IRRIGATION WATER MANAGEMENT REFORMS A CASE STUDY OF PERFORMANCE OF FARMERS ORGANIZATIONS

REFORMES DE LA GESTION D'EAU D'IRRIGATION - ETUDE DE CAS SUR LA PERFORMANCE DES ORGANISATIONS DES FERMIERS

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ABSTRACT

The irrigation system of Pakistan has been facing many managerial problems for last many years, leading to farmer's complaints regarding insufficient water supply, theft of water, inequitable water distribution, seepage problems etc. In order to address these issues, and recognizing that the farmers are the real beneficiaries of irrigation, the government of Pakistan decided to include participation of farmers in irrigation system management and administration of water distribution.

In 1997, the Punjab Assembly passed a resolution for the control and management of irrigation water at the province level and the "Punjab Irrigation and Drainage Authority (PIDA)" came into existence. Under this system, the responsibility of the administration of irrigation water management was delegated to Province Level, Canal Level, Distributary/Minor Level and Watercourse Level. Besides, Farmer's Organizations (FOs) were formed, which are working under the control of Area Water Boards (AWB). These FOs are fully responsible for managerial control of distributaries and minors.

The present study is focused on the performance evaluation of FOs after the implementation of reforms in Area Water Board (AWB) of Lower Chenab Canal Punjab, Pakistan. The performance evaluation of the FOs show that on the whole, out of 84 FOs, there are only 25 FOs ranked as good, while the remaining 59 FOs fall under different levels of performance i.e. poor, adequate and satisfactory. The results of this study show that more efforts are required to motivate the water users for their enhanced participation in the irrigation water management.

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Key words: *Irrigation reforms, Punjab Irrigation and Drainage Authority, Chenub canal, Area Water Board, Pakistan.*

RESUME

Lors des dernières années, le système d'irrigation du Pakistan est affecté par beaucoup de problèmes gestionnaires, menant aux plaintes du fermier concernant l'approvisionnement en eau insuffisant, le vol de l'eau, la distribution inéquitable de l'eau, les problèmes de fuite par percolation etc. Pour aborder ces questions et pour sensibiliser les fermiers à cette fin, le Gouvernement du Pakistan a décidé d'inclure la participation des fermiers dans la gestion du système d'irrigation et la governance de la distribution d'eau.

En 1997, l'Assemblée du Penjab a passé une résolution au niveau de la province pour le contrôle et la gestion d'eau d'irrigation et "l'Autorité d'Irrigation et de Drainage du Penjab (PIDA)" a été établie. Dans le cadre de ce système, la responsabilité de l'administration de la gestion d'eau d'irrigation a été déléguée au niveau de la Province, au niveau du canal, au niveau des canaux secondaires/tertiaires et au niveau du cours d'eau. En outre, les Organisations des Fermiers (FO) ont été établies, qui travaillent sous le contrôle des Conseils d'eau de la région (AWB). Ces FO sont chargées du contrôle de la gestion des canaux secondaires et tertiaires.

L'étude actuelle se consacre à l'évaluation de la performance des FO après la mise en oeuvre des réformes dans le Conseil d'eau de la région (AWB) du canal inférieur de Chenab au Pakistan. L'évaluation de la performance des FO montre que sur le total de 84 FO seulement 25 FO maintiennent un niveau élevé de la performance, alors que le niveau de la performance de reste de 59 FO est catégorisé comme faible, adéquat et satisfaisant. Les résultats de cette étude montrent que plus d'efforts sont exigés pour motiver les usagers d'eau pour accroître leur participation dans la gestion d'eau d'irrigation.

Mots clés: *Réformes d'irrigation, Autorité d'Irrigation et de Drainage du Penjab, canal de Chenab, Conseil d'eau de la région, Pakistan.*

1. INTRODUCTION

The economy of Pakistan is based on its agriculture, which is dependent almost entirely on the conventional canal irrigation system. According to a recent World Bank report (Jan. 2006), Pakistan is fast moving from being a "water stressed country to a water scarce country", mainly due to its high population growth, and water is becoming the key development issue. The groundwater is overexploited and polluted in many areas; most of the water infrastructure (even some of the major barrages) are in poor conditions; the entire system of water management is not sustainable. Considering the alarming predictions of severe water shortages in future, efficient use of irrigation water through various levels of management reforms has gained a lot of importance.

