JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

IRRIGATION AND POWER DEPARTMENT
GOVERNMENT OF PUNJAB
THE ISLAMIC REPUBLIC OF PAKISTAN

THE STUDY ON THE LINING OF DISTRIBUTARIES AND MINORS IN PUNJAB IN THE ISLAMIC REPUBLIC OF PAKISTAN

Volume III

ANNEXES-II

JULY 1997

NIPPON KOEI CO., LTD.
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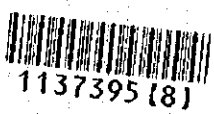

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G.1 National Policy on Institutional Reforms

G.1.1 The Policy

From the meetings with the farmers in the project area, officials of the Federal and Provincial Governments and in pursuance of the documented studies carried out by Government itself and with the assistance of international agencies such as World Bank, Asian Development Bank, and OECF, it is realized that the performance of agricultural sector has been dismal and poor. It is recognized that among the various constraints one of the most serious constraint is the old colonial institutional system which does not allow the beneficiaries to participate in the development, operation & maintenance process of economic resources. This lack of participation by the beneficiaries is more evident in water sector which is having the highest influence on agriculture in the arid and semi arid region of Pakistan. The water resource is increasingly becoming scarce in terms of per capita availability due to rising population. The increased pressure on land and water for maximum productivity by indivisual farmers has resulted into unauthorized use of water particularly by the influential farmers in the head reaches of the distributaries. The problem was recognized as early as in 1975 when the canal and drainage act of 1873 was to go through a major amendment in an attempt to remedy its increasing obsolescence. The back ground to this amendment can be seen in the following comment by Nasir (1981;3):

> *"The Canal and Drainage Act of 1873 was drafted more than a century ago when the irrigation in the Punjab was in its infancy. With the extensive development of irrigation, many new problems have arisen for which adequate and clear cut provisions do not exist in the Act. The growth in population and fragmentation of the land holdings have given birth to serious problems in the equitable distribution of canal supplies especially of internal watercourses within the standard canal irrigation unit of a square. The influential people have been and are resorting to unauthorized irrigation by tampering with the outlets or by cutting the canal banks or by using canal water out of their turns and in excess of their legitimate shares. The proposed amendments in the Canal Act are, therefore, necessary."*

The national commission on agriculture (1988) also comments

> *"Not only does the availability of canal water vary seasonally, the distribution process itself suffer from certain chronic inequities, the worst being tailenders*

i.e.. farmers at the extreme end of the distributary system"

The commission further comments

"of all the inputs in agriculture the greatest gains can be expected from more efficient use of water, which also maximizes gains from other in-puts such as fertilize. Increasing agriculture production will, therefore, depend crucially on the rational use of land, land improvement, increasing the supply of water by reducing the water losses, more efficient water use and better agronomic practices."

It is therefore realized that it is highly essential to improve the efficiency of this resource and one way would be through the full participation of the farmers - the beneficiaries.

The policy of the Government to make the beneficiaries of economic resource participate in the management of these resources is reflected in the 8th five year plan which in its chapter on "Good governance" states to:

"Improve efficiency, responsiveness and participation in the management of economic system, through deregulation, accountability and empowerment of rural communities, NGOs and lower echelons of the Government."

Again in the chapter on "Approach to the plan", it states that the frame work will be geared to:

"encouraging participation of all people in the development process and a more equitable sharing of benefits."

The plan in its objectives and strategies on environment states that the National Conservation Strategy (NCS) implementation agenda during the 8th plan will focus on:

"Strengthening of Regulatory, Technical and participatory institutions. To create a balanced implementation frame work, the types of institutions need to be encouraged are (i) public sector research, regulatory and planning institutions, (ii) Local and community participation institutions and (iii) private sector institutions."

In the priority areas of the NCS emphasized by the 8th plan, the 1st three priorities are (i) maintaining soil in croplands, increasing irrigation efficiency and protection of water sheds.

On the participatory organizations, the 8th plan states that community organization does

not mean a small group of influential local representatives. It means broad based, decentralized homogeneous local organizations at the village and neighbor - hood level with decision making being done by all those whose common economic interest is best served by working together.

The plan recognizes that the development agencies tend to be organized on a sectional or functional basis instead of following an integrated multifunctional approach. To make optimal use of opportunities it is important that villagers have management capacity to integrate the assistance available with their specific needs.

Many efforts at promoting group cooperation and activity have been captured by special interests that seek to optimize their own benefits. To avoid repetition of past mistakes, special procedures and disciplines are required to ensure participation of all possible beneficiaries and effective supervision of the development process. There is, however, an urgent need to promote village level capacity for innovation.

In formulating strategy for implementation in the water sector the plan emphasizes on transferring partial responsibility for O & M to farmers associations so that O & M financial burden on the public sector is eased. It recommends to implement a pilot program to evaluate the concept of transferring irrigation department into autonomous bodies with the ultimate aim of involving the private sector in irrigation management.

The Government has also given a clear mandate to the international financial institutions helping the National Drainage Program to implement institutional reform which would make the participation of the beneficiaries essential to achieve the twin objective of making the system efficient and transfer the burden of O & M expenditure to the beneficiaries. In discussion with Government Agencies at Federal and Provincial level the institutional reforms were clearly mentioned and recognized. The will of the Government was also indicated to implement institutional reforms on pilot bases.

