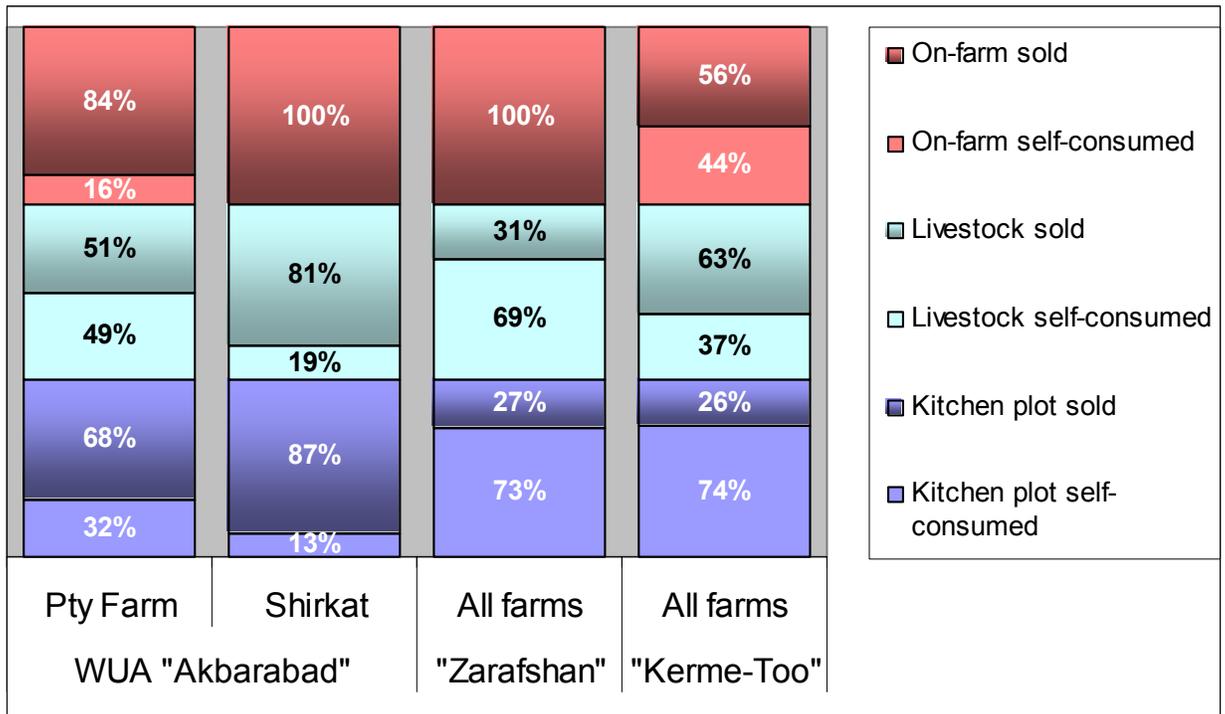
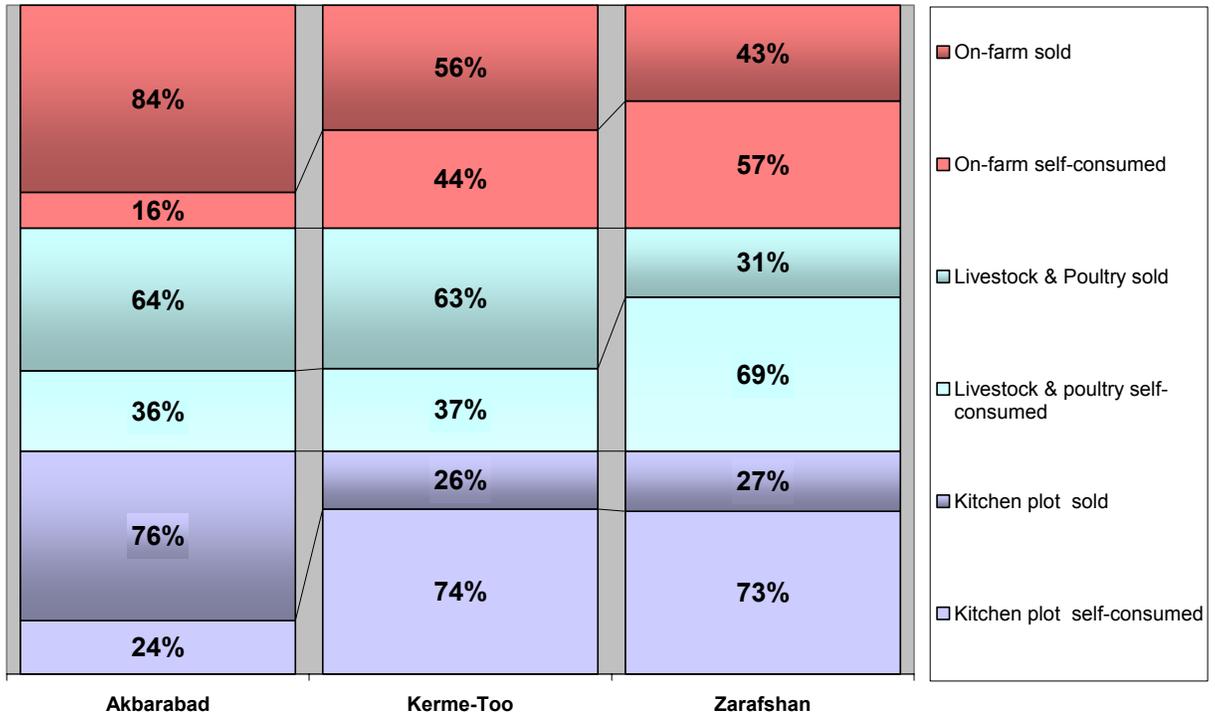
Per-capita income estimates	Gross Income	Size of Household	Per-capita income	Those in work age	Per capita of those in work age
Akbarabad [N=60]	\$1796	6.9	\$260	4.0	\$449
- Pty Farm	\$2556	7.8	\$328	4.7	\$544
- Shirkat	\$ 887	6.1	\$145	3.8	\$233
Zarafshan [N=60]	\$1512	7.6	\$199	4.4	\$344
Kerme-Too [N=60]	\$1263	7.2	\$175	4.2	\$301