The irrigation system of Pakistan has been facing many managerial problems for last many years. These problems include management of canal water and role of administrative authority, farmers' complaints regarding insufficient water supply, theft of water, water distribution issues and seepage problems etc.

2. RECENT WATER MANAGEMENT REFORMS

In order to address these problems, the Government of Pakistan decided to include participation of farmers in irrigation system management and administration of water distribution. This decision was made on the premise that farmers are the real beneficiaries of irrigation water and any miss-management in the administration of water directly affects them. In order to implement this theme, a system has been introduced, based on the ideology that farmers must participate at all levels of irrigation water management. Under this system the following administrative authority levels have been adopted:

2.1 Administration at Province Level

Totally independent organization at the province level had to be established in each of the four province of Pakistan. Government officials and representatives of farmers would be the members of administrative committee of this organization, which will look after the supply of water in the whole province, provide guidance regarding water development policies and will make rules and regulations for running the canal system in proper way. The organizations have been given the name "Provincial Irrigation and Drainage Authorities (PIDAs)".

Currently working irrigation departments will get submerged into PIDA later on. PIDA is not only responsible for performing all irrigation duties but also for strengthening the participation of farmers in the water management issues.

2.2 Administration at Canal Level

An institution namely "Area Water Board (AWB)" at each main canal level has been proposed under the PIDA Act. The administration of this institution is being carried out jointly by government officials and farmers' representatives. AWB will handle the management of canal water under the guidance and policies of provincial level authority (PIDA). This organization will be responsible for practical development of the canal system.

The proposed AWBs will work under PIDA and will be responsible for O&M of irrigation and drainage in their concerned areas and will also provide finances required for these works. Under the supervision of PIDA, the AWBs will perform the following duties.

- Implementation and monitoring of canal works.
- To suggest new development schemes for annual development programs.
- To ensure proper distribution of water in the assigned area and prepare and implement *warabandi* schedule.
- To monitor large and small canals.
- To suggest steps to stop water theft for ensuring water supplies at tails.
- Monitoring of revenue.
- To ensure that expenditure does not exceed the budgeted amount.
- To ensure participation of water users in managerial issues.

- To assist the government in establishing and development of *khal panchayats* at water course level.
- Monitor the performance of *khal panchayats* and give suggestion for further improvements.
- To accept the donations with the approval of authority.
- To utilize the funds in accordance with PIDA rules.
- To look after various other matters of authority.

2.3 Administration at Distributary/ Minor Level

Administration of irrigation water at this level will be carried out by Farmers' Organizations (FOs), which will work under the control of AWB. These FOs will be fully responsible for managerial control of distributaries and minors. They will also look after the water distribution problems and repair and maintenance of outlets and water carrier channels in their area of control. These organizations will also be responsible for collecting *abiana* from the farmers and will also play important role in resolving water theft issue.

Farmers' organizations will consist of representatives of all watercourses. Chairmen of *khal panchayat* will be members of the FOs. Farmers of a *khal panchayat* will elect four members and a chairman from among themselves. This chairman will be member of general body of FO and canal *panchayat*. The elections will be held according to FO rules and regulations.

Each FO will be recognized with a separate name. It will be responsible for running and maintenance of distributary/ minor. Each FO will establish an office in its own area of control. Each FO will consist of a general body and a management committee. The general body of FO will elect management committee for three years. FO will hire the services of an assistant for financial management from either PIDA or AWB.

2.4 Administration at Watercourse Level

Farmers' elected organizations will be responsible for the water management at watercourse level. These organizations would be called as "*khal panchayats*". These will solve problems of farmers in the traditional way and would be responsible for implementation of the decisions made by the *panchayat*.

The above proposed four organizations will work in co-operation with the staff of irrigation department. For the creation and running of such institutions, proper legislative process has been developed.

3. CASE STUDY

The present study is focused on the performance evaluation of FOs after the implementation of reforms in AWB of Lower Chenab Canal in Punjab Province, Pakistan. This was the first Area Water Board established on Pilot basis in February 2000. Accordingly, establishment of eighty four Farmers Organizations (FOs) and Irrigation Management Transfer (IMT) of distributaries to them were completed by the end of year 2005.