G.1.2 Policy Implementation during the 8th Plan

In pursuance of the above basic policy the federal and the four provincial governments have agreed on a draft statute to be promulgated bringing about the institutional reforms in the provincial irrigation departments. The statute broadly stipulates that these departments shall be converted into independent authorities (provincial Irrigation & drainage authorities-PIDA) controlled by a board of Directors which will have the farmers' representatives also as directors besides the official directors including Irrigation & Power department, Agriculture department and planning and development department. The PIDA's will have all the powers of O & M and development of

irrigation and drainage systems under their respective jurisdictions and the fixation of water charges to make them financially independent. Under the PIDA's will be established Area Water Boards for each canal command which will be equally independent. Farmers Organizations will be formed at distributary level on pilot basis to give full participation to the beneficiaries and to operate and maintain the distributaries by themselves. These organizations will be established under the corporate law authority having independent legal status and will be given the relevant powers and responsibilities under legal protection.

G.2 Operation and Maintenance of Irrigation and Drainage Systems

G.2.1 Operation and Maintenance of Irrigation System

Operation and maintenance of irrigation system is done by the Punjab Irrigation and Power Department established during the last quarter of 19 century. It is a department of the Government of Punjab headed by a political Minister and a permanent Secretary with a complementary secretarial staff of senior engineers as additional secretaries, deputy secretaries and section officers (Figure G-1). For the control of field operations the province of Punjab is divided into six zones each headed by a Chief Engineer. The zones are

1. Lahore Zone
2. Faisalabad Zone
3. Sargodha Zone
4. Multan Zone
5. Bahawalpur Zone
6. D.G. Khan Zone.

The area under the project pertain to the first three zones. To illustrate the field control, administrative charts of Sargodha and Faisalabad Zone are attached (Figure G-2 & 3) along with the chart of Irrigation Department(Figure G-1). It can be seen that each zone has five circles three of which are for operation and maintenance of irrigation system and two are for drainage only. The O&M circles have two to four irrigation divisions which are manned by the field officers for operation & maintenance of the canal system and assessment of the water charges.

OPERATION OF THE SYSTEM

The divisional irrigation engineers assess the water requirements of their respective areas and depending upon the canal capacities, place an indent on the head works division directly or indirectly at least 10 days in advance through a canal wire. The indent is usually placed according to the historical record or as per demand/designed capacities of channels. The head works division depending upon availability of water regulates the head work to release the water as per sum total of the demands placed by the divisions after making due adjustment for the losses in the main canal and branches subject to availability of water in the river and taking due regard for the rights of the lower riparians. In accordance with the Water Accord, 10 daily releases for each canal system have already been fixed and are controlled by Indus River System Authority (IRSA), a representative of whom is posted at each head works. In case of shortages

in the river system the IRSA divides the shortages on prorate basis with perennial canals having the 1st charge on available water. In case the shortages cannot be met even by total withdrawal from non-perennial canals then these are divided on prorate basis after deducting the losses in the river.

Within the canal command the shortages are similarly distributed over the entire command area to attain the concept of equity. Such shortages are although not frequent but are usually encountered in the months of April, May and June when the reservoirs have already been drawn down to minimum pond levels and the rivers have not yet risen due to low temperatures in the snowy mountainous sources of the Indus river and non commencement of the monsoon season in the rainfed catchments of Jehlum and Chanab. On the other hand, the temperatures rise in the Indus plains resulting into high water demand by standing crops and preplanting water for the ensuing crops. It is in this critical period that shortage shearing is normally resorted to. The generation of hydoro power of course gets the second priority after irrigation requirements in the operation of the two major reservoirs i.e. Tarbela and Mangla.

MAINTENANCE OF THE CANAL SYSTEM

The maintenance of the canal system from head works to out lets (including the out let) is done by the Irrigation Department. The Department employs Engineers and Sub Engineers on permanent basis and some skilled and unskilled staff for maintaining the canal head works including its gates and gearing and the protection bunds, vigilance over the distributary branch and main canal banks against breaches, vigilance over outlets against interference, repairs to the minor works in the regulators, and banks, removal of weed if any and maintenance of banks and the roads along the banks of the system. Certain major functions are performed through contractors specially appointed such as annual silt clearance. The finances are supposed to be provided by the provincial Finance Department according to an approved yardstick in the annual budget of the province. The Irrigation Department have historically complained that enough finances based on the yard stick have never been provided and therefore the facilities have deteriorated due to accumulated short fall in the resources. The complaint of the irrigation department appears to be having a weightage as from the figures of Lower Jehlum Canal Circle(Table 5, Figure G-4) it appears that the provision of O & M budget has remained constant in nominal prices over the last 10 years (1984 to 1994) although the price escalation would be between 200 to 300%. While the pay and allowances of the supervisory staff rise every three years to some what keep pace with inflation, the freezing of the O & M budget resulted into unbalancing the expenditure in favour of establishment making less and less funds available for actual maintenance. According to NDP the 1995 budget shows that 75%

of it is spent on establishment and only 25% is available for maintenance. The finance department on the other hand complain that due to non-enhancement of water charges commensurate with inflation they are in no position to increase the budget for operation and maintenance of the system. The net result on the ground is that the system is continuously deteriorating despite some major financial dosage under Irrigation System Rehabilitation Project I & II. The department is also plagued with inefficiency, corruption, political interference and incompetence at middle and lower llevel.

G.2.2 Assessment and Collection of Water Charge

The major income of the irrigation system is from water rates (Abiana) assessed and recovered from the farmers. The Irrigation Department has a large revenue staff (In case of L.J.C., 2/5 of the total in terms of budget expenditure and 1/3 of the total in terms of number of employees) engaged on the assessment of the water charges. This has been further confirmed by the data collected for selected distributaries where on the average 80% of the O & M cost is incurred on establishment of which 36% is on revenue staff and 44% is on Engineering and maintenance staff. (Table G-9). The water charges are fixed by the Government for each crop and the revenue staff measures the area under each crop every six months through and elaborate system of checks and counter checks to ensure that the area under crops is correctly measured and that the remission for partial or total failure of crops is correctly reported. The record is then transferred to the District Collector who recovers it through the Revenue Department. The water rates recovered during the 10 years (1984-1994) in Lower Jehlum Canal Command has almost remained constant with a maximum assessment in 1986-87 (Rs.79,441,176/-) and minimum of Rs.69,664,629/- assessed in 1992-93. (Table G-1 & 2) It is further stated in various reports that almost 100% of the small land owners pay their water charges regularly and it is the big land lord who is responsible for an approximate annual less recovery of 7% to 8% both due to under assessment and pure default. In case of crops failure the Irrigation Department has the powers to quarter, half or full remission in water charges but such remission is not very frequent. As per three years record of two Divisions of L.C.C, the average remission is less than 0.5 % after ignoring the pest attack on cotton of 1993-94 in Burala division. (Table 3) The same three years average rate of remission in the 12 selected distributaries is 0.4% only including the years of pest attack (Table 4).

