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Ministry of Water Resources  
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**LIFE Integrated Water Resources Management  
Task Order No. 802  
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# **Monitoring and Evaluation Report Year 2**

*Report No. 31*

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**Prepared by:  
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**October 2006**

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## Acronyms and Abbreviations

AAU	Agricultural Administrative Unit
AED	Academy for Educational Development (a US-based entity providing USAID-funded assistance regarding environmental education and awareness)
APRP	Agricultural Policy Reform Program
BCWUA	Branch Canal Water User Association
CD	Central Directorate
CDA	Community Development Association
CTO	Cognizant Technical Officer (the USAID person responsible for supervising a technical assistance contractor)
CY	Calendar Year
DAI	Development Alternatives, Inc. (a Washington DC-based consulting firm working with IRG to implement the project)
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program (a USAID-funded program aimed at achieving environmental policy reform)
EPADP	(MWRI) Egyptian Public Authority for Drainage Projects
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract
ET	Evapotranspiration
GIS	Geographic Information System
GOE	Government of Egypt
GPS	Global Positioning System
GW	Groundwater
GWS	Groundwater Sector
HD	(Aswan) High Dam
IAS	Irrigation Advisory Service
IBRD	International Bank for Reconstruction and Development or World Bank
ID	Irrigation Department
IDS	Irrigation and drainage system
IIIMP	Integrated Irrigation Improvement and Management Project
IIP	Irrigation Improvement Project
IRG	International Resources Group (a Washington DC-based consulting firm that is prime contractor for the IWRMP)
IRMU	Integrated Water Management Unit
IRs	Intermediate Results
IRU	MWRI Institutional Reform Unit
IS	Irrigation Sector (of the MWRI)
IT	Information Technology
IWMD	Integrated Water Management District
IWMU	Integrated Water Management Unit (A unit of MWRI)
IWRM	Integrated Water Resources Management

IWRMP	Integrated Water Resource Management Project
LAN	Local Area Network
LIFE	Livelihood and Income from the Environment (project)
LOE	Level of Effort
M&E	Monitoring and Evaluation
MALR	Ministry of Agriculture and Land Reclamation
MED	MWRI Mechanical & Electrical Department
MIC	MWRI Ministry Information Center
MISD	Matching Irrigation Supply and Demand
MOE	Ministry of Education
MOH	Ministry of Housing
MOU	Memorandum of Understanding
MSEA	Ministry of State for Environmental Affairs
MWRI	Ministry of Water Resources and Irrigation
NGO	Non governmental Organization
NSCE	North South Consultants Exchange
NWRC	(MWRI) National Water Research Center
O&M	Operation and Maintenance
OJT	On-the-Job Training
PM&E	Performance Monitoring and Evaluation
RSC/WP	Red Sea Coastal/Water Project, short name for USAID Red Sea Coastal and Improved Water Resource Management Project
RWS	Relative Water Supply
SIRs	Sub-Intermediate Results
SOs	Strategic Objectives
STTA	Short-term Technical Assistance
TA	Technical assistance
TOR	Terms of Reference
USAID	United States Agency for International Development
WCU	MWRI Water Communication Unit
WDC	MWRI Central Water Distribution Center
WPRP	Water Resources Results Package
WQU	MWRI Water Quality Unit
WUA	Water User Association

## Executive Summary

The M&E team assembled available data and computed and reported 15 indicators for 3 implementation objectives and 8 indicators for 3 outcome objectives. Three other outcome indicators were not reported because data used to compute them was deemed not sufficiently reliable.

Implementation indicators showed the project reaching most targets and proceeding as per plan. The preparation of water resource inventories by the Districts is the only indicator lagging at this point.

Project outcomes are mixed, with some showing modest progress, one showing deterioration, and others remaining static. In terms of quality of irrigation service, no dramatic changes were evident. Complaints on drainage problems declined for the year, complaints about irrigation problems increased, and farmer satisfaction with irrigation service during the important summer season increased modestly compared with the previous summer. Deliveries to Districts matched targets ( $\pm 10\%$ ) only about one-fifth of the time in both seasons.

One worrisome change detected was a deterioration in equity of water distribution among branch canals within Districts. Improving equity of water distribution is an important project objective and the reasons underlying this apparent deterioration need to be investigated.

On the other hand, equity of water distribution along branch canals improved. This positive outcome is tentatively attributed to improved communication between newly-established BCWUAs and District personnel. This hypothesis should be investigated and confirmed.

Lessons learned related to the M&E program itself include the following.

- A quality control program for irrigation performance data is necessary to insure data quality and reliability. Data on irrigation targets, irrigation demand, and agricultural yields and prices, in particular, require significant attention to improve quality and reliability.
- The project should provide feedback on M&E results to District Managers and staff and BCWUAs and seek their assistance in interpreting the meaning and causes of the measured outcomes.
- The M&E program requires an updated and consistent set of irrigable area figures for all 27 districts. Currently-used figures do not accurately and consistently represent District irrigable areas.

- The second year of the client satisfaction survey worked much more smoothly than the first due to the experience gained during the first year. The survey continues to show its worth as a reliable and inexpensive way of collecting information on project outcomes across the entire one million feddans of project area.
- The M&E team needs to work with the survey consultant to resolve sample distribution problems that cropped up during the second survey round.

## Background

The LIFE Project M&E Plan lays out the background, purpose, methodology, goals, indicators, and targets for the project. The M&E Plan is a working management process that is adjusted periodically to accommodate changes occurring in the context and implementation of the project.

Last year the project Steering Committee decided to postpone inclusion of two of the Aswan districts, Wady el-Nokra and Wady el-Saaida, in the program, reducing the total number of districts covered from 27 to 25 and the total nominal area covered by the project from 1,239,169 feddans to 1,134,169 feddans. Accomplishment targets contained in Table 2 of the M&E Plan under Objectives 1, 2, and 3 were adjusted accordingly. Work has been proceeding in these two districts, however, and their results are reported with respect to Objectives 1, 2, and 3. For the outcome Objectives (4, 5, and 6) these two Districts have not generally been included because they are sometimes missing key data points and because they differ from the other Districts in that they include substantial un-irrigated area within their boundaries and are still expanding.

Two indicators have been adjusted this year. Original indicators 4.5 and 4.6 relating to the duration of rotations in each district proved very difficult to compute with the information at hand. As a result these two indicators were dropped in favor of a pair of indicators which are similar but much easier to measure and evaluate. These two values are (a) the percent of farmers reporting complete correspondence with the district's rotational schedule, and (b) the percent of farmers reporting complete or partial correspondence with the district's rotational schedule. These indicators were computed during Year 1 on an interim basis. This year they have been included permanently, replacing the two former indicators 4.5 and 4.6 in the indicators table<sup>1</sup>.

In addition, values of several of the impact indicators from 2004-5 were recomputed this year. Some of last year's baseline values were interim values, based only on the four pilot IWMDs established during the bridging period. During the past year, data for Year 1 for the remaining Districts were assembled and project-wide baseline values were recalculated to include all 25 Districts. This has changed the project-wide averages in some cases, but the baseline values now represent the entire project rather than only the four initial IWMDs. In

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<sup>1</sup> It is expected that BCWUAs, once established and functioning, will monitor water availability in their branch canals by noting daily whether or not water is flowing, giving a precise record of actual days on and off for the branch canal. Although this information will not be used in the project M&E system, it is expected to form the basis for discussion between the BCWUA and the IWMD over water schedules and distribution.

addition, some errors in last year's data tables were found and corrected, which changed other baseline values slightly.

During 2006, digital maps were completed and verified for each district. These maps will make it possible to make more accurate estimates of the area included within the boundaries of each integrated district using Geographic Information System (GIS) software. It also allows systematic calculation of a "net irrigable area" for each district, based on a standard set of procedures for deducting non-agricultural land from the gross area of the district, improving the accuracy and validity of all of the M&E indicators. These calculations should be included in the coming year's workplan and used to update the M&E database.

There was some uncertainty during Year 2 over the Ministry's policy regarding maintenance contracting directly by IWMDs (Indicator 1.6). The project steering committee meeting on 30 August confirmed that it was Ministry policy to move toward direct contracting. Consequently Indicator 1.6, which had been questioned, will be retained in the M&E plan.

## Data Sources

As described in the M&E Plan, data for the M&E activity comes from three principal sources: project recordkeeping, an annual client satisfaction survey, and IWMD data collection systems.

Project recordkeeping was used to populate the *implementation indicators*, i.e. those under Objectives 1, 2, and 3. Assembling this data was straightforward and no particular difficulties were encountered.

The client satisfaction survey was conducted between May to August 2006. The work was carried out by North South Consultants Exchange (NSCE), who administered the survey to around 4,500 respondents across the 27 IWMDs, prepared a report describing their work and provided reduced data, in spreadsheet form, to Project M&E staff and consultants. IWMDs participated in the survey by generating the sampling frame—a list of all the farmers in the selected sample branch canals—and by providing staff to serve as field enumerators. All participating staff received training in conducting field surveys from NSCE. Many of the staff members involved also participated in last year's survey. The overall cost of the survey was about US\$ 12,500. The result was a set of data that served as a basis for computing some of the M&E *impact indicators*.

Data collected by the IWMDs was also an important source of information for computing *impact indicators*. Data collected by the IWMDs for the 2005-06 agricultural year included:

- Number of complaints filed with the IWMD
- Planned 15-daily target inflows to each IWMD for the agricultural year (from the five General Directorates)
- Computed 15-daily demand figures for each IWMD (from Districts, presumably from MISD)
- Actual measured 15-daily net inflows to each IWMD (from daily readings at calibrated inflow structures)
- Actual cropping patterns in each IWMD (from local Agricultural Administration units through MISD)
- Crop yields from each district for each season (from local Agricultural Administrations)
- Wholesale producer prices for each crop and season for each district (presumably from Agricultural Administrations)

In addition to the 2005-06 data, data missing from the 2004-05 analysis were computed by IWMD and project staff and entered into the database. The most important such data included the values of actual water deliveries to the districts which were computed from water level readings and the newly-developed rating curves for key control structures.

In the process of assembling and analyzing the data for the Year 2 report, a number of anomalies were identified. After careful preliminary review and discussion, the anomalies related to hydrologic data were collected in a note recommending steps necessary to investigate them further (Annex 1). Potential problems with the agricultural data received from the Agricultural Administration units are significant and make it difficult to place much confidence in the indicators based on these data. This lack of confidence is compounded by the lack of knowledge of the exact sources of the data and processes by which it was collected.

## Results

### Implementation Indicators

Objectives and indicators in the M&E Plan are divided into two basic categories. The first three objectives and associated *implementation* indicators relate to the progress achieved in implementing the project. Table 1 shows:

1. The 3 implementation objectives
2. The 15 associated indicators
3. The baseline values of the indicators at the beginning of the LIFE project
4. The target values for the indicators for the 4 years of the project
5. The actual values of the indicators achieved during Years 1 and 2 of the project.

#### Objective 1: IWMDs Established

As reported for Year 1, all 27 IWMDs were established, fully staffed, and equipped with computer systems during the first year of the project (Indicators 1.1, 1.4, and 1.5). During Year 2, digital mapping was completed for boundaries and major canals in all 27 Districts (Indicator 1.2). Work is ongoing to complete the mapping of Branch Canal command areas in all Districts. All Districts completed integrated maintenance plans during Year 2 (Indicator 1.3).

With the expansion in the scope of responsibility of the newly-integrated IWMDs and the higher government grade of their District Managers, the Ministry intended that IWMDs would begin to contract for their maintenance needs directly with private contractors (Indicator 1.6). This is targeted to take place in Years 3 and 4.

Table 1 Implementation Objectives, Indicators, Targets, and Year 2 Accomplishments

LIFE IWMP M&E Indicators - Year 2			Targets and Accomplishments								
Objective	DRAFT Indicator	Units	Baseline	Year 1		Year 2		Year 3		Year 4	
				Target	Actual	Target	Actual	Target	Actual	Target	Actual
<b>1</b>	<b>IWMDs created and functioning to cover completely the 4 project directorates</b>										
1.1	Number of IWMDs established by signed Ministerial decree	Number	4	27	27	27	27	27	27	27	27
1.2	Number of districts with geo-referenced maps showing district boundaries and canal layouts	Number	0	27	14	27	27	27	27	27	27
1.3	Number of IWMDs with completed integrated maintenance plans	Number	0	27	0	0	27	27	27	27	27
1.4	Number of IWMDs with fully-staffed senior positions according to new staffing plan	Number	0	27	27	27	27	27	27	27	27
1.5	Number of IWMDs with local computer networks installed and operational	Number	4	16	27	27	27	27	27	27	27
1.6	Number of IWMDs awarding maintenance contracts directly	Number	0	0	0	0	0	27		27	
<b>2</b>	<b>Measurement-based management practices established and functioning in all IWMDs</b>										
2.1	Number of IWMDs with calibrations for all authorized inflow and outflow structures into and out from the District	Number	1	15	4	27	27 <sup>1</sup>	27	27	27	27
2.2	Number of IWMDs providing 15-daily reports of measured water inflows to the District Manager for one complete season	Number	0	0	0	0	27	27	27	27	27
2.3	Number of IWMDs with a completed water resource inventory in approved standard format	Number	0	9	0	27	0 <sup>2</sup>	27		27	
2.4	Number of IWMDs with a completed water resource management plan in approved standard format (includes MISD)	Number	0	0	0	0	0	27		27	
<b>3</b>	<b>BCWUAs participate in the management system in all IWMDs</b>										
3.1	Area covered by BCWUAs with signed MOUs with MWRI	1,000 Feddans	90	551	320	450	500	700		1,020	
3.2	Area covered by BCWUAs providing written maintenance priorities to IWMD	1,000 Feddans	0	0	0	200	320	500		1,020	
3.3	Area covered by BCWUAs with an agreed upon Action Plan	1,000 Feddans	0	0	0	50	100	150		300	
3.4	Number of IWMDs holding Branch Canal-level meeting with representatives of at least 75% of existing BCWUAs at least once in the previous 6 months to discuss BC issues	Number	0	4	4	27	27	27	27	27	27
3.5	Number of IWMDs holding district-level group meetings with representatives of all BCWUAs at least once per season	Number	0	0	0	4	11	27		27	

<sup>1</sup> Linear calibration only. Non-linear calibration remains to be done.

<sup>2</sup> All 27 Districts completed preliminary water budgets, which is one component of a water resource inventory, but no completed inventories exist at present.

## **Objective 2: Data-based Management**

The second objective calls for the establishment and use of measurement-based management practices in all IWMDs. Two types of activities form the indicator set for Objective 2. The first pair of Indicators (2.1 and 2.2) relate to measurement capacity and call for developing rating curves for all 83 approved major inflow and outflow points in the 27 district and for utilizing these curves, together with daily water level readings, to provide regular, real-time reports on water deliveries to the District Manager. The Year 2 target for Indicator 2.1 called for all 27 districts to have rated their major control structures during Year 2. This was accomplished.