The performance of FOs has been analyzed on basis of monthly progress reports, field inspection reports submitted by Monitoring & Evaluation cell teams, interaction and meetings with office bearers of FOs and management committees by the M&E teams and PIDA officers. Some of the important qualitative and quantitative aspects considered in this study for performance evaluation of FOs include:

- Organizational Development,
- Irrigation Service Delivery,
- Repair and maintenance of works,
- Disputes resolutions & disposal of unauthorized irrigation/water theft & other revenue cases,
- Water charges assessment and collection of water charges (*Abiana*).

3.1 Organizational Development

3.1.1 Meetings

General Body and Management Committee (MC) meetings of the FOs are being carried out regularly but frequency of these meetings differs among the FOs. The extent of participation level of members in these meetings remained at an average of about 70%. Seventy two FOs (86% of the total FOs) have maintained the record of minutes of meetings and attendance very well and the participation of members in the meetings is more than 70%. The 12 Nos. FOs reported low participation of their members. The frequency of meetings remained more than one during a month for almost all the FOs.

The members of the Management Committee are generally taking interest in the affairs of FO but in some cases the office bearers of MC do not attend the meetings regularly. Although the MCs of the FOs are expected to work collectively for operational issues of FOs but it is observed that the Presidents of almost 50% FOs themselves or with one or two active members of management committees are generally carrying out the tasks of the FOs. The performance of the FOs is better in rating where the Management Committee is functional.

3.1.2 Cooperative Approach

Interaction and cooperative approach amongst MCs in functioning of FO and mutual trust in fulfilling responsibilities is increasing day by day. The FOs are taking up the matters in their meetings/agenda discussions and developing their management and operational skill through their collective decision-making. For better performance of the functions, in general, the FOs have established their standing committees and assigned them the responsibilities regarding operation and regulation, repair and maintenance of works, water charges, finance collection and water theft control etc.

Although majority of FO members are well aware about their roles and responsibilities, but they still need to improve the understanding about the standard procedures and responsibilities. Seventy three FOs (87% of the total) have good or satisfactory understanding about the

administrative aspects, while 11 FOs (13%) are poor in this regard. Sixty eight FOs (81%) have good or satisfactory perception and capabilities in accounts management, 74 FOs (88%) have good or satisfactory concepts about the procedure of procurement of goods & services, O&M of system, funds utilization and flow/discharge measurement and discharge table reading.

3.1.3 Staffing

All the FOs have their staff i.e. Manager Technical, Gauge readers, Beldars, Patwaries, FO assistants, Office Clerk/computer operators etc. Total strength of FOs is 460 Nos.; including 31 Managers (Technical), 34 FO Assistants cum Computer Operators, 23 Revenue Assistants, 105 Patwaries, 204 Beldars and 27 gauge readers. Most of the FOs are observing their gauges at head and tail reaches of the channels through utilizing their technical managers, Beldars and regulation committees. Other staff includes 36 Nos. Naib Qasid/ Dak Runners and Security Gaurds.

It is observed that 70 FOs (83%) are satisfied regarding recruitment and working of their staff while remaining 14 FOs realized that they do not have adequate strength in terms of Technical and Revenue staff. The status of current staffing level (460 Nos.) indicates less staff as per the Staffing Plan in IMT Agreement, which was 608 Nos. Therefore, for better performance of FOs the requisite staff should be recruited immediately by the FOs as per the IMT agreement.

3.1.4 Record Maintenance

The FOs are not properly maintaining their records. This aspect is weak which need special attention. The 34 FOs (40%) are good in maintaining their records regarding disputes/ complaints entry, maintaining gauges/discharges register and outlets check register. Fifty seven FOs (68%) reported that they have maintained their accounts record, 10 FOs are in progress to maintain such records and 17 FOs did not maintain their accounts record. Therefore the record maintenance and management of a majority of the FOs still needs to be improved.