G.2.3 O & M of Drainage System

The drainage in the project area is of two type. (a) Surface Drainage (b) Subsurface Drainage. The surface drainage is mostly through natural drains consisting of old

river beds or tributaries of the rivers. Some limited surface drainage has recently been introduced partly as a result of tile drainage system in Faisalabad area. Most of the sub surface drainage is done by tubewells both in the public and private sector. The public tubewells were installed under SCARP programme. A substantial number of these tubewells have either deteriorated or have become saline and abandoned. Where ever the public tubewells are used for irrigation (SCARPS) a drainage cess has been applied and is recovered along with the water charges. The NDP-I is aiming at rehabilitating some of the drainage projects, but emphasis is being given to transition programmes where the farmers are being given incentives to replace the large deep tubewells with high salinity to small shallow wells with comparatively low salinity. The success of the transition will reduce a large burden of operation and maintenance cost of these tubewells on the Provincial Government. The large surface drains are being maintained by the provincial government and its successor, i.e., PIDA. will take over these drains for maintenance. The operational costs, in the long run, will be recovered from the beneficiaries including the farmers. The farm level drains upto 15 cusecs discharge will be transferred to farmers organizations.

G.2.4 Role of Other Departments

Although operation and maintenance of irrigation system is in the exclusive domain of Irrigation department of the Provincial government yet other departments such as Agriculture (Agriculture Extension, Agriculture Research, Agriculture Engineering, On-Farm Water Management, Soil conservation, Animal Husbandry), Rural Development, Revenue , Cooperative, Food, Forest etc. are closely associated and effected by Water Resource Management.

The closest among them is the On-Farm Water Management of Agriculture Department which have done a substantial work on the improvement of water courses after the out let. This programme was introduced in 1976 under the U.S. Aid and is still continued. They have so far improved close to 21,000 water courses out of 100,000 water courses in Pakistan and claim savings in water by 28%, increase in cropped area by 13%, increase in irrigation intensity by 14.8% , increase in yields by 17% etc. The criteria for water course improvement was that there should be a water user's association who were to pay, initially, about 25% of the cost of improvement through labour input. This participation has been gradually increased to 50% by now showing a great success so far as water course improvement is concerned. The water users associations were formed under 1981 ordinance. The water user's associations got dispersed usually after the improvement for the obvious reason that they had neither been given any responsibilities nor powers to operate the water course - a requirement most important for sustainability of the farmers' associations.

The other function of the On-Farm Water Management was precision land leveling which was popular as long as a substantial subsidy was available but is rarely practiced by the farmers at their own being higher on cost as compared to the benefits particularly from food crops. They were also involved in the Command Water Management Project where improvement in the canal system was done by the Irrigation Department and the on-farm improvement was done by Agriculture Department. Although coordinators were appointed to coordinate their activities but the desired results could not be obtained. The coordination between the various departments is one of the most difficult problem because of water tight vertical hararchal system concentrating powers at the top of each department. The departments work in clearly defined narrow corridors and have little side vision or even respect for each other. Perhaps the farmers association formed at the distributary level with well defined powers and responsibilities but not limited by rules and regulations will play a powerful role to obtain other departments support and involvement in agricultural improvement.

G.2.5 Constraints for Irrigation System Management

During the team meetings with the farmers the constraints in irrigation system were high lighted in the following order of importance.

1. The water supply in the system is deficient to respond to the increased cropping intensity which in turn is essential to fulfill the food requirements of the increasing population. It was argued by the farmers that where as their parents and grand parents had more land to look after the requirements of the same family size, the farms got subdivided among their sons and grand sons to almost 1/10 th of the original size and therefore this small plot of land has to grow enough to fulfill the needs of a similar size of family. To do so more intensive irrigation is needed to grow two or three crops per year and consequently more water is required.

2. The irrigation management which was efficient and equitable has deteriorated in the last 30 to 40 years with the result that the canals are in disrepair and desilting of the system is usually deferred. The water distribution which was proportional to the land holding has become highly unequitable to the detriment of the tail farmers. The head farmers and the large farmers using their political and economic influence interfere with the system and draw three to four times more water than their authorized share at the cost of the tail farmers. They resort to use of pipe siphons in the distributary, breaking and lowering the crests of their water courses, making their animals stand in distributary just below their out lets to raise the water level in the distributary enabling their out lets to draw more water or some times even breaching the distributary. They

complained that the irrigation canal officers and staff which used to be highly professional in the exercise of their legal powers, a quarter of a century back, have been rendered power-less by the interference of the political system and therefore, the legal frame work used for equitable distribution of water has been totally dismantled and is rarely applied. They stated that during the last ten years no farmer has ever been punished under the canal and drainage act despite more frequent commission of crime of misappropriation of water. It was desired that the law should not only be made applicable but should be seen to have become applicable.

3. A large number of farmers interviewed stated that they have to pool their resources in order to make informal payments required for obtaining some what regular supply at their water courses. Such informal payments are equal or same times more than the formal payments of water charges and are on the increase.