However the ratings done were linear rather than the more accurate non-linear form. It was a high priority for the project to be able to measure net deliveries to all 27 IWMDs and this is now possible. A priority for Year 3 will be to revise these rating curves with additional measurements and to fit a non-linear function to the data for each measuring point. In addition, 82 drains removing water from the Districts and a number of internal measuring points within the Districts are slated for monitoring, and calibration of these drains and internal measuring points will be carried out during Year3.

The second measurement-related indicator is that District Managers receive real-time reports of inflows to their Districts twice a month. Since such reporting obviously depends on being able to measure deliveries, it can only be done after structures are calibrated. The established targets called for reporting to be implemented in all Districts by the end of Year 3, and none were targeted for Year 2. In fact, all 27 District Managers began receiving bi-monthly reports of water deliveries during Year 2, and this information is now included in the Manager's monthly report.

The second pair of indicators under Objective 2 relate to planning for integrated water management at the District level. The first indicator counts the number of Districts that have completed an inventory of their water resources and structures (Indicator 2.3). The Year 2 target for this indicator was all 27 districts. However, while all Districts completed a rough water balance for the District during the year which is an essential step in the process, none completed a full water resource inventory. This target was rolled over to Year 3.

After completing water resource inventories, Districts will develop integrated water management plans that encompass all water sources within the District—surface, ground, and drainage (Indicator 2.4). The target for this indicator is for all 27 Districts to have completed water resource management plans by the end of Year 3. None were targeted for Year 2.

### **Objective 3: BCWUAs Participating**

The third objective is for BCWUAs to participate in managing all IWMDs. The indicators shown in Table 1 track project progress toward this objective. All of the five objectives had non-zero targets for Year 2. All targets were met or exceeded. These targets continue to increase during Years 3 and 4.

### **Outcome Indicators**

The second set of three objectives relate to the outcomes of project activities. As such, they are not concerned with the details of project implementation, i.e. the inputs, but rather with the results of project activities, i.e. its outputs.

Because there are no absolute reference points for the values of these indicators, Year 1 values have been used as baseline values, with all subsequent changes related to these baseline values. These values will thus be computed for the baseline year (Year 1) and for Years 2, 3, and 4. In all cases, values are computed for individual districts and weighted averages taken to obtain project-wide values. In some cases, results for individual districts are also shown and compared to suggest how such indicators can be used for internal management through performance benchmarking. Results for Objectives 4, 5, and 6 are shown in Table 2.

### **Objective 4: Quality of Irrigation Service**

#### *Complaints*

In 2005-6 farmers filed almost exactly the same number of irrigation and drainage complaints (1,955) as they did in 2004-5 (1,968). As shown in Table 2, the number of complaints per 1,000 feddans was 1.75 in Year 2, compared with 1.77 in the baseline year (2004-5). There were some important shifts within and among individual Districts, however.

Irrigation complaints increased from Year 1 to Year 2 in both summer (+40%) and winter (+52%). These increases were almost exactly offset, however, by sharp reductions in drainage complaints in both seasons (-53% and -27% respectively).

Regionally, more complaints were filed in Lower Egypt (2.25 per 1,000 feddans) than in Upper Egypt (1.30 per 1,000 feddans), however Aswan District recorded more than three times the number of complaints filed in the next most dissatisfied District (El Santa)<sup>2</sup>. All five Directorates showed increases in irrigation complaints over last year, while the

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<sup>2</sup> If Aswan District is removed from the statistics, the overall complaint rate for Year 2 declines from 1.75 to 1.62, which would represent an 8% decline from the baseline year level (1.77).

Delta Directorates and West Qena showed off-setting reductions in drainage complaints. The performance of individual Districts for Year 2 is shown in Figure 1.

Year-on-year changes in level of complaints is shown in Figure 2. Districts are arranged in descending order based on the number of complaints filed during the baseline year. Adjacent to the baseline bar for each District is the Year 2 bar. The sharp reductions in El Santa and North Zifta can be easily seen, as can the dramatic increases in complaints in Aswan, Edfo East, Berket El Sab and Zagazig.

Some District Managers argue that the sharp increases in some Districts such as Aswan may represent teething problems as Districts introduce digital database systems for recording complaints<sup>3</sup>. It is possible that some complaints may not have been transferred from paper ledgers to the electronic format during the baseline year, while this transfer was executed more completely during Year 1. However, these trends of reductions in drainage complaint and increases in irrigation complaint are widespread across Districts, suggesting that there may be broader underlying causes. Since drainage responsibilities were transferred to the IWMDs as a part of the restructuring, it may be that more drainage problems are being solved before they result in formal complaints. The increase in irrigation complaints may be a result of reduced maintenance budgets, although a number of other explanations are possible.

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<sup>3</sup> However, the level of complaints in Aswan is so much higher than any other district, that it would seem to bear looking into.

**Table 2 Baseline and Year 2 Values for Objectives 4, 5, and 6 Indicators**

Objective	Indicator	Units	Targets and Accomplishments						
			Baseline (Year 1)	Year 2		Year 3		Year 4	
				Target	Actual	Target	Actual	Target	Actual
<b>4</b>	<b>Quality of irrigation service to farmers improved in all IWMDs</b>								
4.1	Number of complaints filed by farmers with the IWMD	Number per 1000 feddan	1.77		1.75				
4.2	Ratio of total seasonal IWMD canal inflows to target allocation for season	None	0.96 summer, 1.13 winter		1.00 summer, 1.16 winter				
4.3	Share of number of 15-daily periods for which supply matched target within 10%	Percent	22% summer, 15% winter		20% summer, 22% winter				
4.4	Percent of farmers in each IWMD satisfied with quality of irrigation service	Percent	74% summer, 94% winter		78% summer, 91% winter				
4.5	Percent of farmers reporting complete conformity with planned rotation	Percent	21% summer, 30% winter		17% summer, 28% winter				
4.6	Percent of farmers reporting complete or partial conformity with planned rotation	Percent	73% summer, 88% winter		78% summer, 90% winter				
<b>5</b>	<b>Equity of water distribution among and within all IWMDs improved</b>								
5.1	Fraction of seasonal IWMD RWS values falling within $\pm 10\%$ of allocation target	None	-		-				
5.2	Ratio of satisfied farmers in head and tail reaches of Main Canals within the District	None	1.25 summer, 1.04 winter		1.37 summer, 1.22 winter				
5.3	Ratio of satisfied farmers in heads and tails of Branch Canals within the District	None	1.31 summer, 1.09 winter		1.16 summer, 1.04 winter				
<b>6</b>	<b>Real gross value of agricultural output in all IWMDs increased</b>								
6.1	Real gross value of agricultural output per feddan in IWMD	LE/feddan	4,441 summer, 3,745 winter		-				
6.2	Real gross value of agricultural output per 1,000 m <sup>3</sup> of water in IWMD	LE/1,000 m <sup>3</sup> of water	996 summer, 871 winter		-				

Figure 1 Formal Farmer Complaints, 2005–06 Agricultural Year

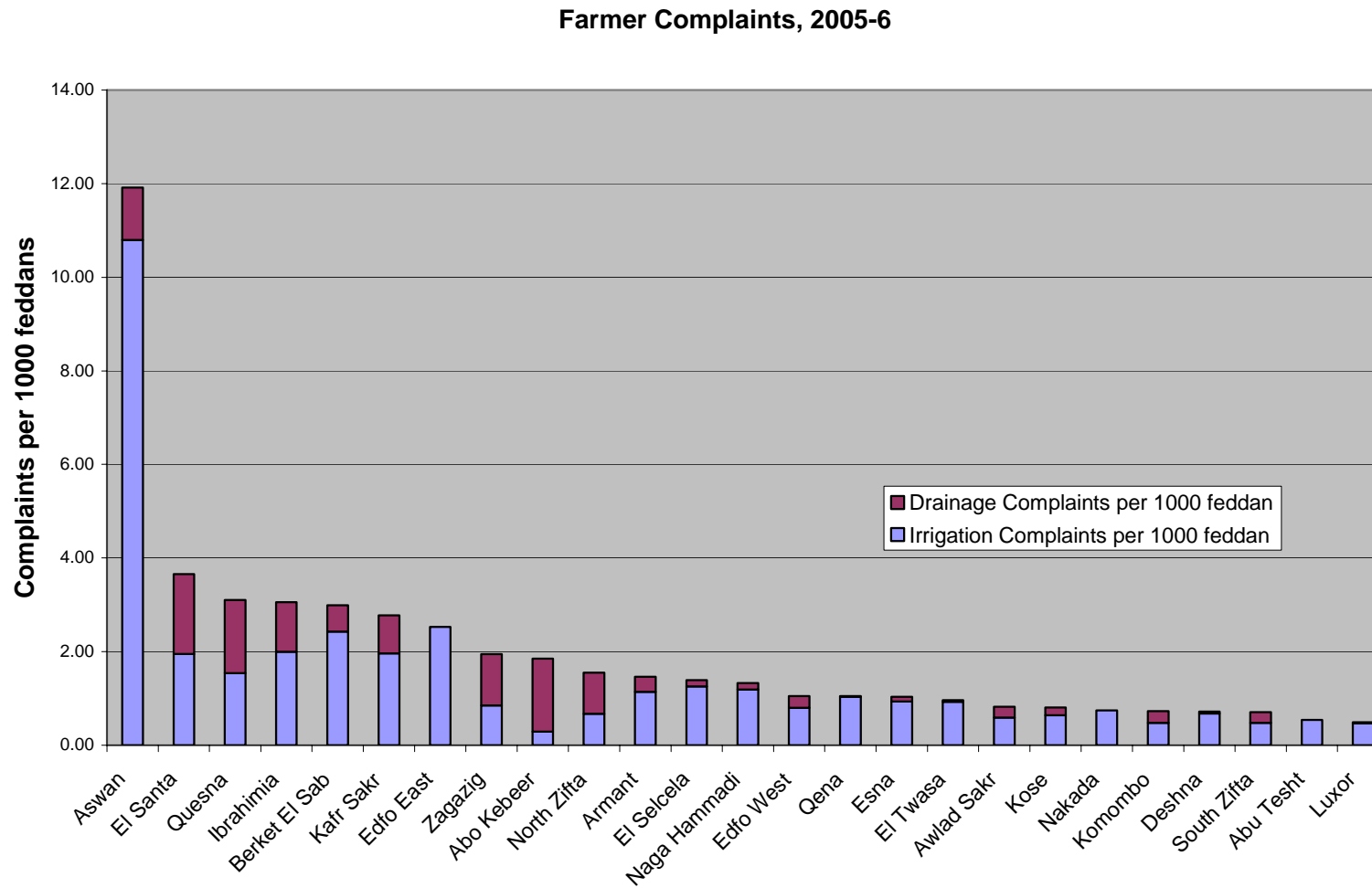
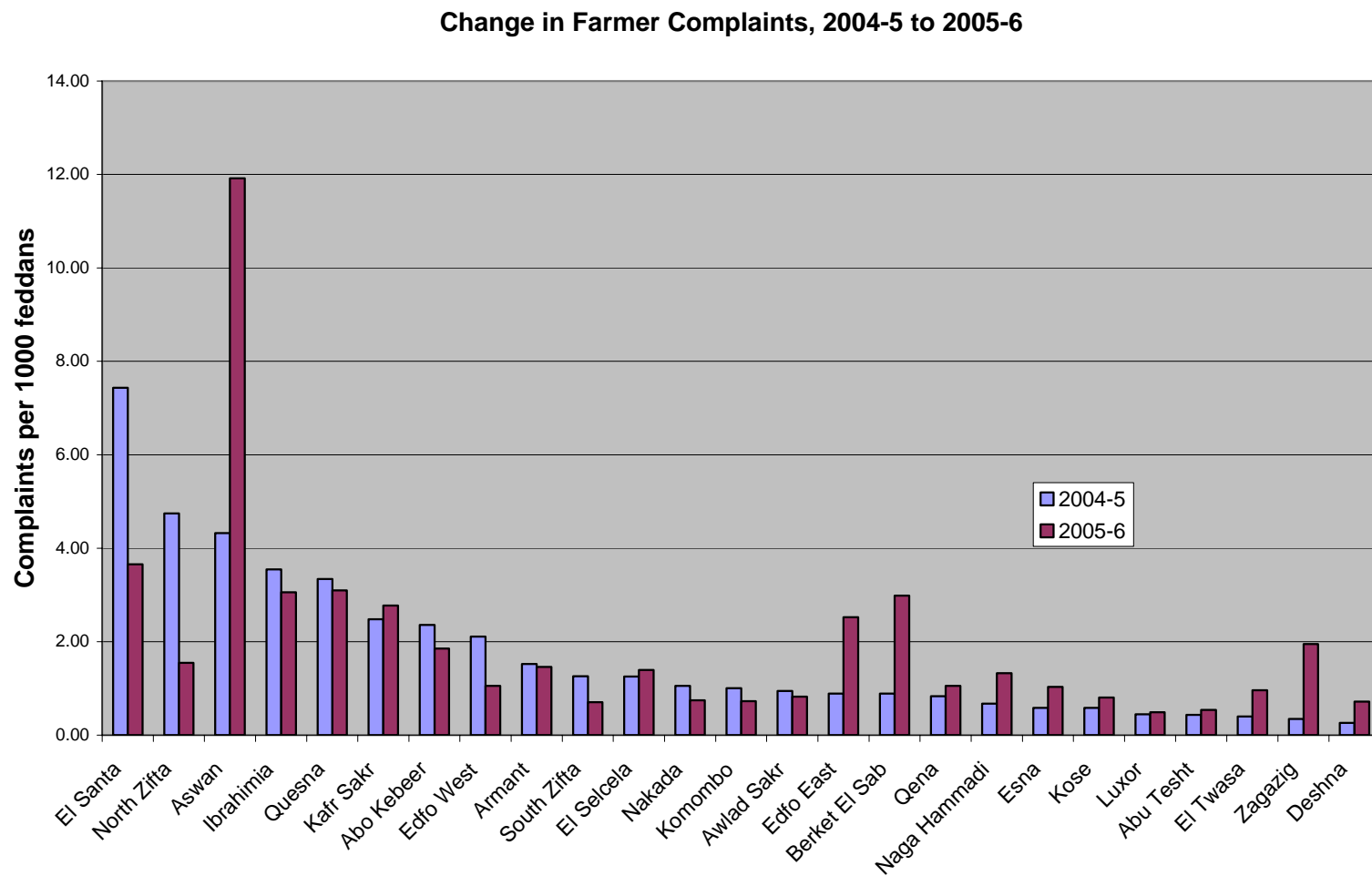


Figure 2 Formal Farmer Complaints, 2004-05 versus 2005-6



*Actual and Target District Inflows*

General Directorates reported the target values of water deliveries which they planned to make to each District for 15-day periods throughout the agricultural year<sup>4</sup>. Actual deliveries were measured by Districts. The ratio of actual deliveries to allocation targets for summer and winter 2005-6 are shown in Tables 3 and 4. Allocation target and actual delivery data for the two seasons are shown in Annex 2.