3.1.5 Capacity Building

All the 84 FOs obtained an average of 8 trainings in various aspects of irrigation management i.e i) Organizational Development and Management Skills; ii) Operation and Maintenance of channels and structures; iii) Equitable distribution of water; iv) Water Charges assessment and collection; v) Disputes resolution and disposal of revenue cases; vi) Financial Management; and vii) Record maintenance. FOs also attended various class room lectures & training courses and workshops for their capacity and skill development. The institutional support and coordination in all fields of functioning of FOs is regularly provided by PIDA. It is observed that the FOs and their staff are visualizing their further training for efficient performance of their duties which indicates their growing interests and learning attitude towards their capacity development. Further Capacity building and training cell of PIDA is assessing the need of continuing training of FOs and facilitate the FOs to enhance their capabilities for managing the system properly and effectively.

3.1.6 Progress Reporting

FOs are submitting their monthly progress of activities on defined proformas/forms regarding conduct of business, dispute/conflict resolution and disposal of revenue cases, repair and maintenance of works, operation & regulation of channels, water delivery of channels and outlets, water charges assessment & collection and expenditures detail. FOs monthly progress are reviewed and lacking/deficiencies are identified and communicated to management of FO and PIDA's concerned cells for improvement, further capacity building trainings and back up support. The scrutiny of progress reports submitted by FOs covering the financial year 2006-2007 reveals that an average 76% of FOs (64 Nos. of FOs) submitted their monthly progress, while 24% FOs (20 Nos. FOs) have not submitted their monthly progress regularly and timely.

3.2 Irrigation Service Delivery

3.2.1 Operation and Regulation of Channels

All 84 FOs have been found functional in operation and regulation of distributaries. The services of Regulation Committees, Manager Technical, Beldars and gauge readers are being utilized to control water theft, check and observe the gauges and discharges at head regulator of the distributary and distribute the supply in off-taking minors and observe tail gauges. It is observed that 61 FOs (73%) effectively improved water supply position in their channels up to the tails as they succeeded to manage water delivery more than 85% in their channels through out the year, and 23 FOs faced problems in delivery of authorized supply at head due to non regular and low supply of water, in the parent channel, rehabilitation works in progress and some reservations on the constructed head, bed/crest level of the channels. Construction of outlets during the rehabilitation/lining works also affected the supply at tails.

The records maintenance/ management status of FOs regarding daily gauges, discharges and the checking of outlets including the delivery performance ratio (DPR) entries still require improvement and need to be maintained regularly by majority of FOs (60%). Thirty nine FOs maintained proper record (100%) of daily gauges/discharges of their channels, 31 FOs maintained satisfactory record (75%), while 14 FOs were poor in record maintenance of daily gauges/discharge of their channels. The *warabandies* of each watercourse are being implemented as per approved schedule by FOs. FOs are establishing and improving a system of safe delivery of water, checking and maintaining of outlets and structures. The cut and breaches in channels were addressed and protective measures adopted properly and timely.

3.2.2 Monitoring of Water Delivery Performance of Channels and Outlets

All FOs are regularly checking the outlets of their channels and observing the discharges and water delivery position in their channels. The Technical Managers, Beldars and Regulation Committees of the FOs are observing the discharges and checking of outlets regularly. FOs are making efforts to improve the water delivery from head of distributaries to tail outlets.

The FOs have reported that they have checked their all outlets and identified and repaired 925 Nos. defective/tampered outlets. Although the outlets parameters have been mostly

restored by the FOs but their fixation to design levels is still needed to be carried out so that the equitable distribution of water at each outlet level as per their authorized discharge can be ensured.

Entries in outlets check register regarding checking of outlets parameters (B, Y & H), delivery performance ratios (DPRs) and observations after repairing of outlets are being done which have also been checked during visits by M&E teams. The 28 FOs (33%) have maintained the outlets check record in proper manner and 39 FOs (46%) maintained satisfactory level record, while 17 FOs (20%) were found poor in maintaining the outlets check register. Although, all the 84 FOs are regularly observing the gauges and checking out their outlets but they did not transfer the data into the registers.