4. Because of the shortage of water, their lands have become saline due to lack of leaching and higher use of tube wells, pumping water with far more salinity than canal water. At the same time the tube well water is many times more expansive than the canal water.

5. Loss of water by seepage, from distributaries was pointed out to be the last item. In fact the lining of distributary and minors was preferred more for system efficiency and equitable operation than for saving the water lost by seepase.

The department of irrigation on the other hand complained that

(i) The canal system has gone into decay because of lack of O & M financing by the government year after year resulting into deferred maintenance. The fixation of yard stick for financing the O & M, has not kept pace with the inflation on one hand and on the other the availability of funds lag far behind even the present yard stick revised some times in eighties (Table G-5, Figure G-4). In fact the O & M financing for L.J.C has not changed since 1984. The Government in the Finance Department complain that since there has been no revision in the water charges since early eighties, it is not possible for them to provide the necessary funds for O & M(Table G-5). They argue that return from agriculture to the farmers has increased more than twenty times since the sixties but water rates have only been doubled. In real terms the water rates have declined to one fifth or one sixth of the water rates paid in sixties. The farmers argue that since the services of irrigation system have deteriorated drastically and informal payments have over taken formal payments, there is hardly any justification for payment of increased water charges. They also complain that the national pricing policy of agricultural products does not

allow them to obtain the market prices for their commodities.

(ii) The irrigation department also accept the fact that there is enormous political interference in the legal, functional and administrative responsibilities of the department resulting into over all deterioration of the system. They are however, confident that the stoppage of such interference by political system, the provision of adequate finance for O & M and corresponding increase in water charges could revive the department to its old glory.

Further studies indicated that irrigation department is highly over staffed particularly at the lower level. In some of its functions which appear to be no longer necessary it could make itself far more efficient by trimming itself into a proper and manageable level. As has been stated else where the expenditure on staff consume more than 75% of the funds (in L.C.C. area more than 95%) available for O & M of the system (Table G-6~9). Obviously this situation should no longer be tolerated. It can be seen that of the three thousand five hundred and one (3501) staff of L.C.C the engineering staff is only 115 or 3.3% of the total (Table G-11). In L.J.C it is 3.2% (Table G-10). Almost the entire field staff except for some office functionaries and some regulation staff on main canal, is engaged on the secondary distribution system. One of the major element in the staff strength of distribution system is the revenue staff which could be rendered totally surplus by making one policy decision of changing water rates assessment to flate rate basis in place of current crop basis. This issue has been studied and raised at some level in the provincial Government of Punjab but has made no progress because of vested interest.

During discussion with farmers it was felt that the introduction of flate rate charges would pose no formidable problem. In fact almost in all the meetings it was stated by the farmers that this system would be most welcome as it would eliminate unnecessary interference of the Government functionaries with the farmers. On further study with particular reference to the two major project areas of Lower Chanab Canal and lower Jehlum Canal it was found, that the revenue staff was consuming an annual budget of Rs 45 million and Rs 28 million respectively on their salaries which was far more than maintenance and repairs requirements of the canals. From the data collected for the 12 selected distributaries it is further confirmed that almost 36% of the total O & M cost is incurred on the revenue staff which can be easily avoided if flat rate assessment is introduced (Table G-12).

G.2.6 Present Status of Farmers Organization for Irrigation Management

Farmer organizations do not exist in Punjab at the distributary level. Water User Associations, however, have been formed in various parts of the province under the On-Farm Water Management (OFWM) programme since the mid-1970s. The WUAs are best viewed as functional entities required by the OFWM Directorate to perform the specific functions associated with watercourse improvement. In this connection, they have been used largely to mobilize unskilled labour, collect farmer contributions for the civil works, and hire masons to undertake the lining and improvement. Once these tasks have been completed, the WUAs cease to function.

The formal management structure of the WUAs has been that of a closed shop: there is no requirement under the enabling legislation for WUAs 1981 to meet regularly to plan and review their activities and accounts. Virtually all powers of the members have been assigned in the legislation to a small committee. In the absence of open discussion and legal powers, the general body of the WUA is rendered impotent. Thus, participation is replaced by representation, and it is the representatives who interact with outside agencies and take decisions in the name of the farmers. In the actual process of implementation the supervisor / a government functionary of the OFWM has assigned to himself the pivotal responsibility of direction and decision making on behalf of the farmers and therefore the farmers representatives have been reduced to obey and carry out the instructions. Although the vision of the WUA, when it was first articulated in the mid-1970s, was that of a permanent farmer institution for irrigated agriculture, in practice the farming community has not been engaged in achieving this vision.

G.2.7 Present Program Relating to Farmers Organizations for O & M

(1) NATIONAL DRAINAGE PROGRAMME

In the early 60's a massive effort was made to control water logging and salinity by implementing SCARP Projects particularly in Punjab using the vertical drainage system recommended by "Master Plan - Initial Phase" by Harza Engineering International. Another revised action programme was prepared (RAP 1979 to 1990) which supplemented the farmer studies but did not pay more attention to the disposal of drainage surplus. Yet another study 'Water Sector Investment Planning Study 1990-2000 was carried out which looked into drainage and disposal problems.

Taking stock of this situation the Government of Pakistan in August 1991 under took an environmental assessment study of irrigation related drainage of which NDP was a conceptual part.

The drainage sector environmental assessment study of 1993 concludes that

(i) projects which mobilize salt from deep ground water storage needs to be avoided.

(ii) Additional surface water should not be supplied to areas which will need massive saline drainage.

(iii) None of the current methods of disposal within the basin seem environmentally acceptable and therefore National Surface Drainage System to carry the saline affluent to sea may be initiated.