As seen in Table 3, the ratio of total actual deliveries to the aggregate targets for all 25 Districts for summer is a perfect 1.00. This reflects a slight improvement from the 0.96 value of 2004. Among Districts, though, there is great variation, and actual deliveries range from 42% to 204% of seasonal targets.

Table 3 Ratio of Actual and Target Allocation Values for Summer 2005

General Directorate	District	Area (feddan)	Summer [% of target]										Total Summer
			May 2005		June 2005		July 2005		August 2005		September 2005		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	65%	85%	87%	83%	65%	64%	60%	70%	74%	65%	72%
	El Santa	55,810	161%	175%	127%	130%	131%	143%	129%	132%	189%	134%	142%
	Quesna	53,250	86%	78%	104%	89%	88%	125%	103%	88%	102%	57%	94%
	South Zifta	39,650	127%	131%	128%	126%	136%	148%	154%	156%	213%	155%	145%
	Berket El Sab	39,490	34%	49%	56%	67%	56%	45%	40%	27%	29%	41%	42%
	<b>TOTAL</b>	<b>231,430</b>	<b>83%</b>	<b>97%</b>	<b>100%</b>	<b>99%</b>	<b>92%</b>	<b>101%</b>	<b>89%</b>	<b>86%</b>	<b>98%</b>	<b>83%</b>	<b>93%</b>
West Sharkia	Abo Kebeer	58,882	152%	130%	134%	153%	141%	132%	143%	146%	258%	106%	143%
	Kafr Sakr	54,070	46%	112%	102%	102%	100%	76%	68%	65%	112%	50%	83%
	Awlad Sakr	68,000	279%	126%	148%	113%	127%	166%	121%	177%	221%	280%	162%
	Ibrahimia	59,214	565%	783%	95%	100%	80%	101%	99%	106%	143%	108%	118%
	Zagazig	63,685	80%	117%	105%	103%	98%	99%	105%	103%	162%	111%	107%
	<b>TOTAL</b>	<b>303,851</b>	<b>146%</b>	<b>151%</b>	<b>115%</b>	<b>111%</b>	<b>105%</b>	<b>111%</b>	<b>102%</b>	<b>112%</b>	<b>166%</b>	<b>116%</b>	<b>119%</b>
West Qena	Esna	59,970	100%	108%	154%	145%	174%	179%	155%	159%	155%	159%	146%
	Armant	34,200	79%	76%	86%	99%	65%	72%	72%	76%	80%	74%	77%
	Nakada	32,210	39%	115%	108%	88%	63%	51%	43%	81%	84%	81%	75%
	Naga Hammadi	64,000	132%	124%	120%	118%	96%	111%	103%	124%	95%	85%	108%
	Abu Tesht	37,010	98%	118%	121%	117%	85%	103%	75%	83%	78%	81%	94%
	<b>TOTAL</b>	<b>227,390</b>	<b>95%</b>	<b>109%</b>	<b>119%</b>	<b>116%</b>	<b>98%</b>	<b>107%</b>	<b>94%</b>	<b>108%</b>	<b>98%</b>	<b>95%</b>	<b>103%</b>
East Qena	Luxor	42,850	167%	191%	208%	201%	199%	193%	196%	195%	179%	268%	201%
	Kose	36,010	53%	146%	92%	70%	95%	103%	88%	81%	71%	60%	86%
	Qena	49,400	85%	80%	52%	54%	44%	47%	40%	43%	47%	46%	51%
	Deshna	50,100	111%	127%	121%	112%	101%	102%	90%	93%	82%	79%	100%
	<b>TOTAL</b>	<b>178,360</b>	<b>95%</b>	<b>115%</b>	<b>90%</b>	<b>83%</b>	<b>81%</b>	<b>86%</b>	<b>76%</b>	<b>77%</b>	<b>73%</b>	<b>78%</b>	<b>84%</b>
	Aswan	Aswan	14,350	233%	185%	209%	214%	178%	182%	203%	226%	199%	222%
El Twasa		30,210	88%	84%	67%	70%	72%	82%	97%	99%	108%	108%	86%
Komombo		39,768	74%	75%	71%	77%	75%	84%	80%	85%	83%	88%	79%
El Selcela		29,490	90%	90%	88%	98%	91%	92%	96%	116%	102%	116%	97%
Edfo East		28,105	84%	82%	86%	85%	85%	85%	86%	87%	85%	86%	85%
Edfo West		31,335	81%	111%	91%	109%	104%	109%	151%	139%	160%	152%	117%
<b>TOTAL</b>	<b>173,258</b>	<b>91%</b>	<b>91%</b>	<b>86%</b>	<b>91%</b>	<b>89%</b>	<b>94%</b>	<b>104%</b>	<b>107%</b>	<b>106%</b>	<b>109%</b>	<b>97%</b>	
<b>All</b>	<b>TOTAL</b>	<b>1,114,289</b>	<b>99%</b>	<b>110%</b>	<b>101%</b>	<b>100%</b>	<b>93%</b>	<b>100%</b>	<b>94%</b>	<b>99%</b>	<b>106%</b>	<b>97%</b>	<b>100%</b>

For the winter season, the average for all 25 Districts is 1.16 which represents a slight increase over 2004-5. Among Districts, though, actual deliveries range from 34% to 174% of seasonal targets, a narrower range than in summer, but still considerable.

It is likely that target setting by the Directorates is not taken very seriously at present. This is because the volumetric water allocation process currently operates only from the basin level (Water Distribution Center) to the level of the General Directorate. Allocations from the Directorate to the Districts are more informal and intuitive. Estimates of target allocations

<sup>4</sup> See Annex 1 for a discussion of the quality of these data. In general it would seem that these reported values are not strongly rooted in the MWRI water allocation process.

prepared by the Directorates were thus done specifically for the project and not for internal use. During Year 3, the project should work with the Ministry to extend the volumetric allocation process down to the District level. An initial step would be to refine the demand assessments made at the District level and work with the Directorates to help them use this quantitative information in setting 15-day allocation targets for each District.

Tables 3 and 4 provide the basis for a second indicator reported in Table 2—the share of 15-day periods for which supply matched allocation targets within 10 percent. During the summer season, there were 51 such periods out of a total of 250 among the 25 IWMDs or an average of 20%. This means that, on average, water supplied matched target values ( $\pm 10$  percent) one-fifth of the time. This represents a slight decrease from the 2004-5 summer value of 22%.

During the winter season, there were 78 matching periods out of a total of 350. Thus supply matched targets 22% of the time. This represents an improvement of the 2004-5 value of 15%.

While this level of performance is unimpressive, the process of specifying 15-day target allocation amounts for each District must be improved before too much emphasis can be placed on this indicator. Once target amounts are specified more rigorously and realistically, this indicator will become more meaningful and may also be employed as a practical management tool by the Directorates.

Table 4 Ratio of Actual and Target Allocation Values for Winter 2005–06

General Directorate	District	Area (feddan)	Winter [% of target]														Total Winter
			October 2005		November 2005		December 2005		January 2006		February 2006		March 2006		April 2006		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-28	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	250%	180%	202%	175%	159%	152%	229%	97%	194%	165%	133%	139%	125%	168%	166%
	El Santa	55,810	126%	163%	168%	192%	194%	108%	128%	-	189%	173%	183%	151%	159%	190%	174%
	Quesna	53,250	81%	155%	158%	87%	37%	71%	60%	0%	108%	112%	65%	130%	62%	80%	89%
	South Zifta	39,650	149%	228%	157%	125%	159%	131%	194%	19%	132%	156%	129%	139%	130%	124%	140%
	Berket El Sab	39,490	40%	30%	43%	39%	57%	40%	42%	5%	19%	42%	29%	31%	32%	31%	34%
	<b>TOTAL</b>	<b>231,430</b>	<b>102%</b>	<b>131%</b>	<b>129%</b>	<b>106%</b>	<b>105%</b>	<b>87%</b>	<b>110%</b>	<b>63%</b>	<b>100%</b>	<b>108%</b>	<b>84%</b>	<b>95%</b>	<b>83%</b>	<b>96%</b>	<b>100%</b>
West Sharkia	Abo Kebeer	58,882	109%	90%	118%	103%	83%	62%	50%	0%	28%	75%	52%	66%	88%	84%	64%
	Kafr Sakr	54,070	48%	127%	194%	150%	134%	119%	84%	0%	1521%	140%	194%	47%	104%	159%	127%
	Awlad Sakr	68,000	260%	159%	156%	147%	119%	139%	110%	-	95%	127%	157%	104%	211%	161%	145%
	Ibrahimia	59,214	230%	270%	351%	336%	223%	251%	229%	41%	46%	197%	92%	112%	182%	157%	173%
	Zagazig	63,685	145%	153%	133%	140%	159%	177%	77%	-	76%	151%	127%	144%	139%	136%	132%
	<b>TOTAL</b>	<b>303,851</b>	<b>141%</b>	<b>149%</b>	<b>170%</b>	<b>155%</b>	<b>131%</b>	<b>127%</b>	<b>93%</b>	<b>9%</b>	<b>69%</b>	<b>129%</b>	<b>116%</b>	<b>91%</b>	<b>141%</b>	<b>140%</b>	<b>120%</b>
West Qena	Esna	59,970	89%	102%	96%	100%	96%	89%	89%	96%	92%	102%	91%	89%	-	-	112%
	Armant	34,200	65%	59%	113%	102%	114%	103%	-	111%	126%	108%	104%	109%	103%	70%	99%
	Nakada	32,210	83%	109%	76%	128%	140%	184%	-	100%	123%	100%	110%	100%	105%	149%	111%
	Naga Hammadi	64,000	262%	267%	226%	163%	146%	148%	-	143%	173%	107%	139%	147%	124%	113%	163%
	Abu Tesht	37,010	118%	98%	151%	144%	101%	137%	-	-	93%	76%	99%	138%	150%	91%	121%
	<b>TOTAL</b>	<b>227,390</b>	<b>112%</b>	<b>116%</b>	<b>133%</b>	<b>126%</b>	<b>117%</b>	<b>121%</b>	<b>1384%</b>	<b>136%</b>	<b>121%</b>	<b>97%</b>	<b>108%</b>	<b>116%</b>	<b>164%</b>	<b>147%</b>	<b>125%</b>
East Qena	Luxor	42,850	234%	168%	344%	172%	133%	157%	-	-	148%	142%	101%	114%	60%	56%	153%
	Kose	36,010	50%	41%	53%	18%	0%	13%	-	0%	74%	126%	47%	198%	96%	9%	53%
	Qena	49,400	149%	166%	153%	160%	183%	201%	27%	136%	240%	227%	165%	158%	242%	208%	170%
	Deshna	50,100	93%	112%	128%	120%	121%	113%	-	108%	87%	94%	76%	65%	66%	83%	97%
	<b>TOTAL</b>	<b>178,360</b>	<b>118%</b>	<b>113%</b>	<b>134%</b>	<b>113%</b>	<b>107%</b>	<b>113%</b>	<b>96%</b>	<b>117%</b>	<b>131%</b>	<b>145%</b>	<b>98%</b>	<b>127%</b>	<b>108%</b>	<b>83%</b>	<b>114%</b>
Aswan	Aswan	14,350	86%	91%	77%	85%	79%	72%	66%	103%	83%	73%	77%	99%	86%	85%	83%
	El Twasa	30,210	99%	105%	110%	105%	106%	94%	-	189%	182%	160%	173%	174%	156%	157%	134%
	Komombo	39,768	98%	98%	104%	103%	104%	104%	104%	110%	110%	110%	106%	97%	96%	112%	103%
	El Selcela	29,490	160%	177%	172%	178%	189%	272%	-	168%	154%	147%	127%	131%	101%	100%	153%
	Edfo East	28,105	92%	93%	92%	93%	91%	95%	77%	95%	92%	93%	92%	92%	91%	89%	92%
	Edfo West	31,335	283%	293%	195%	157%	232%	224%	146%	230%	151%	142%	146%	34%	124%	142%	174%
	<b>TOTAL</b>	<b>173,258</b>	<b>116%</b>	<b>120%</b>	<b>116%</b>	<b>113%</b>	<b>116%</b>	<b>119%</b>	<b>122%</b>	<b>131%</b>	<b>124%</b>	<b>118%</b>	<b>116%</b>	<b>103%</b>	<b>105%</b>	<b>111%</b>	<b>116%</b>
All	<b>TOTAL</b>	<b>1,114,289</b>	<b>117%</b>	<b>123%</b>	<b>134%</b>	<b>122%</b>	<b>116%</b>	<b>116%</b>	<b>120%</b>	<b>106%</b>	<b>112%</b>	<b>116%</b>	<b>106%</b>	<b>107%</b>	<b>119%</b>	<b>116%</b>	<b>116%</b>

*Farmer Satisfaction*

The client satisfaction survey provided information on farmers’ assessment of irrigation service. Upon analysis, the surveys showed overall that 78 percent of farmers were satisfied with summer season service, and 91 percent were satisfied in the winter.<sup>5</sup> This compares with 74 percent and 94 percent, respectively, for the 2004-5 seasons, reflecting a modest 4 point increase in satisfaction for the summer season and a 3 point decrease in the winter.

Supporting this result, two other questions in the survey asked farmers to rate the timing of irrigation water and its abundance, the two principal components of “overall quality of irrigation service.” Eighty-two percent of farmers reported that, in summer, water was either always or sometimes available when they needed it and 77 percent reported that water abundance was either excellent or moderate. Summary results for both summer and winter of the past two years are shown in Table 5.

As seen in Table 5, farmer ratings of the abundance and timing of water supplies is consistent with their overall rating of quality of irrigation service.

**Table 5 Farmer satisfaction with quantity, timing, and overall quality of irrigation service**

Farmer Satisfaction	Summer			Winter		
	Excellent	Moderate	Poor	Excellent	Moderate	Poor
<b>Overall quality of irrigation service</b>						
2004-5	22%	52%	26%	42%	52%	6%
2005-6	22%	56%	22%	44%	47%	9%
<b>Water abundance</b>	<b>Excellent</b>	<b>Moderate</b>	<b>Poor</b>	<b>Excellent</b>	<b>Moderate</b>	<b>Poor</b>
2004-5	23%	50%	27%	41%	51%	8%
2005-6	23%	55%	23%	46%	45%	9%
<b>Water available when needed</b>	<b>Always</b>	<b>Sometimes</b>	<b>Seldom</b>	<b>Always</b>	<b>Sometimes</b>	<b>Seldom</b>
2004-5	21%	55%	25%	41%	52%	6%
2005-6	18%	64%	18%	37%	54%	9%

There is a slight tendency to blame poor overall performance in summer more on the limited quantity of water available than on poor timing of deliveries. In fact, the percentage of farmers saying that “water was seldom available when needed” in summer fell by 7 percentage points between the baseline year and Year 1. This reflects, perhaps, greater attention to implementing the rotational schedule by the Districts, or improved coordination between the Districts and the BCWUAs, or both.