PIDA monitoring field teams jointly with FOs are also carrying out physical inspections of channels and checked outlets parameters and water delivery performance of channels and outlets from head to tails. The PIDA M&E teams inspected the 80 channels during the year 2006-07. Out of these, 36 distributaries have been checked completely in all aspects of its functioning. The copies of physical inspection sheets were delivered to the concerned FOs and identified weak areas were conveyed to FOs for follow up improvement and necessary action to improve water delivery and ensure equity, and further verification of improvement made by the FOs are again monitored by the M&E teams.

The water delivery performance of two channels and their outlets as recorded by FOs are presented in Figure 1.

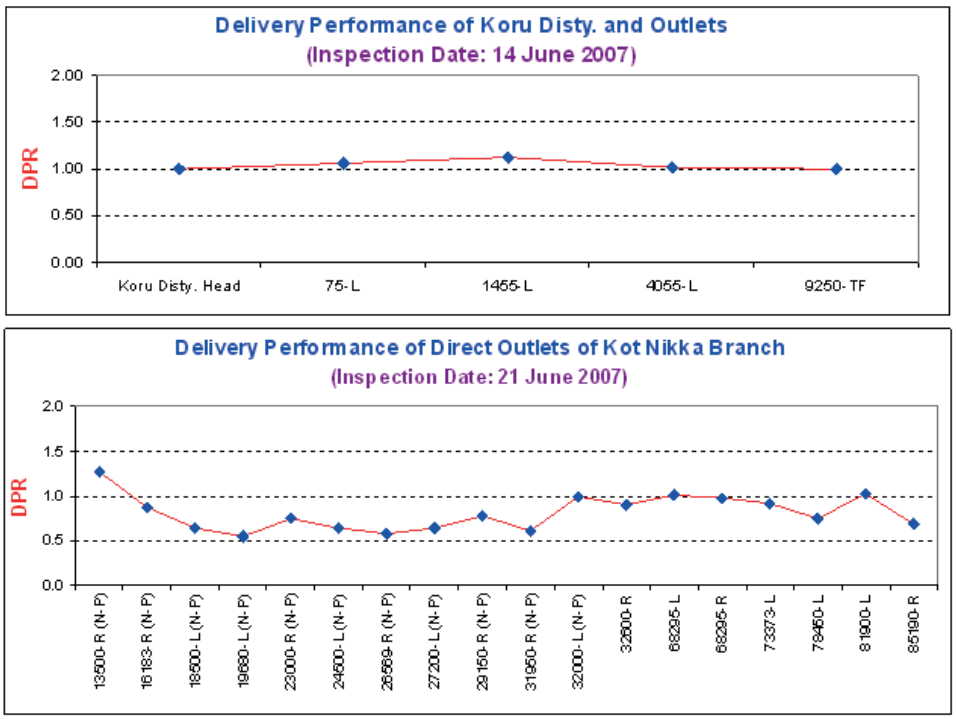

Fig. 1. Delivery performance of two channels, as recorded by farmers' organizations

3.3 Repair and Maintenance of Works

In general, the FOs maintained the irrigation channels and infrastructure with a sense of participation on the self help basis using their resources as well as from the 40% share of *Abiana* of the FOs. The desilting, jungle clearance, sarkanda/weed/vegetation growth removal, berm cutting and strengthening of banks etc. were carried out on self help basis by FOs through deploying tractors and volunteer labour. In this way, the most of FOs (about 75%) have succeeded in clearing the water way of channels and feeding the tails through regulating the authorized discharges of distributaries and by repairing the defective outlets. Among all 84 FOs, 70 FOs (83%) have carried out O&M activities on self help basis besides from its share of *abiana*. Almost all the FOs have mobilized their community resources of labour and farm machinery for maintenance activities on cooperative basis. The farming community fully participated in desilting activities and repairing of weak banks of the channels and jungle clearance, Total 75 Nos. of FOs executed repair and maintenance works of channels out of their 40% share. The remaining 9 FOs reported that they could not plan and execute the repair and maintenance works at their channels due to the rehabilitation and lining works in progress.