World Bank examined the issue and concluded that there are no two opinion that the present state of affairs is fast heading towards the total collapse of the irrigation and drainage system in Pakistan. They further state that the poor performance of the drainage projects is due to deficiencies in policies and institutional matters and low priority given to O&M of drainage facilities in allocation and management of resources.

Provincial Irrigation Departments, once highly conscientious of their responsibility, have deteriorated in their professionalism and scientific management of their systems due to political interference, lack of recognition of talent, very low level of salries, over staffing and, lack of resources and training. They are over staffed to the extant that about 75% to 90% of their O & M budget is spent on salaries and utilities for staff and only 25% to 10% is left for maintenance, a substantial part of which is used under informal political directives.

The commulative effect is that the irrigation system in general and the drainage in particular have serious problems of (a) run drown projects, (b) shortage of funds for O&M and (c) lack of clear policy on sustainable investment.

NDP - I

The NDP-I envisages that the problems faced by drainage sector cannot be addressed in isolation by increased financial in put. It therefore recommends multi faced approach including institutional and policy reforms, initiating changes in the legal and regulatory frame work to allow farmers and private sector participation in improving

O&M, improving management of public expenditure to increase allocations for O & M.

The main components of NDP-I are :

(a) Policy Component: It was intended to provide a framework under which the donors, Government of Pakistan, Government of Provinces would agree on performance targets and arrangements to monitor: (i) size, composition, and sequencing of annual development expenditure on irrigation and drainage; (ii) criteria for selection of drainage scheme; (iii) annual recurrent O&M expenditure on irrigation and drainage; and (iv) cost recovery targets for O&M on irrigation and drainage. The policy component would also formulate policies to encourage private sector investment and farmers participation in construction and O&M of drainage.

(b) Institutional component: It was intended to provide technical assistance to : (i) strengthen capabilities of WAPDA and provincial authorities to plan and implement projects, manage water resources; (ii) supervise NDP-I; (iii) form Farmer Organization (FOs) and to train them to carry out on-farm drainage; (iv) design and implement regulatory reform for irrigation and drainage and (v) Monitor the environmental effects of irrigation and drainage i.e. environmental assessment and monitoring.

c) Research and studies component: It had to be designed for carrying out: (i) studies to prepare further projects and NDP-II; (ii) a Feasibility Study for the proposed National Surface Drainage System; (iii) studies to develop structures, and formulate the necessary changes in the legal and regulatory framework to permit formation , of FOs, PUs and PWAs; and (iv) drainage research.

d) Investment component: It was to provide financial assistance for early completion of locally funded ongoing drainage projects, rehabilitation of existing drainage facilities, improving operation and maintenance of drainage infrastructure and implementation of selected high priority new projects. The investment component of NDP-I would represent a time slice of GOP investment programme in the 8th Five Year Plan. However, it was not intended to be synonymous with the entire 8th Plan."

It further highlights each and every component in detail including the policy issues, institutional issues, technical issues, sustainability of drainage investments, O & M procedure and budgeting, recovery of service charges, beneficiary participation and investment component. It clearly brings out that future investment on drainage without

a comprehensive approach will not be sustainable.

(2) THE PROPOSAL FOR INSTITUTIONAL REFORMS UNDER NDP-I

The proposal for institutional reforms as given in the NDP-I is mainly concerned with the Water and Power Development Authority and the Provincial Irrigation Departments. The reforms in provincial Irrigation Departments and the formation of farmers' association for O&M are discussed in the draft ordinance. broadly the ordinance would establish Provincial Irrigation and Drainage Authorities (PIDAs) in each of the four provinces and Area Water Boards (AWBs) in the canal command areas. (Figure G-5) The PIDAs will be autonomous bodies controlled by a Board of Directors, the Chairman of which will be the Additional Chief Secretary Planning and Development of the three Provinces. In case of punjab it will be the Chairman P & D board. The Secretary Finance, Secretary Irrigation, Secretary Agriculture and some experts from outside will be the members of the board. The authority and its members will meet at least once in three months or earlier as the case may be and will be on a non-permanent basis. The authority will appoint a Managing Director and a Board of Management who will be responsible for day to day working of the authority. However, the corporate body will be fully empowered to hold property, to do planning and development of water sector projects within the provinces, to operate and maintain the irrigation, drainage & flood control systems. The autonomous Provincial Irrigtion and Drainage Authority will prescribe and collect fees and other charges from the farmers, obtain loans from national and international financial institutions and formulate financial policies, ensuring that finances of the authority are managed in a consistent, conservative and diligent manner and service its debts and obligations. The authority will have its own staff down to the operational level for developing and operating the system. During the transition period the authority is empowered to prepare and implement its own policies with a view to ensure that the staffing level within the authority and other entities conform with the corresponding level indicated in the plan prepared by the authority itself. It will enforce a freeze on hiring new employees, replacement of retiring employees, reassigning of surplus employees and introduce policies of financial and other benefits for voluntarily retirement. The authority will be fully operational within a period not exceeding seven years.

With regard to the existing employees of the Provincial Irrigation and Power Departments it is stated that the employees of such departments will become automatically employees of the authority. The authority would then prone and reduce the staff in the manner prescribed above. The authority will be financed through (i) water charges, sale proceeds, development cess and drainage cess etc. (ii) grant made by the Government; (iii) loan obtained from the Government; (iv) grant made by local

bodies; (v) sale proceeds of bonds etc. (vi) loan obtained from the financial institutions with the general sanction of the Government; (vii) foreign assistance or loans from foreign agencies with the approrel of the Government

(3) FIXATION OF WATER CHARGES BY THE AUTHORITY.

The Authority is fully empowered to revise water charges under a well established procedure. The Authority will be working under Provincial Government.