	Yearly income		Monthly cash income	Income self-consumed	Cash + consumed income	Aggregate monthly income
	US\$	%	US\$	US\$	US\$	US\$
Private Farmers/N=25	\$1750	50%	\$145	799	2549	212
	\$1206	50%	\$100	276	1482	123
Shirkat Farmers/N=20	\$ 725	55%	\$ 60	114	839	70
	\$ 355	45%	\$ 30	114	469	40
Cooperative Farmers/N=60	\$ 542	55%	\$ 45	670	1212	101
	\$ 442	45%	\$ 37	670	1112	93
Private Farmers/N=60	\$ 617	33%	\$ 50	637	1254	104
	\$ 480	33%	\$ 40	637	1117	93
	\$ 393	33%	\$ 33	359	752	63

	Yearly income		Monthly cash income	%=\$ self-consumed	Aggregate yearly income	Aggregate monthly income
	US\$	%	US\$	%=\$	US\$	US\$
Private Farmers/N=25	\$1750	50%	\$145	32%=\$824	2574	214
	\$1206	50%	\$100	32%=\$568	1774	148
Shirkat Farmers/N=20	\$ 725	55%	\$ 60	26%=\$255	980	82
	\$ 355	45%	\$ 30	26%=\$125	480	40
Cooperative Farmers/N=60	\$ 542	55%	\$ 45	57%=\$718	1260	105
	\$ 442	45%	\$ 37	57%=\$586	1028	86
Private Farmers/N=60	\$ 617	33%	\$ 50	52%=\$668	1285	107
	\$ 480	33%	\$ 40	52%=\$520	1000	83
	\$ 393	33%	\$ 33	52%=\$426	819	68

Farmer Type	Proceeds from main plot		Proceeds from livestock		Proceeds from kitchen garden		Grand Total in yearly income		Monthly income
	US\$	% of yearly total	US\$	% of yearly total	US\$	% of yearly total	US\$	% within the farmer type	US\$
UZB Private Farmers/N=25	1043	60%	544	30%	163	10%	\$1750	50%	\$145
	1043	86%	0	0	163	14%	\$1206	50%	\$100
	175	24%	370	50%	180	26%	\$ 725	55%	\$ 60
TAJ Cooperative Farmers/N=60	175	49%	0		180	51%	\$ 355	45%	\$ 30
	262	50%	180	30%	100	20%	\$ 542	55%	\$ 45
KYR Private Farmers/N=60	262	60%	180	40%	0	0	\$ 442	45%	\$ 37
	393	65%	137	20%	87	15%	\$ 617	33%	\$ 50
	393	80%	0	0	87	20%	\$ 480	33%	\$ 40
	393	100%	0	0	0	0	\$ 393	33%	\$ 33

	Akbarabad [N=60]					Zarafshan [N=60]			Kerme-Too Aburasy [N=60]		
	Total income	HH Size	Those in work age	Per-cap income	Per capita (work age)	Total income	HH Size	Per-capita income	Total income	HH Size	Per-capita income
Yearly averages (\$)	1796	6.9	4	\$260	\$449	1512	7.6	199	1263	7.2	175
Pty Farm (\$)	2556	7.8	4.7	\$328	\$544						
Shirkat (\$)	887	6.1	3.8	145	\$233						



Akbarabad	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse while irrigating stable and constant?																
Only some of the time	18%	45%	32%	32%	36%	44%	38%	29%	12%	35%	33%	53%	50%	-	29%	39%
Never	9%	-	11%	-	14%	6%	15%	7%	-	-	21%	-	-	-	12%	2%
Total	N=11	N=11	N=28	N=22	N=14	N=18	N=13	N=14	N=16	N=17	N=24	N=19	N=2	N=1	N=56	N=51