3.4 Disputes Resolution and Disposal of Unauthorized Irrigation/ Water Theft and Canal Revenue Cases

FOs are resolving disputes/conflicts relating to water distribution, *Warabandi* and *Nakka* etc. collectively and timely. It is also a good sign that the FOs are keeping transparency/ fairness in resolving the disputes, and farming community is satisfied with FO's decisions. The progress reports of FOs have been reviewed and accounted that the FOs have resolved total 585 numbers of disputes and decided 906 numbers of unauthorized irrigation / water theft cases and *chakbandi* (revenue) cases. It also observed that FOs have initiated and taken action on 728 Nos. of cases of water theft.

The analyses of progress of FOs regarding disputes resolution shows that 71 FOs (85%) have resolved efficiently and timely all water relevant disputes, while remaining 13 FOs (15%) were found weak and lacking in resolution of disputes. The record management and maintenance of FOs regarding disputes/complaints entry and resolution status was observed, which reveals that on the whole 34 FOs (40%) maintained their records properly, while remaining FOs did not maintain their record in proper format and the resolved cases status. Such lacking/ shortcomings were communicated to concerned units/cells of PIDA for further guidance, support and capacity building of FOs which is being provided by the field teams PIDA. Year-wise progress of FOs regarding disputes resolution, water theft cases and chak bandi cases are shown in the bar chart in Figure 2.

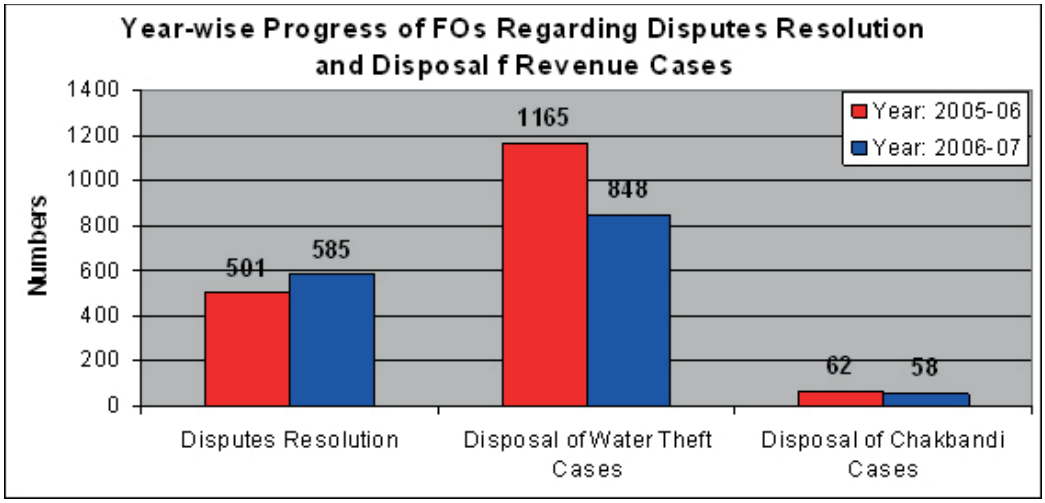

Fig. 2. Year-wise progress in FO activities

3.5 Assessment and Collection of Water Charges (*Abiana*)

The task of assessment and collection of water charges (*Abiana*) was entrusted to FOs so as to enable them to generate their funds for management of their channels and smooth functioning of FOs.

FOs have adopted the services of their *Khal Punchayats* (KPs) for distribution of bills to farmers and collection of abiana. The response in water charges (*Abiana*) collection by the 65 FOs was very encouraging during first crop *Rabi* 2004-2005 as collection of water rate is observed 88%, among them 28 numbers of FOs have collected 100% Abiana. For the second crop in *Kharif* 2005 the all 84 FOs have collected 80% water charges , among them 27 FOs collected 100% of the due. For the third crop *Rabi* 2005-2006 the total 84 FOs have collected 79% *Abiana*, among them 24 FOs collected 100% of the due. For the fourth crop *Kharif* 2006, all 84 FOs, collected 53% of *Abiana*, among them 11 FOs collected 100% of the due.