(4) AREA WATER BOARDS (AWBs)

The Government will establish AWBs under the control of the Authority for canal command areas within a period of 90 days. Constitution of the AWBs will include a Managing Director, two elected representatives of farmer's organizations, a representative of the authority, Director Agriculture, two technocrats with proven background in water resources management and finances, one member representing the Government.

Under the above board there will be established a Board of Management under the Managing Director with two or three members.

(5) FUNCTIONS OF THE AREA WATER BOARDS

1) To received water supplies from authority and deliver the same to the farmers' organizations at distributary/minor level.

2) To receive drainage affluent from the farmers' organizations and convey the same through relevant drains.

3) To establish the water rates to be charged from the farmers both for supply of irrigation water and disposal of drainage surplus. The AWB will be delegated the powers of the authority both for managing, operating and developing water resources and recovery of charges from the farmers.

(6) FARMERS' ORGANIZATIONS

The ordinance specifies that within one year of the formation of AWBs they will implement pilot programme policies and take steps there under to ensure that farmer's organizations are formed at minor/distributary level in a phased and orderly manner. The farmers' organization so formed should be made financially self sustaining and self sufficient for the effective performance of their functions within a maximum period of four years. The authority shall within six months of its coming into being

publish bye-laws and regulations relevant to the formation of farmers' organization in the provinces.

(7) FUNCTIONS & POWERS OF THE FARMERS' ORGANIZATIONS

1) To manage, operate and improve the irrigation and drainage infrastructure located within the area under their jurisdiction.

2) To obtain water from AWBs concerned at the head of the distributary/minor and supply the same to water users.

3) To receive the drainage affluent from water users and convey the same through field/collector drain to designated nodal points of the drainage system.

4) To collect the agreed water charges and other dues from its water users and pay the agreed consideration for the supply of irrigation water and conveyence of drainage affluent to the AWBs concerned.

5) To engage, hire and employ any consultants, advisors and employees for the performance of their functions and powers on their own prescribed terms and conditions.

6) Any other powers which may be porescribed under regulations prepared by the Authority.

The farmer's organizations will be corporate bodies but they have not been empowered to transfer or dispose of any assets given or transferred to them.

The statutes also provide for appointment of Provincial Water Commissioner who will resolve disputes between the authority, the AWBs, the Farmers' organizations and the water users under a given procedure.

G.2.8. Comments on NDP

As a result of the NDP-I discussed earlier, the donor agencies including the World Bank, Asian Development Bank and the OECF desired the Government of Pakistan to undertake institution related reforms in the Water and Power Development Authority and the Provincial Irrigation Departments of the four provinces. The donors insisted that the approval of the loans for NDP-I will be subject to the initiation of the institutional reforms by the Government of Pakistan. Frequent contacts were made between the donor agencies and the Government of Pakistan and it was tentatively decided that Government of Pakistan through a statute will introduce the institutional

reforms on 1st July 1996. A draft ordinance was prepared by the GOP and sent to the donors in March 1996 for their comments, if any. The donor agencies considered that the draft statute did not reflect the understanding reached between the donor agencies and the GOP. A delegation of the Pakistan Government duly represented by the four provinces visited the World Bank at Washington and held series of discussions in April/May 1996 on draft statute for institutional reforms. Since the Pakistan delegation did not have any mandate to make changes in the earlier draft statute, it was decided that a workable draft statute be prepared through informal discussions between the GOP, Provinces and NDP Donors. However, the donors informed the Pakistan delegation that there is substantial degree of urgency associated with enactment of this statute by July 1, 1996. During negotiations in June 1996 it was decided that Government of Pakistan will issue the statute on the above date and then the bank management would present the loan request to the Board. On return of the Pakistan delegation to Pakistan a task force was established by the Government of Pakistan to go into informally proposed statute and expedite the finalization. The Task force has finalized the draft statute, through intensive negotiations and lengthy discussions between the provincial and Federal Governments in Dec. 1996. The draft statute agrees to the formations of PIDAs, area water boards and farmers organizations at distributary level on pilot basis. This draft statute has now been promulgated as an Ordinance on May 29, 1997 giving broader parameters of establishing PIDA in Punjab (copy at Attachment C).

G.3 Farmers Meeting

G.3.1 General

The Interim report prepared as a result of Phase-I field study contained the basic concept of institutional reforms needed in the light of constraints presently experienced by the farmers of the three target canal commands of Lower Jehlum canal, Lower Chanab canal and Central Bari Doab canal. This report was discussed with the Irrigation & Power Department of Government of Punjab, on October 14, 1996. The minutes of the meeting are appended as Attatchment C.

During these meetings the issues of present constraints and proposed Institutional reforms were discussed at length. Except for certain phraseology used in the statements of the farmers while high lighting the constraints, the proposal was accepted to be adopted on a pilot basis.

In response to the observation of the irrigation department on the interim report that the size of sample was very small to rely upon with respect to the constraints high lighted by the farmers, the team organized additional meetings along the selected 12 Distributaries in the head reach, middle reach and tail reach where the distributary was very long, and in the head and tail reaches where the distributary was a short one. In this way 24 meetings were held in November, 1996 in addition to the seven meetings held in May-June,1996 jointly involving about 1200 to 1300 farmers. These meetings were intended to elicit an articulate response from the farmers regarding their under standing of the current situation and their prospective for a more equitable and sustainable system of water management at the distributary and minor level. This participatory appraisal involved direct dialogue with farmers at the locations along the distributary given in Figure G-8 and in the Table below;