Overall satisfaction values for individual districts for 2005-6 are shown in Table 6. As seen, satisfaction is higher across the board in winter when demand is lower. Summer levels vary from just 37 percent in Komombo to 100 percent in El Santa and Kose. In winter, most Districts were over 90 percent, with the exceptions concentrated in West Sharkiya Directorate.

It is interesting to note there is a pronounced drop in the percentage of farmers who rated service as “poor” in the summer season in all three categories, with the increase going into

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<sup>5</sup> “Satisfaction” is based on farmers rating overall quality of irrigation service as “moderate” or “excellent”.

the “moderate” category. However considerable room for improvement during the summer remains. There is little strong dissatisfaction with irrigation service in the winter.

Changes in farmer satisfaction in summer and winter between Year 1 and Year 2 are shown in Figures 3 and 4.

**Table 6 Farmer satisfaction with irrigation service**

General Directorate	District	Area (feddan)	Summer 2005		Winter 2005-6	
			Satisfied	Unsatisfied	Satisfied	Unsatisfied
New Zifta	North Zifta	43,230	86%	14%	99%	1%
	El Santa	55,810	100%	0%	100%	0%
	Quesna	53,250	73%	27%	88%	12%
	South Zifta	39,650	82%	18%	97%	3%
	Berket El Sab	39,490	83%	17%	100%	0%
	<b>TOTAL</b>	<b>231,430</b>	<b>85%</b>	<b>15%</b>	<b>97%</b>	<b>3%</b>
West Sharkia	Abo Kebeer	58,882	67%	33%	72%	28%
	Kafr Sakr	54,070	96%	4%	98%	2%
	Awlad Sakr	68,000	50%	50%	94%	6%
	Ibrahimia	59,214	54%	46%	65%	35%
	Zagazig	63,685	86%	14%	50%	50%
	<b>TOTAL</b>	<b>303,851</b>	<b>70%</b>	<b>30%</b>	<b>75%</b>	<b>25%</b>
West Qena	Esna	59,970	89%	11%	100%	0%
	Armant	34,200	82%	18%	88%	12%
	Nakada	32,210	98%	2%	98%	2%
	Naga Hammadi	64,000	81%	19%	99%	1%
	Abu Tesht	37,010	78%	22%	94%	6%
	<b>TOTAL</b>	<b>227,390</b>	<b>85%</b>	<b>15%</b>	<b>96%</b>	<b>4%</b>
East Qena	Luxor	42,850	94%	6%	100%	0%
	Kose	36,010	100%	0%	100%	0%
	Qena	49,400	69%	31%	88%	12%
	Deshna	50,100	92%	8%	99%	1%
	<b>TOTAL</b>	<b>178,360</b>	<b>89%</b>	<b>11%</b>	<b>97%</b>	<b>3%</b>
Aswan	Aswan	14,350	95%	5%	99%	1%
	El Twasa	30,210	56%	44%	95%	5%
	Komombo	39,768	37%	63%	86%	14%
	El Selcela	29,490	52%	48%	96%	4%
	Edfo East	28,105	80%	20%	96%	4%
	Edfo West	31,335	82%	18%	97%	3%
	<b>TOTAL</b>	<b>173,258</b>	<b>63%</b>	<b>37%</b>	<b>89%</b>	<b>11%</b>
<b>All</b>	<b>TOTAL</b>	<b>1,114,289</b>	<b>78%</b>	<b>22%</b>	<b>91%</b>	<b>9%</b>
	Wady El Nokra		59%	41%	53%	47%
	Wady El Saaida		50%	50%	100%	0%

Figure 3 Farmer satisfaction, summer 2004-5 versus 2005-6

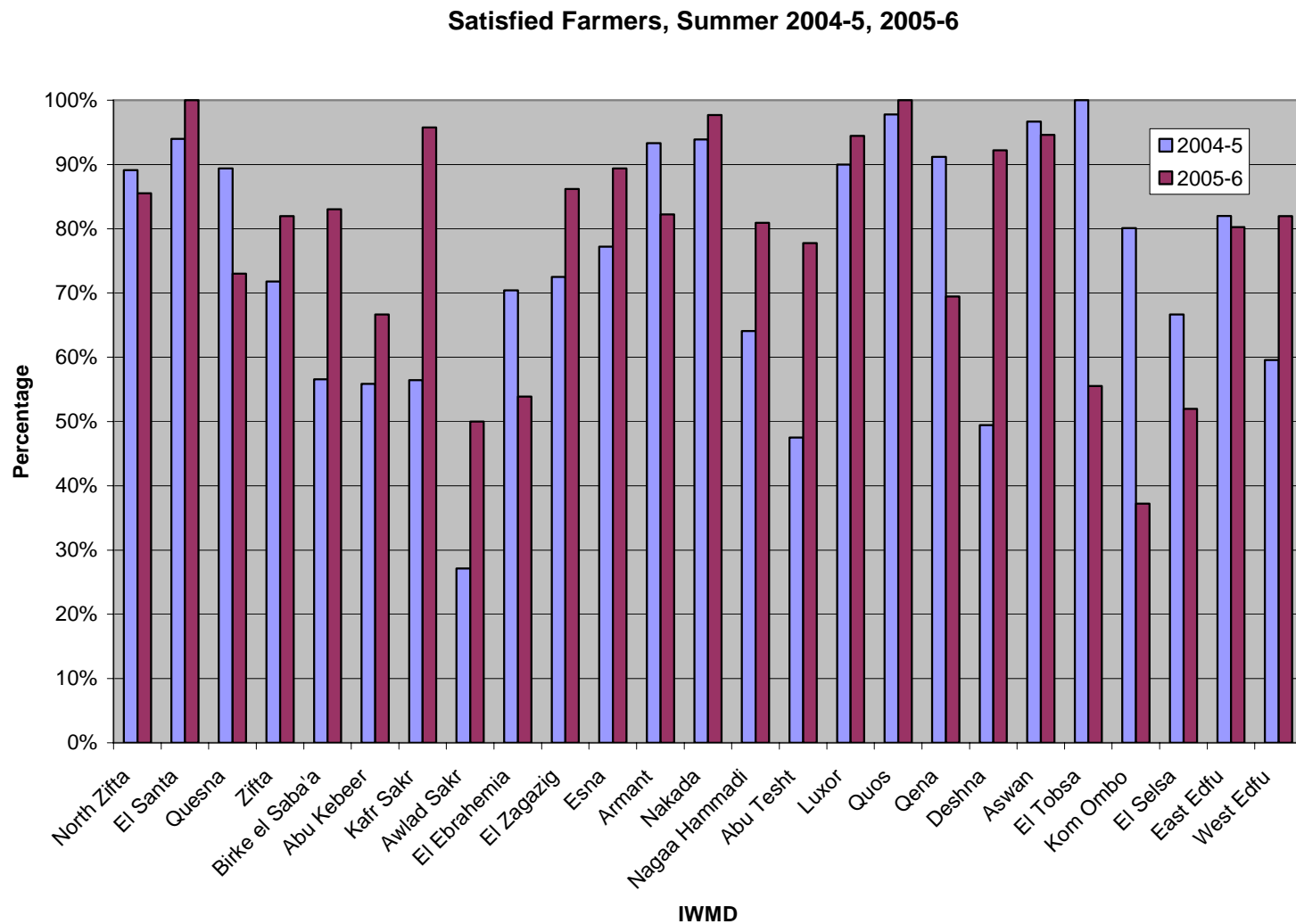
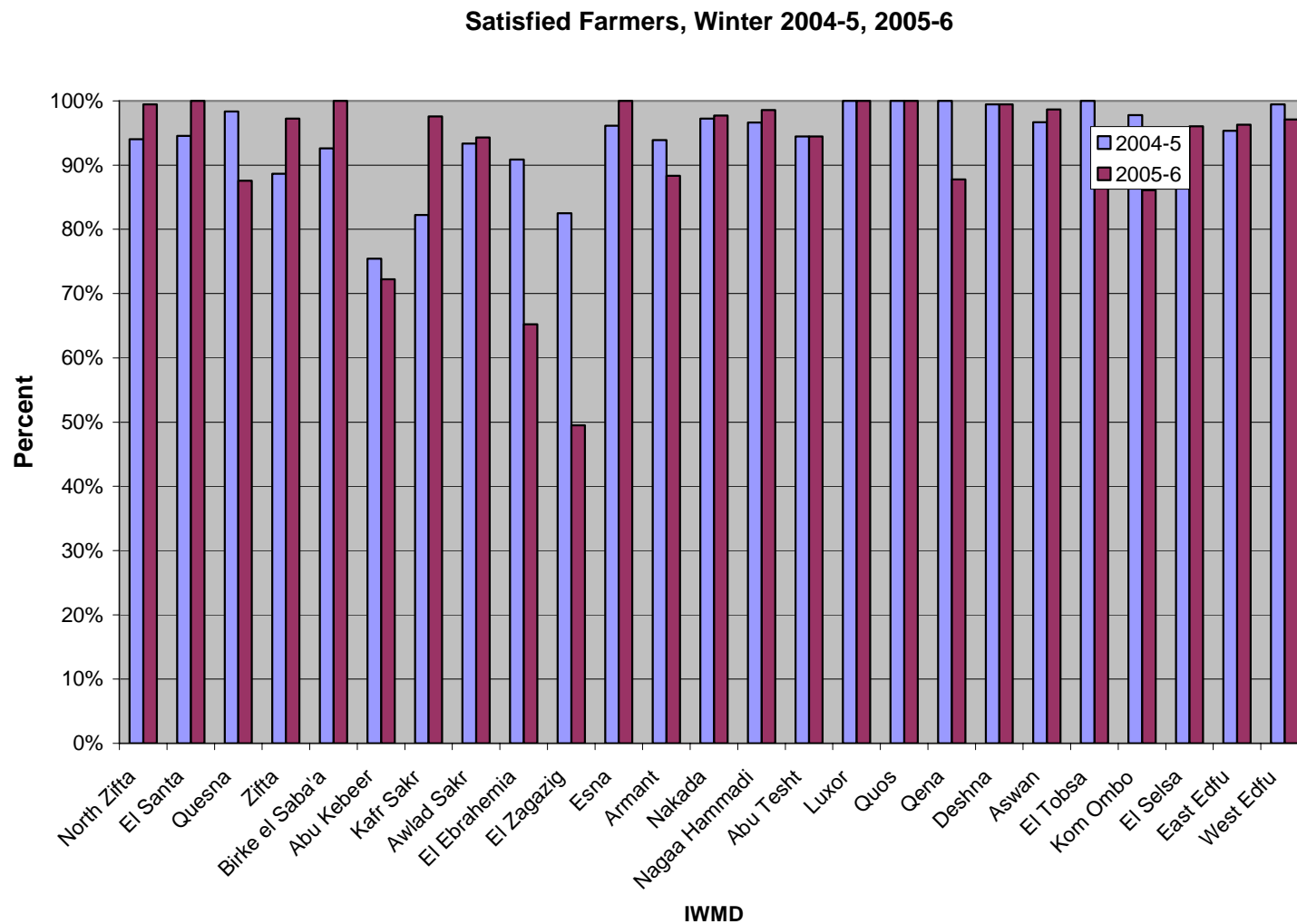


Figure 4 Farmer satisfaction, winter 2004-5 versus 2005-6



*Rotations*

Rotating irrigation service among branch canals is one of the most important tools managers have for allocating available water. It is expected that, over time, IWMDs will adjust and customize rotations as they attempt to save water and improve the quality of irrigation service to farmers. The two original indicators of adherence with rotational schedules (4.5 and 4.6) have been replaced this year by two indicators that were used on an interim basis last year<sup>6</sup>. For these indicators, farmers were asked to rate how well the actual rotation corresponded with the planned one in each season. Overall, in summer, 17 percent reported complete correspondence, 61 percent reported partial correspondence, and 22 percent reported no correspondence. Average values for the five directorates are shown in Tables 7 and 8.

**Table 7 Degree of Correspondence between Planned and Actual Rotations, Summer 2005**

<b>Directorate</b>	<b>Complete (Percent)</b>	<b>Partial (Percent)</b>	<b>None (Percent)</b>
New Zifta	20	68	11
West Sharkiya	14	56	30
West Qena	13	73	15
East Qena	23	57	20
Aswan	17	49	34
<b>Overall</b>	<b>17</b>	<b>61</b>	<b>22</b>

**Table 8 Degree of Correspondence between Planned and Actual Rotations, Winter 2005–06**

<b>Directorate</b>	<b>Complete (Percent)</b>	<b>Partial (Percent)</b>	<b>None (Percent)</b>
New Zifta	21	78	1
West Sharkiya	13	60	27
West Qena	28	64	8
East Qena	55	35	10
Aswan	28	66	7
<b>Overall</b>	<b>28</b>	<b>62</b>	<b>10</b>

These values suggest that in summer some Districts in West Sharkiya and Aswan may not be following a regular rotational schedule. For the winter season, West Sharkiya again stands out, with more than a quarter of the farmers reporting no correspondence between planned and actual schedules. Looking at individual Districts, Abo Kebeer (42% “no

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<sup>6</sup> Note that data contained in the Year 1 Report for these indicators contained errors. Corrected values are presented in Annex 3.

correspondence”), Awlad Sakr (53% “no correspondence”), El Twasa (60% “no correspondence”), Komombo (46% “no correspondence”), and El Selcela (54% “no correspondence”) stand out for the summer season. In winter, the West Sharkiya Districts of Kafr Sakr and Ibrahimia both show more than 60% of farmers reporting “no correspondence.”

In West Sharkiya, the summer “no correspondence” Districts of Abo Kebeer and Awlad Sakr are the two most water abundant Districts in the Directorate, with actual deliveries at 143% of target and 162% of targets respectively. This would fit with the theory that, because water is abundant, these Districts may impose rotations irregularly or not at all.

In Aswan, this pattern does not hold since actual summer deliveries in the “no correspondence” Districts are all less than 100% of targets<sup>7</sup>. However, the reported targets in Aswan Directorate are very high, and may be inflated beyond actual crop water needs. In both Directorates, further exploration is needed to understand the reasons for the high reported incidence of “no correspondence” with stated rotational schedules.

### **Objective 5: Equity of Water Distribution**

This is a critical objective, as improved equity of water distribution means generally that crop yields in areas that have been short of water will increase, raising average yields. This assumes that farms in relatively water abundant areas receive and apply more water than they need at present and that if some of this excess water were diverted to water short areas that total output and overall average yields would rise.

Equity indicators include one measure of equity among districts, one measure of equity among the branch canals within a district, and one measure of equity along branch canals—from head to tail.

#### *Relative Water Supply among IWMDs*

Calculating Relative Water Supply requires information on aggregate crop water demand for 15-day periods throughout the season. Because reliable information on crop water demands is not yet consistently available through the Districts’ information systems, it was not possible to compute this indicator for Year 2. Improving the quality and reliability of crop water demand data should be a high priority for Year 3.