Table 1: Crop Wise Progress of FOs Regarding Assessment and Collection of Water Charges

Crop Season	Nos. of FOs	Assessed Amount (Rs. Million)	Collected Amount (Rs. Million)	Av. % age Collection	Remarks
Rabi 2004-2005	65 FOs	47.60	41.72	88	28 FOs collected 100% *Abiana*
Kharif 2005	84 FOs	112.48	89.98	80	27 FOs collected 100% *Abiana*
Rabi 2005-2006	84 FOs	61.32	48.44	79	24 FOs collected 100% *Abiana*
Kharif 2006	84 FOs	112.16	58.92	53	11 FOs collected 100% *Abiana*

It is observed that the trend of the collection of water charges by the FOs is declining. PIDA coordination and social mobilization cell has stressed the FOs to improve the collection of water charges. Regular meetings are being held by the field staff with Management Committees and General Body members of FOs in this regard. The revenue coordinators of capacity building & training cell are providing on-the-job training and assistance to each FO regarding maintenance of assessment and *abiana* record and guidance for recovery of *abiana* etc. The services of tehsildar for recovery of *abiana* from defaulters has been obtained who is assisting FOs in the collection process.

The following main problems are identified which affected the performance of water charges collection.

a. Inexperienced revenue staff of FOs for assessment and preparing water charges bills.
b. Poor mechanism adopted by the FOs for collection, which mainly depends on chairmen *Khal Panchayats* who have collected the water charges from farmers but did not deposit back to the FOs.
c. Non-provision of incentives to collectors of water charges, while all FOs demanded to allow them to pay collection charges in line with existing practices in Government.
d. The weak internal interaction and cohesion among Management Committees and *Khal Panchayats* chairmen.
e. Socio-political and cultural factors has started effecting the performance of FOs and mistrust gap has developed.
f. Fluctuation in delivery of water supplies due to ongoing rehabilitation works in channels.
g. Problem in effective control over water theft resulting non-feeding of water supply to tail reaches.

On the basis of collection of *abiana*, ranking of FOs is given in Table 2.

Table 2: Cumulative Water Charges (*Abiana*) Collection Performance Ranking

Ranking	Standard	Nos. of FOs	%age of FOs out of 84 FOs
Good	Greater than 90% Collection	29	35%
Satisfactory	80-90% Collection	11	12%
Adequate	60-80% Collection	25	30%
Poor	Less than 60% Collection	19	23%

4. CONCLUSIONS

The overall performance of all 84 FOs in AWB/LCC (East) Circle is evaluated against performance benchmark indicators/parameters and standards. The evaluation of performance of FOs on above mentioned parameters show that on the whole, out of 84 FOs, there are only 25 FOs ranked as good, while remaining 59 FOs fall under different levels of performance i.e. poor, adequate and satisfactory.

The performance ranking of FOs is tabulated as under:

Table 3. Performance of FOs

Ranking	Standard	Nos. of FOs	%age out of 84 FOs
Good	**Greater than 85%**	25	30 %
Satisfactory	**70-85%**	19	23 %
Adequate	**55-70%**	25	30 %
Poor	**Less than 55%**	15	17 %

There is need to evolve mechanism for improving the performance level of FOs i.e. poor (15 FOs) to adequate, adequate (25 FOs) to satisfactory, satisfactory (19 FOs) to good, and good (25 FOs) towards the sustainable. The results of this study show that more efforts are required to motivate the water users for their enhanced participation in the irrigation water management.

5. RECOMMENDATIONS

In a water-stressed environment all around, the following factors are growing in importance that needs to be addressed for sustainable development of water resources:

- Integration of Water Resources Development and Management;
- Radical changes in irrigation practices, adoption of pressurized and precision irrigation methods to increase productivity;
- Training and capacity building of users and the line personnel;
- Mobilization of financial resources for improved maintenance, operation, modernization and replacement;
- Water quality improvement and use of low quality water;
- Improvement in operation and maintenance through water users' associations, transfer of irrigation management to them for improving water use efficiency (particularly irrigation management);
- Automation of the infrastructure and control on releases; and
- Water pricing regime and legislative improvements;

All these issues have to be handled in a more scientific and efficient way to overcome the weaknesses. Automation of water flow, in the main system or the secondary system appears inescapable because of the aging infrastructure. Till that becomes possible, regulation of water and maintenance procedures have to be tightened to meet the immediate basic principle of irrigation for providing the right quantity of water at the right time and at right place. For this purpose, the water users have to be drawn in a full-scale participation in the water management.

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