Zarafshan	Location of your WC along DC						Location of your fields along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse while irrigating stable and constant?																
Only some of the time	4%	24%	-	23%	28%	56%	11%	24%	7%	30%	29%	42%	-	33%	11%	32%
Total	N=24	N=21	N=14	N=22	N=18	N=16	N=9	N=17	N=40	N=20	N=7	N=19	N=0	N=3	N=56	N=59

Kerme-Too Akburasy	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse while irrigating stable and constant?																
Only some of the time	-	-	5%	5%	23%	23%	-	-	-	8%	28%	29%	-	-	9%	12%
Total	N=17	N=10	N=22	N=22	N=17	N=26	N=10	N=16	N=25	N=25	N=18	N=17	N=3	N=0	N=56	N=58

Akbarabad	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse in the off-season stable and constant?																
Only some of the time	18%	18%	15%	9%	14%	17%	-	7%	14%	6%	25%	26%	-	-	15%	14%
Never	-	-	4%	5%	7%	-	-	7%	-	-	12%	-	-	-	6%	2%
Total	N=11	N=11	N=27	N=22	N=14	N=18	N=13	N=14	N=14	N=17	N=24	N=19	N=2	N=1	N=54	N=51

Zarafshan	Location of your WC along DC						Location of your fields along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse in the off-season stable and constant?																
Only some of the time	4%	67%	31%	61%	29%	53%	-	63%	24%	65%	17%	63%	-	25%	19%	61%
Never	-	-	-	-	-	20%	-	-	-	-	-	16%	-	-	-	5%
Total	N=23	N=21	N=13	N=23	N=17	N=15	N=9	N=16	N=38	N=20	N=6	N=19	N=0	N=4	N=54	N=59

Kerme-Too Akburasy	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in watercourse in the off-season stable and constant?																
Only some of the time	29%		50%	21%	40%	27%	40%	10%	46%	25%	40%	17%			41%	19%
Never		14%		7%	10%			10%		6%	10%				3%	6%
Total	N=7	N=7	N=12	N=14	N=10	N=11	N=5	N=10	N=13	N=16	N=10	N=6	N=0	N=0	N=29	N=32

Akbarabad	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in your village watercourse stable and constant?																
Only some of the time	-	43%	26%	29%	18%	50%	17%	47%	15%	37%	24%	37%	-	-	19%	39%
Never	-	-	10%	-	18%	-	-	-	19%	-	16%	-	-	-	15%	-
Total	N=5	N=14	N=31	N=24	N=11	N=18	N=6	N=17	N=27	N=19	N=25	N=19	N=0	N=1	N=59	N=56

Zarafshan	Location of your WC along DC						Location of your fields along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Was water level in your village watercourse stable and constant?																
Only some of the time	11%	33%	-	30%	21%	38%	24%	41%	4%	20%	8%	42%	-	25%	12%	33%
Never	-	-	5%	-	-	25%	-	-	4%	10%	-	11%	-	-	2%	7%
Total	N=19	N=21	N=20	N=23	N=19	N=16	N=21	N=17	N=25	N=20	N=13	N=19	N=0	N=4	N=59	N=60

Kerme-Too Akburasy <i>Was water level in your village watercourse stable and constant?</i>	Location of your WC along DC						Location of your farm land along WC								Total	
	Head		Middle		Tail		Head		Middle		Tail		Alone			
	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
Only some of the time	-	-	29%	11%	27%	5%	-	7%	25%	11%	28%	-	--	-	20%	7%
Never	-	25%	4%	5%	9%	11%	-	21%	5%	-	6%	17%		-	6%	11%
Total	N=14	N=8	N=24	N=19	N=11	N=19	N=14	N=14	N=20	N=19	N=18	N=12	N=0	N=0	N=51	N=46

Stability of water level in the veg-season 2003	Akbarabad	Zarafshon	Kerme-Too Akburasy
Thefts	5		
Too many water users/ no discipline	8	2	
Tail-ender	4		3
Little water in the distributary/ water source	1	5	
Poor control over water distribution	1		
Canals poorly maintained/ Huge water losses		2	
Remote location from the main canal head		1	
Total	17	10	3

Stability of water level in the off-season	Akbarabad	Zarafshon	Kerme-Too Akburasy
Water is shared with mahalla/ Poor discipline & order	6		
Little water in the water source/ Water shortage	1	7	3
I am a tail-ender	2		1
Depends on how warm is the weather		1	
Mirab's poor performance/ no off-season service	2		
Huge seepage losses due to poorly maintained canals		2	
Low water demand and fewer water requests		1	2
Untimely water supply		1	
Total	11	10	6

Stability of water level for kitchen gardens	Akbarabad	Zarafshon	Kerme-Too Akburasy
Too many population/no discipline/ Lack of drainage	9		
I am a tail-ender	4		1
It is rain-fed only			2
Little water in the sai		2	
Water fluctuations in the distributary		2	
No power or failure when pumping from drain canal	2	1	
Watercourses are poorly cleaned/ Huge water losses	1	1	
We irrigate after farms satisfy their needs		1	
Sai has no back-up from any reservoir		1	
Poor water distribution in the watercourse			1
Total	15	6	4