Lower Chenab Canal

Day	Date	Time	Village	Distributary	Minor	Location
Saturday	09 Nov, 1996	1200	361 JB	Gojra	Gojra	Head
		1400	95 JB	Nasrana	Nasrana	Tail
		1600	369 JB	Gojra	Gojra	Tail
Sunday	10 Nov, 1996	0930	437 GB	KillianWala	KillianWala	Head
		1300	453 GB	KillianWala	KillianWala	Middle
		1530	KillianWala	KillianWala	KillianWala	Tail
Monday	11 Nov, 1996	0900	241 GB	Mungi	Mungi	Head
		1200	251 GB	Mungi	Mungi	Middle
		1600	536 GB	PirMahal	PirMahal	Head
Tuesday	12 Nov, 1996	0930	269 GB	Mungi	Mungi	Tail
		1200	660/1 GB	PirMahal	PirMahal	Middle
		1430	674/15 GB	PirMahal	PirMahal	Tail

Lower Jehlum Canal

Day	Date	Time	Village	Distributary	Minor	Location
Saturday	16 Nov, 1996	1100	22 / SB	Kirana	Kirana	Head
		1400	90 / SB	Kirana	Kirana	Middle
Sunday	17 Nov, 1996	0900	16	Hujjan	Jaspal	Tail
		1200	Kot Raja	Hujjan	Kot Momen	Middle
		1415	Hujjan	Hujjan	Hujjan	Head
Monday	18 Nov, 1996	1200	84 / NB	Pindi	Pindi	Tail
		1300	104 / SB	Kirana	Malkana	Tail

Central Bari Doab

Day	Date	Time	Village	Distributary	Minor	Location
Saturday	25 Nov, 1996	0900	Sirhali Khurd	Thamman	Thamman	Head
		1200	Thea Roosa	Thamman	Siharan	Tail
		1400	Kaly	Chinna	Kalu	Tail
Monday	26 Nov, 1996	0900	Matta	Chinna	Chinna	Head
		1200	Chinna	Chinna	Chinna	Tail

The JICA team was composed of two JICA specialist viz Mr. T.Othani, the Team Leader, and Mr. A.R.Mahsud, the Institutional Expert, supported by Mr. A.R.Saleemi a local consultant specializing in Socio Economic development including Institutional reforms. Some of the meetings were also attended by local counter parts.

The application of this approach engendered a very strong and articulate response from the farmers during the appraisal. Farmers expressed acute dissatisfaction with the current Water management practices particularly at the distributary and minor levels. Free and creative discussion between farmers and JICA team members resulted in rapid emergence of key issues.

G.3.2 Present Conditions of Irrigation O & M at Head, Middle and Tail Reaches

Farmers in the head reaches of the distributaries did not make any severe complaint against the inequitable distribution of water but they did indicate that their was a general shortage of water for the present cropping intensities and therefore, some of their colleagues in this reach indulge in unauthorized use of canal water by putting siphon pipes in the distributaries and interfering with the outlets. The head reach farmers particularly in the areas where ground water was sweet, used private tube wells to supplement canal water and obtain much higher intensities of irrigation. This sweet ground water apparently resulted from distributary seepage at the head, as these tube wells were generally located in the near proximity of the canals. However, even these farmers complained about the intermittent canal closures that did not ensure a regular and plentiful water supply. The outright admissions by these head reach farmers, that they did induldge in unauthorized use of caval water, confirmed the oft repeated complaint of the tail water users that they (the head farmers) are drawing more water than their authorized share.

The consistent complaint from farmers at the middle reaches was that too much water was being appropriated by the upstream farmers. Lack of proximity to the canal meant that augumentary irrigation from tube well at the middle was drastically less than the head reaches because of brackish ground water.

Most tail-end farmers received severally restricted and irregular quantities of canal water and were forced to depend largely on brackish tube well water. (Figure G-6)

The exceptions to this pattern were two tail reaches (at the Mungi and KillianWala distributaries), where all surface water sources had been permanently closed off for over a decade, forcing farmers to pump up sweet ground water from a steadily falling water table of a possible aquifer, endangering future access. At the Mungi and KillianWala distributary tail reaches, one village alone had 40 tube wells of 25 horsepower each, drawing water from a depth of 22 meters. The water table was reportedly falling at a rate of 45 cm per year. With this fall of water table, the differential head in the adjoining saline aquafer could trigger ground water movement resulting in salinization of the sweet water zone (see Table G-13).

Government owned and operated tube wells have been installed for lowering overly high water tables. They are mostly out of order, except for one location (head reaches of distributary on the Lower Jehlum Canal) where two operative tube wells were observed pumping sweet water into the watercourses.

G.3.3 Water Transactions

(a) Informal Water Transaction: No incidents of canal water sales were reported. Informal ground water markets have established themselves at the head reaches where sweet ground water from tube wells is available. An hour pumping of tube well is transacted between Rs.50 to Rs.80 per hour. At this rate the water charges for an acre of Wheat crop from sowing to maturity dependent on the tube well water alone would be Rs.600 to Rs.1000. At the middle and tail reaches where tube wells yield brackish water, water markets transform to informal non-cash reciprocity transaction between allied farmers kin groups. In this zone, tube wells are usually rudimentary boreholes fitted with pumps to which tractor power is intermittently applied by individual tractor owned farmer as and when water is needed.

(b) Formal Water Transaction: The only formal water transaction is the *abiana* or seasonal water tax, which is ostensibly applied for the supply of surface water to farmers. Farmers were aware that this taxation has been rising regularly over the years, although the actual supply of water has become more irregular.

G.3.4 Farmers Perception of Management Problems

(i) The participatory nature of the appraisal ensured constant interfacing with farmers in order to achieve a deeper understanding of their perception regarding powers around water that impinged directly or indirectly upon the adequate and timely supply of irrigation water. These powers were identified by the farmers as primarily being the Irrigation Department and influential local farmers / politicians. Farmers openly aired their grievances and put forward their ideas about what they believed to be an ideal situation.