#### *Equity among Branch Canals*

At the outset of the M&E program, branch canals within each District were divided into three equal groups by the District Manager and his staff, according to whether they were “easy,” “moderate,” or “difficult” to supply with water. This distinction corresponds roughly to the traditional terms “head,” “middle,” and “tail” of the main canal segment passing through the

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<sup>7</sup> Indeed total summer 2005 deliveries for the entire Directorate are only 97% of the aggregate target value, and in only one District (Edfo West) did actual deliveries exceed the District’s target allocation.

District. Farmer satisfaction with irrigation service in these three classes of branch canals is shown in Tables 9 and 10 for the summer and winter seasons, respectively.

**Table 9 Farmer Satisfaction with Irrigation Service, Summer 2005**

	Overall	Easy/Head BCs	Moderate/Middle BCs	Difficult/Tail BCs
<b>Satisfied</b>	78%	87%	80%	63%
<b>Unsatisfied</b>	22%	13%	20%	37%

**Table 10 Farmer Satisfaction with Irrigation Service, Winter 2005–06**

	Overall	Easy/Head BCs	Moderate/Middle BCs	Difficult/Tail BCs
<b>Satisfied</b>	91%	96%	95%	79%
<b>Unsatisfied</b>	9%	4%	5%	21%

The evaluation indicator of equity used is the ratio of satisfaction in the “easy” branch canals to satisfaction in the “difficult” branch canals. This ratio reflects the performance of the District in allocating water equitably among the BCs. The ideal value of this indicator is 1.00, indicating that farmers are equally satisfied in the head and tail of the main canal. These ratios are 1.37 for the summer season and 1.22 for the winter season. Table 11 shows the values of these indicators for the Baseline Year and Year 2.

**Table 11 Ratio of satisfied farmers in head and tail reaches of District Main Canals**

Summer		Winter	
2004	2005	2004-5	2005-6
1.25	1.37	1.04	1.22

As seen, for Year 2 the ratio increased in both seasons from the baseline year, indicating deterioration in equity of distribution.

This equity ratio can also be computed for each of the 25 IWMDs to indicate their success in distributing water equitably among their own branch canals. Graphs of these ratios for summer and winter seasons are shown in Figures 5 and 6. Note that in summer, 7 of 25 Districts have equity values greater than 2.0, indicating that more than two times as many farmers along head end BCs are satisfied with service compared with those in the tail end BCs. Distribution in these Districts is regarded as highly inequitable. In winter, only 4 Districts are above 2, and even then the highest value is less than 3.

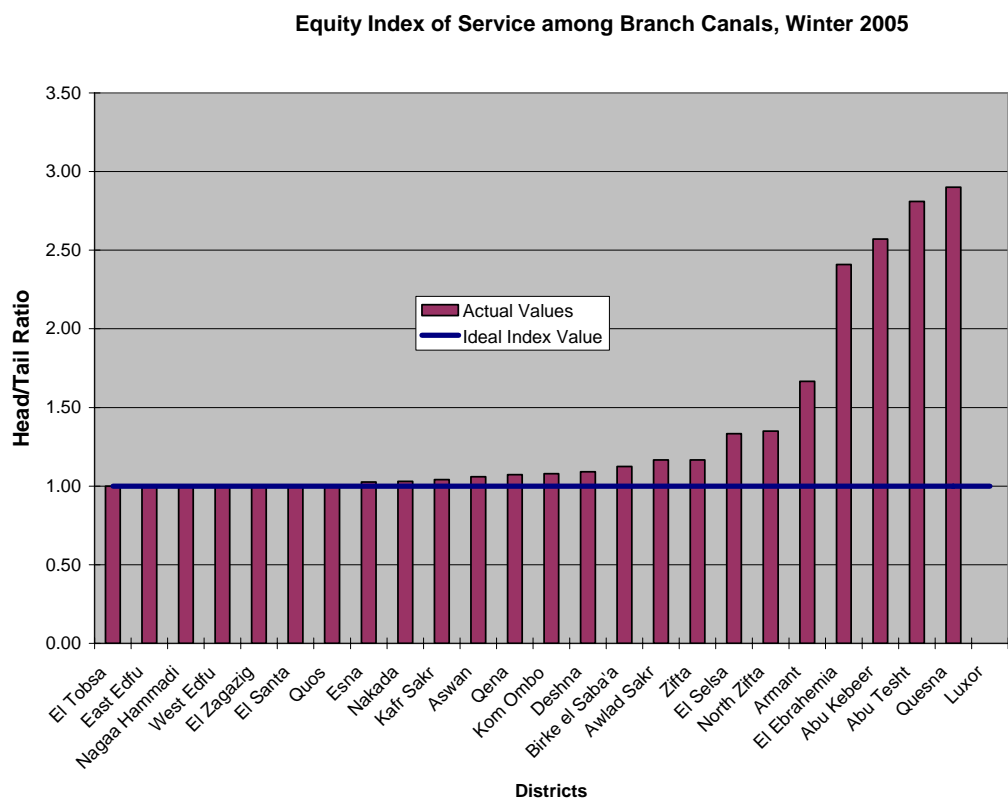


Figure 5 Equity Index of Irrigation Service among Branch Canals, Summer 2005

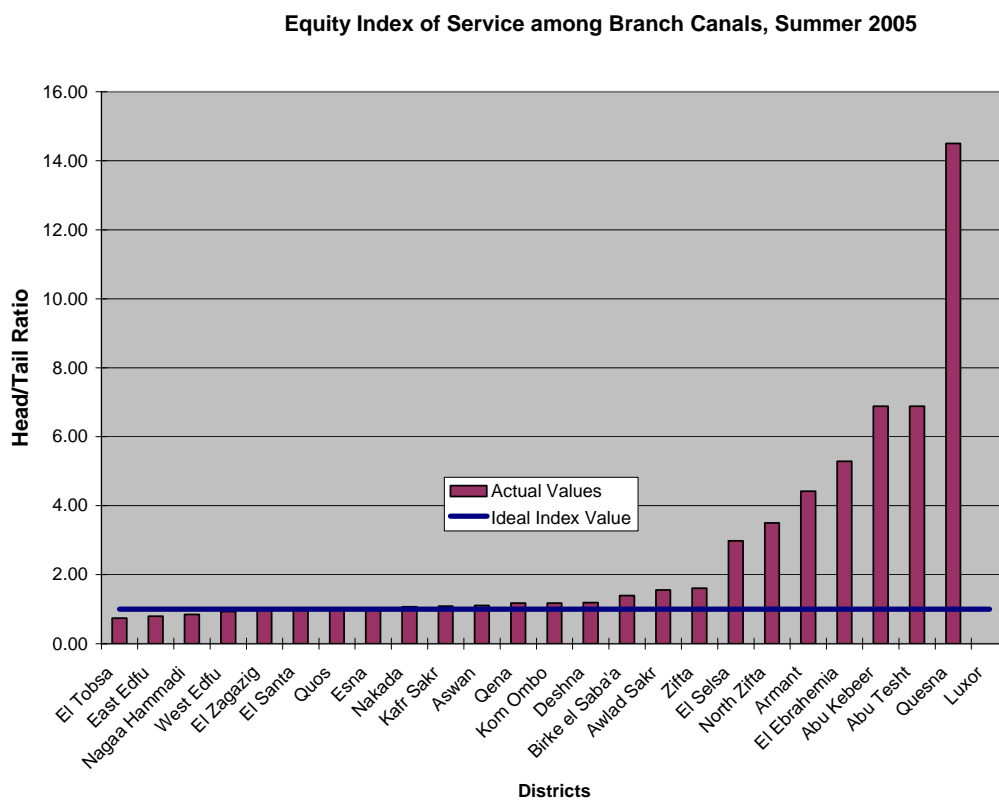


Figure 6 Equity Index of Irrigation Service among Branch Canals, Winter 2004-05

*Equity along Branch Canals*

Farmers at the head, middle, and tails of each of the sample branch canals in each district were sampled. By looking at the upper thirds (heads) and the lower thirds (tails) of all of the branch canals sampled across all 25 districts, it was possible to assess the way in which water is distributed along branch canals. Satisfaction assessed for different branch canal reaches is shown in Tables 12 and 13 for summer and winter, respectively.

**Table 12 Farmer Satisfaction with Irrigation Service in Different Parts of Branch Canals, Summer 2005**

	<b>Overall</b>	<b>BC Heads</b>	<b>BC Middles</b>	<b>BC Tails</b>
<b>Satisfied</b>	78%	84%	79%	72%
<b>Unsatisfied</b>	22%	16%	21%	28%

**Table 13 Farmer Satisfaction with Irrigation Service in Different Parts of Branch Canals, Winter 2005–06**

	<b>Overall</b>	<b>BC Heads</b>	<b>BC Middles</b>	<b>BC Tails</b>
<b>Satisfied</b>	91%	93%	92%	89%
<b>Unsatisfied</b>	9%	7%	8%	11%

The indicator used for M&E is the ratio of the fraction of satisfied farmers in the heads of the BCs to the fraction of satisfied farmers in the tails. This indicator thus represents the equity of distribution of water along the BCs. To the extent that the newly-created Branch Canal Water User Associations (BCWUAs) have been involved in distributing water along the BCs, this indicator reflects their performance. These ratios are 1.16 for the summer season and 1.04 for the winter season. This means, for example, that in summer for every 100 satisfied farmers in the tail end reaches of branch canals, there are 116 satisfied farmers in head end reaches.

**Table 14 Ratio of satisfied farmers in head and tail reaches of District Branch Canals**

<b>Summer</b>		<b>Winter</b>	
<b>2004</b>	<b>2005</b>	<b>2004-5</b>	<b>2005-6</b>
1.31	1.16	1.09	1.04

The ideal value of this indicator is also 1.00, reflecting equal satisfaction in heads and tails of Branch Canals. This indicator declined between the baseline year and 2005-6, reflecting an improvement in equity along project BCs.

These results show that equity along BCs improved over the past year. This is most noticeable, and most important, for the summer season when water is more scarce and demand higher. This is the portion of the irrigation system where BCWUAs are expected to

play a major management role, however it is too early to credit BCWUA activities for the improvement. None of the BCWUAs have authority, funds, and staff yet to manage water along the BC. However the one thing than many BCWUAs have been successfully doing, to date, is to interact with the District Manager and staff to communicate their problems and receive information about the timing of rotations. It is possible that this improved communication between BCWUAs and Districts has resulted in the observed improvement in equity of distribution along the BC.

Support for this explanation is found in Table 15, which shows the fraction of farmers reporting contact with District field personnel and BCWUA board members in the two years. Note that the percentage of farmers reporting contacts with District Gatekeepers and District Irrigation Technicians increased from 42% and 36% to 48% and 57% respectively. Likewise farmers reporting contact with a BCWUA board member increased from just 1% to 23%. In part this later figure is due to the creation on new BCWUAs, but it also reflects increased levels of contact within existing BCWUAs. Increases in contacts took place across the board in head, middle, and tail-end BCs in roughly equal proportions.

**Table 15 Fraction of farmers reporting contact with various irrigation officials, 2004-5, 2005-6**

	District Gatekeeper				District Irrigation Technician				BCWUA Board Member				
	2004-5		2005-6		2004-5		2005-6		2004-5		2005-6		
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
<b>Total overall</b>													
Poor BCs	0.58	0.42	0.49	0.51	0.66	0.34	0.39	0.61	0.99	0.01	0.77	0.23	
Moderate BCs	0.55	0.45	0.49	0.51	0.59	0.41	0.43	0.57	0.98	0.02	0.76	0.24	
Good BCs	0.62	0.38	0.59	0.41	0.69	0.31	0.46	0.54	1.00	0.00	0.79	0.21	
Overall	0.58	0.42	0.52	0.48	0.64	0.36	0.43	0.57	0.99	0.01	0.77	0.23	

**Objective 6: Value of Agricultural Output**

This objective calls for the real gross value of agricultural output in all IWMDs to increase. There are two indicators for this objective—output per unit land, and output per unit water. The value of these indicators were computed for illustrative purposes in the Year 1 assessment. However, in reviewing the agricultural data for Year 2, the M&E team concluded that the data received were not sufficiently reliable to compute valid indicators. While there is an established system for obtaining data on areas planted to particular crops from local Agricultural Administration (AA) units through IWMDs, there are still shake-down problems with the data coming through this system. Other required information – per hectare yields and farm gate prices – were collected by project staff working through the IWMDs. Upon examination, however, it was apparent that the yield data are only rough estimates, and that the price data are either estimated or are target prices set by the AA unit. Because the indicators would be measuring fairly small changes in value of production, it is important that both yield and price data be quite accurate if these indicators are to be meaningful. Since the data received did not appear to meet this criterion, it was decided not to compute and report these indicators.

A secondary source of agricultural data is the client satisfaction survey conducted in all Districts. These data allow the computation of farmers' yields for the two main crops grown by each respondent farmer. It is theoretically possible to combine these yield data with the area data reported by the Districts to obtain an estimate of the output of the major crops grown in each District. Year on year changes in agricultural output could this be determined for the major crops. To develop integrated estimates of agricultural output from each district, and to compute output per unit water, reliable data on farm-gate prices would still be required.

The M&E team will further examine the yield data from the survey and the cropped area data reported by the AA units to see if reliable estimates of major field crop output can be computed with this combination of data. We will produce a note on this topic in 2007 reporting on the outcomes of this exercise.

## Summary

### Implementation Objectives

Implementation objectives show satisfactory values virtually across the board, indicating that the project is making strong progress in introducing the changes in organizational structure and processes that it set out to introduce. The only task lagging is developing water resource inventories in each District, and that work has begun and will continue during Year 3 of the project.

#### IWMD Establishment

IWMDs have been re-organized, staffed, trained, and equipped with computer facilities. Digital mapping of all Districts is underway and Districts have prepared integrated maintenance plans. A major remaining task is to authorize the Districts to begin direct contracting for maintenance work, rather than working through the Directorates to contract for services.

#### Data-based Management

Eighty-three inflow and outflow structures in the 27 Districts have been calibrated and rating curves prepared, enabling computation of measured volumetric discharges at each structure. These measured discharges are being reported to District Managers every two weeks and are included in the District Managers' monthly reports. These rating curves need to be incorporated into the database that the Districts are using to record water levels so that the software will report instantaneous and cumulative discharge in addition to water levels in canals. Districts have begun to develop inventories of water resources and water facilities within their boundaries. This inventory process will continue and should lead to an integrated water resource management plan for each District.

#### BCWUA Participation

The project is achieving the basic targets set for establishing BCWUAs according to schedule. BCWUAs are communicating with District Managers and staff and supplying maintenance priorities to the District. They still lack authority to collect fees and to operate the system at the Branch Canal level, and their impact on performance will likely remain limited until these authorities are granted.

### Outcome Objectives

Outcome objectives show a mixed picture with some moving in a positive direction and other static or negative.

### **Quality of Service**

The number of complaints filed with the Districts per 1,000 feddans in Year 2 was virtually unchanged from the baseline year. However, the number of drainage complaints was down across the board, while irrigation complaints were up. These changes largely offset one another. A possible explanation for the reduction in drainage complaints is that the integration of drainage responsibilities within the IWMD resulted in faster and more successful responses to drainage problems, reducing the number of formal complaints filed. The increase in irrigation complaints may be a result of a reduction in funds available for maintenance. The ministry should explore these issues further, however.

The number of complaints was 73% higher in Lower Egypt than in Upper Egypt, perhaps as a result of more abundant water supplies and higher gradients (and the resulting lower incidence of drainage problems) in Upper Egypt.

The number of 15-day periods during which measured water supply matched the target amount allocated within 10% was down slightly in summer and up somewhat in the winter season. However the percentage of periods in which a match was achieved in both Years 1 and 2, about 20% in both seasons, is rather low. Matching should improve as the management process of setting and using volumetric targets becomes more established and as District Managers become more familiar with managing by volume rather than by water level.

The percentage of farmers reporting satisfaction with the quality of irrigation service received increased slightly in summer and declined slightly in winter, compared with the baseline year. About three-quarters of farmers report being completely or moderately satisfied in the summer, while 9 out of 10 report being satisfied in the winter. The small improvement in satisfaction during the more critical summer season is a positive development.

The percentage of farmers reporting that rotational water deliveries made by the District followed the planned schedule completely declined slightly in both summer and winter. Interestingly, the percentage of farmers reporting “no correspondence” between the planned and actual schedules during the summer was quite high in certain Districts – particular ones in West Sharkiya and Aswan General Directorates. This suggests that these Districts, which are often “water rich”, may not be practicing regular rotations. Alternatively, it may be that there is simply poor communication of rotational schedules to farmers in these Districts.

### **Equity of Distribution**

Main canal equity ratios, which indicate how even evenly water was distributed along the main canal in a district, deteriorated in both seasons during Year 2, as compared with Year 1. This disappointing result requires further exploration and explanation by the Ministry and the project. The reasons for the deterioration are not known. Nevertheless, in many Districts equity ratios were close to the ideal value of 1. However, in 7 of 25 Districts in summer and 4 of 25 Districts in winter, equity ratios were greater than 2, indicating that less than half as many farmers in tail-end BCs were satisfied with service compared with those in the head. The Ministry should explore further the reasons for the poor distributional equity achieved in these Districts.

By contrast, branch canal equity ratios, which indicate how even evenly water was distributed between heads and tails of branch canals, improved in both seasons during Year 2. This positive development relates to the management of water (and maintenance) along the length of the branch canals. This is the portion of the irrigation system where BCs are

expected to play a major management role, however it is too early to credit BCWUA activities directly for the improvement since they have no actual management responsibilities (or authority) as yet. However it may be that improved communication between farmers and Districts, through the BCWUA, and the supply of maintenance priorities to the District, resulted in improved distribution of water along branch canals. Farmers reported sharp increases in frequency of contact with both District field staff and BCWUA board members during Year 2.

## **Lessons Learned**

Lessons learned regarding the M&E program itself from the second year of operation are given below in three categories. The first relates to the field survey and the second to the IWMD data collection program. These are followed by recommendations.

### **Client Satisfaction Survey**

The Client Satisfaction Survey (CSS) this year covered about 4,500 farmers and cost about US\$12,500. With the advantage of the previous year's experience, the entire process was much smoother this year. A number of the enumerators provided by the Districts were veterans from Year 1 and so were already familiar with the enumeration process. And Districts were much better at creating the lists of farmers on the sampled branch canals which served as sampling frames for the survey. Consultants again recommended that more enumerators than needed be trained and the best among them selected to conduct the survey. This recommendation is endorsed.

There was a problem with the distribution of the selected sample among Branch Canals which, for some Districts was somewhat skewed, i.e. in a given District, more farmers in one type of canal (head, middle, tail) were interviewed than in other types of canals. Although the reasons for this are unknown, the M&E team will work with the consultants to correct this problem for the next year. Also, as a precaution the M&E team will work with the consultants to develop a more formal and rigorous quality control scheme for the survey enumeration for coming year.

### **IWMD Data Collection**

The dataset available from the IWMDs this year was much more extensive than that available in Year 1. In particular, measured canal inflow data was available for all Districts this year, where it was only available for 4 of the 27 districts last year. Complaints data was also more comprehensive.

There were, however, significant problems with some types of data reported by the Districts. Because Directorates do not presently make volumetric allocations of water to Districts, the allocation "target" data reported by the Directorates were developed solely for the project and not part of the routine data system of the Directorate. As a result, 15-day targets data may not have been prepared with much care, and may not have been only roughly estimated. Although the data generally seem reasonable, too much reliance should not be placed on them at this stage.

The “demand” data present a more serious problem. It was expected that demand estimates would be taken from the Ministry’s Matching Irrigation Supply and Demand (MISD) system. However, it was clear from the data reported by the Districts that, in many cases, this was not the case. As a result, the origins of this data are unknown. Moreover, the values of demand reported often appeared unreasonable high or low. Follow up of this issue also raised questions about the way in which the MISD software itself calculates crop water demand. Although it is not clear whether there is or is not a problem with the computations made by the software at present, it is important to re-validate the MISD software by comparing its results with results from alternative demand computations to insure that it is producing the intended outputs. After validating the software, Districts must be retrained to use the MISD software to produce the demand estimates needed both for the M&E process and for their own data-based management of irrigation water. Follow up and quality control is then required to monitor the data stream being produced and reported by the Districts.

Serious problems were also found in agricultural data reported by the Districts. The evident estimations and approximations being used, and the lack of clarity and documentation on just how these data are being collected, rendered this data insufficiently reliable to use in the M&E process. It is necessary either to (a) find ways of producing reliable information on yields and crop prices, or (b) to drop the two indicators based on this information from the set used to monitor project impacts.

### **Recommendations**

- The project should expand data-based water management work to the General Directorate level and so complete a volume-based water management system extending from the national Water Distribution Center to the IWMD level.
- The project should provide feedback to District managers and staff on the results of the annual M&E exercise and seek their help in interpreting outcomes.
- The Ministry should follow up to identify the causes of some of the performance outcomes measured in the M&E program, including
  - Declines in drainage complaints and increases in irrigation complaints in most Districts
  - Deterioration in main canal equity ratios
  - Improvement in branch canal equity ratios
  - Practice of rotational irrigation in West Sharkiya and Aswan Directorates
- The project and the Ministry should re-validate the MISD software, re-train District staff in its use, and provide follow-up problem solving and quality control assistance.
- The project and the Ministry should generate a consistent set of updated irrigable area figures for all 27 project Districts using remote sensing imagery.

- The project and the Ministry should introduce more formal quality control measures for project performance data to increase their reliability and the confidence that can be placed in them.
- The project and the Ministry should decide whether or not it is possible to produce a reliable set of agricultural data for use in populating M&E indicators during Year 3, or if the indicators using this information should be dropped from the set.
- The M&E team should work with the survey consultants to solve problems related to sample size in different types of branch canals.

## **Annex 1. Note on Hydrologic Data Sets for Monitoring and Evaluation (Mark Svendsen, M&E Specialist)**

### **Introduction**

There are now four project datasets available for M&E, benchmarking, and other purposes. These are data for

1. District area
2. Water delivery targets
3. Crop water demands
4. Actual canal water deliveries to Districts

Although there are some missing values, these four datasets generally cover four seasons.

1. Summer 2004 (baseline)
2. Winter 2004-5 (baseline)
3. Summer 2005
4. Winter 2005-6

This note summarizes results of a review of the accuracy and completeness of the data sets by the M&E Specialist, and recent discussions involving the project data team and other stakeholders. The analysis of the quality and completeness of the data sets considered such things as missing values, internal consistency, outliers<sup>8</sup>, and measured or computed values which appear as unusually “round”. In addition, data were examined in various combinations – as ratios or on a per unit area basis – to see if this produced unexpected results or outliers. The main discussions contributing to this note were a briefing for the USAID CTO on Thursday 17 August, which included a presentation by project database specialist Tom Sheng, and a meeting of the project data team later the same day. Below the four types of data are considered individually.

### **Area Data**

The current set of area data consists of 27 values which represent the area of each of the IWMDs. Values were computed by staff in each District at the time of District formation. However, staff in different Districts used different assumptions in making their estimates. The most important divergence in procedures used is between those Districts which estimated

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<sup>8</sup> Data that are far from the average or norm for that type of data in the dataset.

only the gross area within the designated boundaries of the District, and those which subtracted out certain non-agricultural lands such as urban areas, to obtain a net figure. It is not known which Districts fall into which category and, where deductions were made, what specific rules were used in making the deductions. These differences make the area data currently being used inconsistent and generally unsuitable for use in computing M&E indicators. Earlier this year, estimates made using Landsat images indicates that in 16 of the 27 Districts, current area estimates differ from the Remote Sensing (RS) estimates of gross District area by more than  $\pm 10\%$ .

Needed, in general, is a set of area figures produced using a standard set of rules and the most up-to-date geographic information available. The best available data will generally be remote sensing images. Maps which are more than a few years old will almost certainly under-represent the extent of urban area. More specifically, for M&E purposes, what is needed is a consistent set of values which represent the potential irrigable agricultural area within each District rather than the gross area enclosed by District boundaries.

There are two possible approaches to this problem, both based on analysis of satellite images. The first is to assess directly the cropped area during the baseline year (2004-5), i.e. “the green area” within the boundaries of each District. This area would then be treated as a constant value for the duration of the project. This approach has the advantage of simplicity. Its drawbacks are (a) green area may actually change from year to year or season to season, when what is needed is a fixed value of “irrigable” area, (b) this value will not include “irrigable but currently fallow” land, (c) this value may be perceived as a **variable** rather than the required **parameter** (one which characterizes the district for a longer period of time), (d) it will not include areas which are indeterminate or difficult to classify.

An alternative approach, the deduction method, begins with the gross area of the District, as measured on RS images, and deducts three categories of known non-agricultural land, (1) open water, (2) urban and residential areas, and (3) wasteland<sup>9</sup>. This approach offsets many of the drawbacks mentioned above for the “green areas” approach. In particular these net values (a) change only slowly and incrementally as urban areas expand, (b) are more closely related to the “District area” values currently accepted by the Ministry and are thus likely to be more acceptable within the Ministry, and (c) include fallow but irrigable areas.

## Recommendations

A two-track approach is recommended for rationalizing the District area figures. One track would use the best available technology with RS images and a set of standard rules to create estimates of net irrigable area of each district through the *deduction method* described above. This set of estimates would be used consistently throughout the Project M&E process.

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<sup>9</sup> A fourth category may be necessary in areas in Upper Egypt such as Wadi el Nokra and Wadi el Saaida which are still expanding through new construction which would classify separately land planned for irrigation development in the future.

The second track would work through Ministry channels to build consensus around a revised set of “official” values for district area. The ministry would develop and manage this process itself. The project would support the “official” process by assembling consistent sets of values of different types of “areas” for each District for illustrative purposes. This comparative dataset table would comprise 27 rows, corresponding to the 27 Districts in the project. Columns would include (a) currently accepted area values for each District, (b) actual gross area measured from digital maps or RS images, (c) net irrigable area computed by the *deduction method* from RS images, (d) “green area” estimated from RS images for a baseline year (preferably 2004-5), and (e) agricultural area as computed by the MoA. These different sets of area values could be compared with each other and would provide guidance for the Ministry as it develops rules and procedures for making its own “official” estimates of District areas.

### **Water Delivery Targets**

It is not entirely clear what the data in our database reported by the Directorates as “targets” actually represents. There is currently a formal process by which the Water Distribution Center in the Ministry allocates the available supply of Nile water to all Irrigation General Directorates for the coming agricultural year on a 10-daily basis. This is done every year in October at the beginning of the agricultural year and after the major inflows for the year to Lake Nasser have occurred. The General Directorates, in turn, make allocation plans and allocate the water allocated to them to the Districts under them. In theory, this process should result in a set of 10-daily “target” volumes of water to be delivered to each District throughout the agricultural year (1 October through 30 September). These are the values that the M&E exercise had intended to obtain and use.

However this process is not well developed at the directorate level and below. Also, it is unclear just how the “target” values requested from the Directorates by project personnel were described to Directorate staff. These two factors together have resulted in uncertainty about what the values which were reported by the Directorates actually represent.

This concern is heightened by the data quality analysis conducted by the M&E Specialist, which shows that during summer 2005, for example, 11 of the 25 fully operational districts show exactly the same values for “targets” and for “demand.” Keep in mind that targets are set prior to the season and are obtained from the Directorates, while “demand” values are obtained from the Districts (see next section) and are computed as the season progresses using the MISD software. Hence seasonal demand data would be available only at the end of each season. The fact that the target and demand values coincide exactly for more than 40% of the fully operational districts for summer 2005 calls into question the validity of both sets of data. The source and meaning of both target and demand data thus must be investigated more thoroughly.

In addition some of the target values seem unusually low. These include, in particular, values for Luxor, Deshna, and Aswan for summer 2005.

### **Recommendations**

The following steps are recommended.

1. Prepare a clear written description of the process used to allocate volumes of Nile water for each season and year from the WDC down to the Districts
2. Obtain examples of completed forms used by the Ministry in documenting “target” values and communicating them within the Ministry chain of command
3. Discuss and clarify with Directorates their understanding of the concept of “targets” and the values they reported to project staff as targets.
4. Check, in particular, the target values identified above as being unusually low and those values which match “demand” reported by the Districts exactly.

Recommendations related to demand data are given in the next section.

## **Crop Water Demands**

Water “demand” represents crop water requirements, as computed by the MISD software used by all of the Districts. The MISD software computes crop water demand by inputting area planted to various crops in a district every 15 days and then using crop factors (Kc) and average potential evapotranspiration (PET) values to compute aggregate crop water demand for the 15-day period. Note that the PET values used in the MISD program are not based on real-time meteorological data but rather on long-term average values of climatic conditions drawn from tables prepared by the Water Management Research Institute. Each resulting value is then divided by an assumed irrigation efficiency value to obtain a gross water requirement for District for the 15-day period. The irrigation efficiency value used for all Districts is 0.7. The resulting value is thus about 43% higher than the actual computed crop water requirement ( $1.0/0.7 = 1.43$ ).

Information in the database representing computed water demands for a number of Districts are called into question by their exact correspondence with “target” values in some seasons, as described in the previous section. They thus need to be investigated in conjunction with the target values.

In addition, there are missing values for 6 of the Districts for the 2004-5 agricultural year. These Districts are Awlad Sakr, Armant, Abu Tesht, Aswan, El Twasa, and Edfo East. The reason for this is that these Districts did not start using the MISD software until the following year. However, because a complete set of values is needed for the M&E process, it is necessary to estimate these missing values. Two alternative approaches for doing this are possible. The first would be to obtain cropping data from the local Agricultural Administration units for 2004-5 and then run MISD retroactively using these data. The second approach would be to estimate the values using the “duty” tables prepared by the Water Management Research Institute together with seasonal cropped area figures for 2004-5.

In addition there are a number of zero values shown for crop water demand during January in both 2005 and 2006. These zero values correspond to periods when canals are typically closed for maintenance. It is thus reasonable for “targets” to be zero for these periods, but

crops continue to require water and so it is not reasonable for the “demand” figures to be zero. This suggests confusion between the two concepts at the District level which needs to be clarified. The zero values are clearly erroneous and need to be replaced with actual demand values from MISD.

Additionally, a number of the demand values are unusually “round.” That is, it is unlikely that MISD would repeatedly compute values such as 4.000, 5.500, 6.000, 9.500, and 14.250 for total demand as figures for Kose report. Such “round” values are the rule rather than the exception across all the Districts, indicating that many Districts may not be using the MISD software to compute the values they report or that they are adjusting the results before reporting them. The project needs to obtain stored results of MISD computations by Districts and rerun them to compare with the values in the database.

## **Recommendations**

The following steps are recommended.

1. Estimate missing “demand” values for 2004-5 using one of the two alternative approaches suggested above.
2. Re-estimate demand values for at least two Districts in each Directorate (select the ones with the “roundest” values) using MISD software and compare with reported values in the M&E database. If discrepancies are found, re-estimate demand for all Districts within the Directorate. This should be done for all 4 seasons.
3. Re-estimate demand values for all January 2005 and January 2006 “zeros” using MISD software.
4. Discuss and clarify with the Districts their understanding of the concept of “demand” and the values they reported to project staff as “demand.”

## **Actual Deliveries**

Actual deliveries to Districts are the measured inflows to the Districts on a 15-daily basis throughout the agricultural year. Inflows are calculated from water level readings taken by biharis one or two times a day, using a calibration equation developed for each measurement structure or canal reach. While water level readings are stored in a database in each District, discharge values are calculated “off-line” in a spreadsheet program.

The dataset for deliveries is complete for all 4 seasons, with no missing values. Values reported are generally reasonable. Some values of water delivered per unit area are unusually high or low compared with the average for the Directorate and should be confirmed. These values are not necessarily incorrect, but should be checked, bearing in mind that the area figures for each district also affect these duty values. Districts and periods to confirm include the following.

### **Summer 2004-5**

1. Esna
2. Deshna

3. Aswan
4. Komombo

### **Winter 2004-5**

1. Kafr Sakr
2. Nakada
3. Abu Tesht
4. Luxor
5. Kose
6. Komombo

### **Summer 2005-6**

1. Nakada
2. Abu Tesht
3. Aswan

### **Winter 2005-6**

1. Kose
2. Qena
3. Aswan
4. Edfo East

### **Recommendations**

The following steps are recommended.

1. Investigate and confirm or revise flagged values noted above.
2. Include calibration equations in the water level database in all districts so that managers can use the database to pull up (a) discharge values, (b) cumulative daily deliveries, and (c) 15-day delivered volumes, as well as (d) water levels.
3. Publish pdf files of delivery data for the past four seasons on the project website. Since these values seem reasonably reliable, this establishes the precedent of delivery data as “open access.”

## **Annex 2. Allocation Target and Water Delivery Data, 2005-6**

Table A2.1. Target Water Allocation Values for Summer 2005

General Directorate	District	Area (feddan)	Summer [M m <sup>3</sup> ]										Allocation Target for Summer
			May 2005		June 2005		July 2005		August 2005		September 2005		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	18.000	18.000	22.500	22.500	24.750	24.750	24.750	22.500	19.500	15.000	212.250
	El Santa	55,810	14.908	14.908	19.070	19.070	19.553	19.553	19.027	19.027	11.197	11.197	167.510
	Quesna	53,250	15.000	18.000	21.000	21.500	21.000	22.000	21.000	21.000	15.000	13.000	188.500
	South Zifta	39,650	9.745	9.745	12.470	12.470	12.780	12.780	12.435	12.435	8.055	8.055	110.970
	Berket El Sab	39,490	26.550	19.350	15.900	12.000	15.000	19.350	22.650	24.900	22.050	12.750	190.500
	<b>TOTAL</b>	<b>231,430</b>	<b>84.203</b>	<b>80.003</b>	<b>90.940</b>	<b>87.540</b>	<b>93.083</b>	<b>98.433</b>	<b>99.862</b>	<b>99.862</b>	<b>75.802</b>	<b>60.002</b>	<b>869.730</b>
West Sharkia	Abo Kebeer	58,882	12.700	15.900	18.600	15.000	17.200	18.600	17.100	17.100	9.150	18.650	160.000
	Kafr Sakr	54,070	19.110	20.380	24.570	24.570	28.390	31.280	31.030	32.032	21.480	23.290	256.132
	Awlad Sakr	68,000	10.000	18.000	22.000	24.000	24.000	24.000	23.000	20.000	16.000	12.000	193.000
	Ibrahimia	59,214	3.240	3.240	28.900	28.900	33.040	33.040	29.020	29.020	20.300	20.300	229.000
	Zagazig	63,685	13.000	13.400	20.000	22.700	26.000	27.000	25.600	26.000	15.000	15.040	203.740
	<b>TOTAL</b>	<b>303,851</b>	<b>58.050</b>	<b>70.920</b>	<b>114.070</b>	<b>115.170</b>	<b>128.630</b>	<b>133.920</b>	<b>125.750</b>	<b>124.152</b>	<b>81.930</b>	<b>89.280</b>	<b>1,041.872</b>
West Qena	Esna	59,970	27.150	29.600	19.200	21.450	19.200	20.480	23.700	23.700	22.800	22.080	229.360
	Armant	34,200	14.710	14.710	17.160	17.160	20.059	20.059	20.126	20.126	19.427	19.427	182.964
	Nakada	32,210	12.000	12.000	13.050	13.950	13.200	15.100	16.350	17.200	16.050	14.550	143.450
	Naga Hammadi	64,000	19.316	18.638	24.160	23.897	31.635	31.569	33.213	30.867	37.357	37.537	288.189
	Abu Tesht	37,010	22.684	22.684	21.236	21.236	22.807	22.807	24.640	24.640	28.661	28.661	240.055
	<b>TOTAL</b>	<b>227,390</b>	<b>95.860</b>	<b>97.632</b>	<b>94.806</b>	<b>97.693</b>	<b>106.901</b>	<b>110.015</b>	<b>118.029</b>	<b>116.533</b>	<b>124.295</b>	<b>122.255</b>	<b>1,084.018</b>
East Qena	Luxor	42,850	6.150	6.560	9.000	9.300	9.750	11.200	11.100	11.100	10.350	10.080	94.590
	Kose	36,010	9.075	13.904	26.150	25.650	21.750	22.650	20.680	21.120	20.680	21.120	202.779
	Qena	49,400	30.512	30.512	42.420	42.420	50.300	50.300	51.340	51.340	48.222	48.222	445.588
	Deshna	50,100	14.250	15.200	16.050	16.650	17.250	19.680	20.400	22.400	20.700	17.700	180.280
	<b>TOTAL</b>	<b>178,360</b>	<b>59.987</b>	<b>66.176</b>	<b>93.620</b>	<b>94.020</b>	<b>99.050</b>	<b>103.830</b>	<b>103.520</b>	<b>105.960</b>	<b>99.952</b>	<b>97.122</b>	<b>923.237</b>
Aswan	Aswan	14,350	7.144	7.251	7.642	7.207	8.532	8.454	8.227	7.573	7.943	6.677	76.650
	El Twasa	30,210	23.900	23.900	27.700	27.700	27.000	27.000	22.000	22.000	18.340	18.340	237.880
	Komombo	39,768	36.000	38.400	36.900	38.850	36.900	38.880	36.000	38.400	36.000	36.900	373.230
	El Selcela	29,490	16.000	17.000	17.000	18.000	21.000	21.000	19.000	17.000	17.000	15.000	178.000
	Edfo East	28,105	20.664	22.179	22.443	23.364	22.967	25.485	24.826	26.880	23.705	24.863	237.376
	Edfo West	31,335	16.500	16.500	19.500	19.500	20.000	20.000	15.500	15.500	12.700	12.700	168.400
	<b>TOTAL</b>	<b>173,258</b>	<b>120.208</b>	<b>125.230</b>	<b>131.185</b>	<b>134.621</b>	<b>136.399</b>	<b>140.819</b>	<b>125.553</b>	<b>127.353</b>	<b>115.688</b>	<b>114.480</b>	<b>1,271.536</b>
All	<b>TOTAL</b>	<b>1,114,289</b>	<b>418.308</b>	<b>439.961</b>	<b>524.621</b>	<b>529.044</b>	<b>564.063</b>	<b>587.017</b>	<b>572.714</b>	<b>573.860</b>	<b>497.667</b>	<b>483.139</b>	<b>5,190.393</b>

Table A2.2. Actual Water Deliveries for Summer 2005

General Directorate	District	Area (feddan)	Summer [M m <sup>3</sup> ]										Actual Delivery for Summer
			May 2005		June 2005		July 2005		August 2005		September 2005		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	11.683	15.232	19.491	18.716	16.204	15.934	14.905	15.749	14.367	9.729	152.010
	El Santa	55,810	23.932	26.030	24.265	24.750	25.655	27.929	24.546	25.208	21.207	15.039	238.561
	Quesna	53,250	12.943	14.111	21.860	19.039	18.385	27.555	21.648	18.537	15.230	7.402	176.710
	South Zifta	39,650	12.384	12.773	16.012	15.655	17.386	18.854	19.203	19.373	17.178	12.446	161.264
	Berket El Sab	39,490	9.060	9.536	8.957	8.081	8.391	8.772	8.992	6.631	6.372	5.172	79.964
	<b>TOTAL</b>	<b>231,430</b>	<b>70.002</b>	<b>77.682</b>	<b>90.585</b>	<b>86.241</b>	<b>86.021</b>	<b>99.044</b>	<b>89.294</b>	<b>85.498</b>	<b>74.354</b>	<b>49.788</b>	<b>808.509</b>
West Sharkia	Abo Kebeer	58,882	19.275	20.612	24.831	22.989	24.278	24.571	24.452	24.989	23.618	19.813	229.428
	Kafr Sakr	54,070	8.810	22.825	24.960	24.960	28.445	23.912	21.037	20.712	24.106	11.644	211.411
	Awlad Sakr	68,000	27.917	22.696	32.491	27.148	30.534	39.871	27.720	35.452	35.392	33.644	312.865
	Ibrahimia	59,214	18.321	25.375	27.501	29.003	26.326	33.279	28.727	30.795	28.938	21.880	270.145
	Zagazig	63,685	10.458	15.633	21.037	23.311	25.360	26.791	26.842	26.858	24.251	16.637	217.178
	<b>TOTAL</b>	<b>303,851</b>	<b>84.781</b>	<b>107.141</b>	<b>130.820</b>	<b>127.411</b>	<b>134.943</b>	<b>148.424</b>	<b>128.778</b>	<b>138.806</b>	<b>136.305</b>	<b>103.618</b>	<b>1,241.027</b>
West Qena	Esna	59,970	27.177	31.855	29.625	31.156	33.466	36.747	36.698	37.651	35.258	35.112	334.745
	Armant	34,200	11.585	11.131	14.820	16.959	12.996	14.497	14.474	15.239	15.555	14.309	141.565
	Nakada	32,210	4.723	13.795	14.112	12.298	8.294	7.747	7.085	13.910	13.507	11.750	107.221
	Naga Hammadi	64,000	25.485	23.151	29.099	28.268	30.370	34.967	34.244	38.220	35.485	32.054	311.343
	Abu Tesht	37,010	22.336	26.694	25.630	24.740	19.438	23.437	18.367	20.346	22.353	23.311	226.652
	<b>TOTAL</b>	<b>227,390</b>	<b>91.306</b>	<b>106.626</b>	<b>113.286</b>	<b>113.421</b>	<b>104.564</b>	<b>117.395</b>	<b>110.868</b>	<b>125.366</b>	<b>122.158</b>	<b>116.536</b>	<b>1,121.526</b>
East Qena	Luxor	42,850	10.281	12.534	18.700	18.648	19.394	21.615	21.718	21.695	18.530	27.056	190.173
	Kose	36,010	4.808	20.264	24.155	18.049	20.699	23.361	18.281	17.129	14.636	12.641	174.023
	Qena	49,400	25.979	24.358	22.131	22.998	22.236	23.790	20.740	21.937	22.737	22.267	229.173
	Deshna	50,100	15.785	19.243	19.356	18.727	17.503	20.089	18.325	20.751	17.042	13.900	180.721
	<b>TOTAL</b>	<b>178,360</b>	<b>56.853</b>	<b>76.399</b>	<b>84.342</b>	<b>78.422</b>	<b>79.832</b>	<b>88.855</b>	<b>79.064</b>	<b>81.512</b>	<b>72.945</b>	<b>75.864</b>	<b>774.090</b>
Aswan	Aswan	14,350	16.658	13.379	15.988	15.389	15.147	15.361	16.694	17.093	15.824	14.819	156.352
	El Twasa	30,210	21.063	20.156	18.474	19.339	19.369	22.191	21.436	21.794	19.789	19.784	203.395
	Komombo	39,768	26.762	28.907	26.155	29.783	27.822	32.642	28.924	32.543	29.834	32.370	295.742
	El Selcela	29,490	14.331	15.229	14.880	17.565	19.099	19.380	18.245	19.657	17.359	17.430	173.175
	Edfo East	28,105	17.383	18.221	19.347	19.816	19.495	21.653	21.426	23.386	20.132	21.390	202.249
	Edfo West	31,335	13.402	18.237	17.677	21.250	20.779	21.845	23.393	21.589	20.260	19.342	197.774
	<b>TOTAL</b>	<b>173,258</b>	<b>109.599</b>	<b>114.129</b>	<b>112.521</b>	<b>123.142</b>	<b>121.711</b>	<b>133.072</b>	<b>130.118</b>	<b>136.062</b>	<b>123.198</b>	<b>125.135</b>	<b>1,228.687</b>
<b>All</b>	<b>TOTAL</b>	<b>1,114,289</b>	<b>412.541</b>	<b>481.977</b>	<b>531.554</b>	<b>528.637</b>	<b>527.071</b>	<b>586.791</b>	<b>538.123</b>	<b>567.244</b>	<b>528.961</b>	<b>470.941</b>	<b>5,173.839</b>

Table A2.3. Target Water Allocation Values for Winter 2005–06

General Directorate	District	Area (feddan)	Winter [M m3]														Allocation Target for Winter
			October 2005		November 2005		December 2005		January 2006		February 2006		March 2006		April 2006		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-28	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	3.100	4.020	3.845	4.300	3.960	4.195	4.030	3.500	3.080	3.440	4.150	6.370	5.160	6.920	60.070
	El Santa	55,810	9.200	9.200	9.787	9.787	6.968	6.968	10.933	0.000	7.530	7.530	9.929	9.929	11.898	11.898	121.557
	Quesna	53,250	10.500	10.500	10.000	10.000	8.000	8.000	6.000	7.000	8.000	9.000	11.000	12.000	14.000	13.000	137.000
	South Zifta	39,650	6.162	6.162	8.230	8.230	6.410	6.410	6.170	6.170	6.770	6.770	9.347	9.347	9.720	9.720	105.618
	Berket El Sab	39,490	12.000	13.350	13.950	16.650	13.050	12.150	13.050	12.150	15.150	15.900	25.350	25.800	25.350	25.800	239.700
<b>TOTAL</b>	<b>231,430</b>	<b>40.962</b>	<b>43.232</b>	<b>45.812</b>	<b>48.967</b>	<b>38.388</b>	<b>37.723</b>	<b>40.183</b>	<b>28.820</b>	<b>40.530</b>	<b>42.640</b>	<b>59.776</b>	<b>63.446</b>	<b>66.128</b>	<b>67.338</b>	<b>663.945</b>	
West Sharkia	Abo Kebeer	58,882	11.250	12.640	11.550	12.600	13.950	17.600	19.650	26.240	21.150	17.290	16.800	16.000	13.800	13.350	223.870
	Kafr Sakr	54,070	11.880	10.390	9.950	9.800	9.800	9.800	9.600	0.500	0.500	10.390	10.390	14.850	16.050	16.950	140.850
	Awlad Sakr	68,000	6.500	8.000	12.000	12.000	12.000	11.000	12.000	0.000	12.000	12.500	12.000	13.500	13.000	13.000	149.500
	Ibrahimia	59,214	7.300	7.300	5.040	5.190	5.980	5.980	7.760	7.760	8.780	8.780	14.490	14.490	11.010	11.010	120.870
	Zagazig	63,685	9.009	10.301	10.269	9.595	7.522	7.308	18.750	0.000	6.017	10.049	11.542	11.239	10.830	11.019	133.450
<b>TOTAL</b>	<b>303,851</b>	<b>45.939</b>	<b>48.631</b>	<b>48.809</b>	<b>49.185</b>	<b>49.252</b>	<b>51.688</b>	<b>67.760</b>	<b>34.500</b>	<b>48.447</b>	<b>59.009</b>	<b>65.222</b>	<b>70.079</b>	<b>64.690</b>	<b>65.329</b>	<b>768.540</b>	
West Qena	Esna	59,970	36.563	35.117	23.848	22.971	22.323	33.803	1.946	27.234	22.556	18.201	27.939	28.959	0.000	0.000	301.460
	Armant	34,200	18.400	18.400	13.750	13.740	12.420	12.420	0.000	14.042	11.405	11.405	14.520	14.520	13.940	13.940	182.902
	Nakada	32,210	14.200	11.260	10.000	8.500	7.420	6.000	0.000	6.825	8.656	9.140	9.600	11.090	10.360	5.932	118.983
	Naga Hammadi	64,000	13.180	13.220	16.420	19.280	21.560	24.770	0.000	23.640	23.640	23.640	20.900	22.070	26.290	27.460	276.070
	Abu Tesht	37,010	17.790	17.790	13.130	13.130	16.760	16.760	0.000	0.000	23.400	23.400	18.320	18.320	14.060	13.580	206.440
<b>TOTAL</b>	<b>227,390</b>	<b>100.133</b>	<b>95.787</b>	<b>77.148</b>	<b>77.621</b>	<b>80.483</b>	<b>93.753</b>	<b>1.946</b>	<b>71.741</b>	<b>89.657</b>	<b>85.786</b>	<b>91.279</b>	<b>94.959</b>	<b>64.650</b>	<b>60.912</b>	<b>1,085.855</b>	
East Qena	Luxor	42,850	9.450	14.400	5.550	9.600	11.700	8.700	0.000	0.000	7.200	6.450	9.750	9.750	11.700	11.700	115.950
	Kose	36,010	17.070	20.990	17.080	13.690	12.680	14.520	0.000	11.470	12.300	10.660	14.120	11.920	11.510	14.410	182.420
	Qena	49,400	14.250	14.250	13.900	13.900	12.200	12.200	11.240	11.240	10.170	10.170	16.050	16.050	11.175	11.175	177.970
	Deshna	50,100	14.850	13.280	11.250	10.350	9.600	9.600	0.000	11.520	12.300	12.350	16.050	20.000	19.200	19.350	179.700
	<b>TOTAL</b>	<b>178,360</b>	<b>55.620</b>	<b>62.920</b>	<b>47.780</b>	<b>47.540</b>	<b>46.180</b>	<b>45.020</b>	<b>11.240</b>	<b>34.230</b>	<b>41.970</b>	<b>39.630</b>	<b>55.970</b>	<b>57.720</b>	<b>53.585</b>	<b>56.635</b>	<b>656.040</b>
Aswan	Aswan	14,350	8.305	7.365	6.226	5.747	6.639	6.379	5.090	5.090	5.793	5.566	6.564	6.059	6.677	6.677	88.177
	El Twasa	30,210	21.700	21.700	18.100	18.100	18.100	18.100	0.000	10.000	10.000	10.000	11.250	11.250	11.250	11.250	190.800
	Komombo	39,768	33.000	34.500	25.700	23.700	25.600	26.400	11.700	24.900	19.700	19.700	25.000	29.400	28.000	23.800	351.100
	El Selcela	29,490	11.000	11.000	9.000	9.000	8.000	7.000	0.000	9.000	11.000	11.000	12.000	12.000	14.000	14.000	138.000
	Edfo East	28,105	25.471	27.607	20.197	20.243	19.790	22.246	15.199	23.830	18.129	19.058	22.548	24.948	22.597	22.985	304.848
	Edfo West	31,335	8.250	8.250	8.250	8.250	6.000	6.000	6.000	6.000	6.000	6.250	9.250	9.250	10.000	10.000	107.750
<b>TOTAL</b>	<b>173,258</b>	<b>107.726</b>	<b>110.422</b>	<b>87.473</b>	<b>85.040</b>	<b>84.129</b>	<b>86.125</b>	<b>37.989</b>	<b>78.820</b>	<b>70.622</b>	<b>71.574</b>	<b>86.612</b>	<b>92.907</b>	<b>92.524</b>	<b>88.712</b>	<b>1,180.675</b>	
<b>All</b>	<b>TOTAL</b>	<b>1,114,289</b>	<b>350.380</b>	<b>360.992</b>	<b>307.022</b>	<b>308.353</b>	<b>298.432</b>	<b>314.309</b>	<b>159.118</b>	<b>248.111</b>	<b>291.226</b>	<b>298.639</b>	<b>358.859</b>	<b>379.111</b>	<b>341.577</b>	<b>338.926</b>	<b>4,355.055</b>

Table A.4. Actual Water Deliveries for Winter 2005–06

General Directorate	District	Area (feddan)	Winter [M m3]														Actual Delivery for Winter
			October 2005		November 2005		December 2005		January 2006		February 2006		March 2006		April 2006		
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-28	1-15	16-31	1-15	16-30	
New Zifta	North Zifta	43,230	7.747	7.229	7.771	7.546	6.295	6.366	9.226	3.397	5.980	5.684	5.510	8.832	6.471	11.626	99.681
	El Santa	55,810	11.555	14.956	16.490	18.779	13.489	7.549	14.016	12.896	14.205	12.992	18.139	14.977	18.897	22.643	211.584
	Quesna	53,250	8.527	16.255	15.779	8.684	2.945	5.649	3.629	0.000	8.609	10.045	7.150	15.658	8.654	10.425	122.009
	South Zifta	39,650	9.171	14.057	12.909	10.274	10.178	8.372	11.961	1.163	8.936	10.586	12.094	13.033	12.595	12.085	147.414
	Berket El Sab	39,490	4.842	4.066	5.956	6.471	7.462	4.889	5.518	0.598	2.869	6.632	7.370	7.986	8.108	7.924	80.690
	<b>TOTAL</b>	<b>231,430</b>	<b>41.842</b>	<b>56.563</b>	<b>58.905</b>	<b>51.754</b>	<b>40.369</b>	<b>32.825</b>	<b>44.351</b>	<b>18.053</b>	<b>40.599</b>	<b>45.938</b>	<b>50.264</b>	<b>60.487</b>	<b>54.726</b>	<b>64.702</b>	<b>661.379</b>
West Sharkia	Abo Kebeer	58,882	12.231	11.374	13.582	12.954	11.522	10.887	9.875	0.000	6.005	12.944	8.801	10.533	12.090	11.221	144.020
	Kafr Sakr	54,070	5.730	13.167	19.307	14.742	13.151	11.616	8.054	0.000	7.607	14.595	20.194	6.968	16.640	26.943	178.713
	Awlad Sakr	68,000	16.903	12.681	18.680	17.655	14.330	15.325	13.177	0.000	11.415	15.868	18.811	13.983	27.422	20.930	217.179
	Ibrahimia	59,214	16.814	19.686	17.670	17.461	13.330	14.983	17.758	3.195	4.074	17.325	13.277	16.235	20.023	17.284	209.114
	Zagatig	63,685	13.072	15.795	13.614	13.412	11.984	12.927	14.442	0.000	4.558	15.203	14.685	16.228	15.023	15.025	175.969
	<b>TOTAL</b>	<b>303,851</b>	<b>64.750</b>	<b>72.702</b>	<b>82.853</b>	<b>76.225</b>	<b>64.317</b>	<b>65.738</b>	<b>63.305</b>	<b>3.195</b>	<b>33.658</b>	<b>75.934</b>	<b>75.767</b>	<b>63.948</b>	<b>91.198</b>	<b>91.403</b>	<b>924.994</b>
West Gena	Esna	59,970	32.475	35.877	22.827	22.887	21.329	29.942	1.738	26.140	20.691	18.606	25.386	25.808	27.467	27.672	338.844
	Armant	34,200	12.033	10.771	15.599	14.072	14.131	12.775	5.080	15.546	14.324	12.325	15.142	15.826	14.392	9.755	181.768
	Nakada	32,210	11.750	12.269	7.603	10.886	10.368	11.059	0.000	6.826	10.656	9.101	10.541	11.088	10.858	8.813	131.818
	Naga Hammadi	64,000	34.530	35.270	37.030	31.403	31.555	36.721	19.154	33.843	40.932	25.291	29.089	32.521	32.502	31.163	451.005
	Abu Tesht	37,010	21.077	17.371	19.862	18.856	16.847	22.903	0.967	15.008	21.658	17.833	18.045	25.343	21.068	12.417	249.255
	<b>TOTAL</b>	<b>227,390</b>	<b>111.864</b>	<b>111.558</b>	<b>102.921</b>	<b>98.104</b>	<b>94.230</b>	<b>113.399</b>	<b>26.938</b>	<b>97.363</b>	<b>108.260</b>	<b>83.156</b>	<b>98.203</b>	<b>110.586</b>	<b>106.286</b>	<b>89.820</b>	<b>1,352.689</b>
East Gena	Luxor	42,850	22.100	24.160	19.119	16.480	15.599	13.675	0.000	12.427	10.684	9.181	9.855	11.095	6.966	6.564	177.905
	Kose	36,010	8.598	8.707	9.082	2.526	0.000	1.950	0.117	0.000	9.149	13.406	6.578	23.646	11.044	1.275	96.079
	Gena	49,400	21.162	23.693	21.297	22.216	22.283	24.488	3.082	15.294	24.393	23.056	26.489	25.345	27.043	23.243	303.084
	Deshna	50,100	13.774	14.826	14.393	12.442	11.661	10.855	7.571	12.424	10.662	11.661	12.140	12.952	12.577	16.100	174.039
	<b>TOTAL</b>	<b>178,360</b>	<b>65.634</b>	<b>71.387</b>	<b>63.891</b>	<b>53.664</b>	<b>49.543</b>	<b>50.968</b>	<b>10.770</b>	<b>40.146</b>	<b>54.888</b>	<b>57.304</b>	<b>55.061</b>	<b>73.038</b>	<b>57.631</b>	<b>47.182</b>	<b>751.108</b>
Aswan	Aswan	14,350	7.130	6.707	4.772	4.885	5.227	4.624	3.355	5.246	4.800	4.045	5.058	5.990	5.771	5.655	73.264
	El Twasa	30,210	21.413	22.879	19.835	19.048	19.171	16.972	8.877	18.867	18.219	16.016	19.475	19.592	17.603	17.654	255.621
	Komombo	39,768	32.300	33.815	26.654	24.521	26.552	27.371	12.148	27.410	21.667	21.621	26.547	28.604	26.875	26.692	362.777
	El Selcela	29,490	17.553	19.427	15.463	16.061	15.102	19.058	1.352	15.075	16.995	16.153	15.219	15.768	14.204	13.961	211.391
	Edfo East	28,105	23.320	25.622	18.665	18.759	17.953	21.194	11.757	22.664	16.607	17.651	20.757	23.024	20.640	20.392	279.003
	Edfo West	31,335	23.381	24.178	16.113	12.958	13.918	13.443	8.759	13.824	9.048	8.866	13.472	3.140	12.352	14.227	187.681
	<b>TOTAL</b>	<b>173,258</b>	<b>125.098</b>	<b>132.628</b>	<b>101.502</b>	<b>96.232</b>	<b>97.922</b>	<b>102.662</b>	<b>46.247</b>	<b>103.086</b>	<b>87.336</b>	<b>84.352</b>	<b>100.529</b>	<b>96.117</b>	<b>97.445</b>	<b>98.581</b>	<b>1,369.736</b>
<b>All</b>	<b>TOTAL</b>	<b>1,114,289</b>	<b>409.189</b>	<b>444.838</b>	<b>410.073</b>	<b>375.979</b>	<b>346.381</b>	<b>365.593</b>	<b>191.611</b>	<b>261.844</b>	<b>324.741</b>	<b>346.684</b>	<b>379.824</b>	<b>404.176</b>	<b>407.286</b>	<b>391.688</b>	<b>5,059.906</b>

### **Annex 3. Corrected regularity of rotation data for 2004-5**

**Table A3.1. Degree of Correspondence between Planned and Actual Rotations, Summer 2004**

<b>Directorate</b>	<b>Complete (Percent)</b>	<b>Partial (Percent)</b>	<b>None (Percent)</b>
New Zifta	15	60	25
West Sharkiya	6	43	51
West Qena	17	57	26
East Qena	41	43	17
Aswan	32	53	15
Overall	21	52	27

**Table A3.2. Degree of Correspondence between Planned and Actual Rotations, Winter 2004–05**

<b>Directorate</b>	<b>Complete (Percent)</b>	<b>Partial (Percent)</b>	<b>None (Percent)</b>
New Zifta	21	68	11
West Sharkiya	14	51	35
West Qena	26	68	6
East Qena	67	32	1
Aswan	31	64	6
Overall	30	58	12