(a) Irrigation Department: Farmers wrath was directed at the line departments in general and the Irrigation Department in particular, whom they held directly responsible for the current situation. The wide spectrum of grievances listed by them included;

- dry mogas with no water supply for years
- lower officials in connivance with the head reach farmers let them use more water than authorized
- no punishments or sanctions for water theft
- farmers fined collectively (*tavan*) for individual water criminality
- deliberate damage of irrigation works by miscreants to fine innocent farmers
- no registration of police cases without acquiescence of irrigation department
- corrupt water gauge operators
- faulty design of irrigation an drainage works
- unscheduled closures of minors and distributaries
- not adhering to water share schedule
- no desilting of canals

- destroyed banks and silted beds yielding below authorized discharge
- farmer initiatives in mending breaches charged as official works
- water taxes charged even if no canal water used by farmers for years
- bribes extracted regularly for illegally increased outlet dimensions
- no response to grievances by small farmers.

(b) Influential Farmers: Influential farmers and politicians were held directly responsible for intimidating and influencing irrigation department officials and perpetuating inequity in water management. Among other aspects, big and influential farmers and politicians in the areas studied were accused of the following;

- placing of obstacles (including buffaloes) down stream of outlets
- intimidation of Irrigation Department officials on official duty
- widening of outlets
- using unauthorized pipe siphons for increased water share
- bribing officials for sanction of increased water for non existent gardens and fish farms
- manipulating honest Irrigation Department officials posting and transfers by members of parliament
- non-perennial operation of distributaries illegally (closed one week in a month)
- creation of unauthorized additional outlets at cost of other farmers
- diversion of subsidized gypsum for sodic soils away from small farmers
- night theft of water by erecting temporary bunds down stream of outlets.

Thus a much larger sample of farmers from the project area not only confirmed the constraints given above but added the area specific constraints also.

(c) Water Rates Assessment: Most farmers thought that the current water charges were not high. They were also aware of the fact that the Government was actively considering imminent increase in these charges. there was considerable resentment among those farmers who had to pay water taxes even though they had not received any canal water for decades, where as influential farmers paid the same nominal rate while enjoying illegal access to water.

When further asked about the current low water rates, the farmers indignantly retorted that the cost of each moga to remain at authorized discharged over the year was Rs.10,000 paid informally in addition to the formal water charges. They said that this was in effect the true water rate being paid by them without the concomitant services from the official departments.

The official with the highest visibility at the moga level is the water tax assessor - the irrigation Patwari. This official is charged with the assessment of a minimum annual amount of revenue from a given surface irrigation network. His current role is perceived by farmers to be dysfunctional, as the system has remained static over several

decades. For example, in former times, a tax relief was given by the Patwari for crop failure or for land destroyed by floods or salinity / water logging. This relief, known as *kharaba* is now unknown to the farmers participating in dialogues with the JICA team. Similarly water charges are levied by this official even on land that is fed exclusively by tube well water at the farmer's own expense under the pretext that it lies under command of a given irrigation channel.

(ii) **Objectives:**

Dialogues with farmers indicated that their desired objectives were clearly articulated, even if the mechanism for achieving these objectives was not. Farmers were unanimous about their felt needs, which saliently included;

- complete lining of the distributaries and minors with well-secured banks upon which motor able paths were constructed; the lining should be deigned to accept the authorized discharge and not the currently low discharges
- increase in water supply if possible to respond to the present intensity
- construction of flow gauges at control points to measure actual discharge at various points
- tamper proof outlets of heavy gauge steel lining
- management by competent incorruptible persons familiar with local farming systems
- any new outlets should be built only after a concomitant increase in irrigation water in the disttibutary / minor was ensured at the canal head gate
- adequate arrangements for buffaloes to prevent them from damaging minors/distributaries/water courses
- mogas to be designed according to the actual water requirements of the land; in particular the level at the tail reaches be correct
- illegal supply of water to influential farmers be stopped
- closure of distributsries / minors should not be beyond the annual canal closure period
- acceptance of farmer reports to police without Irrigation Department involvement
- provision of water according to the authorized discharges
- realization of heavy fines and other sanctions for water theft and water related crime.

G.3.5 Farmer Perception of Management Options:

After concluding the initial dialogue on grievances and desired situations outlined above, attempts were made to develop a farmer consensus about a workable solution to the constraints and moving towards a realistic attainment of desired goals. The farmers were, therefore, asked to comprehend and perceive various management options that could bring about such an attainment.

Farmers were not aware of detailed mechanisms for achieving such a plan, nor was any reflection on their part forth coming about possible solutions to their current

unsatisfactory condition. In fact their responses consistently perceived the problem as being of an external nature and thus, alien to their every day lives. Water received from distributaries / minors was perceived as an external public utility service for which the farmers paid. However, after a great deal of time and patience the following three perspectives emerged which were discussed one by one to arrive upon the best solution.

(a) Improvement of the Existing System: Farmers initially believed that the solution lay in the physical improvement of surface water supply which included increased availability, lining,proper maintenance of canal banks and correct outlet installation and design. Regarding the irregularities committed by both the line departments and influential farmers they vehemently stressed that all political influence should be removed from the institutions and all postings and transfers should be made on merit only. Strict and honest persons should be made responsible for the water distribution and maintenance of canals and in case of any default heavy and exemplary punishment should be awarded. The pre democracy (1971) conditions of institutional independence should be restored.

Controversy among farmers arose on this point, as no one was sure about who would bring about such a change. Many farmers wanted a just dictatorial system instead of democracy, as elected representative of the people were perceived to be the root cause of corruption.

(b) Contracting Out the Distributary / Minor: The dominant popular ideology currently operative in the country is the *theka* , i.e, contracting out requirements of goods and services. The farmers participating in the discussion were no exception to the rule and chose the contracting option as a viable one. they believe at the outset that the Government should hold periodic auctions of minors / distributaries, in which private contractors would be entrusted with their management. These contractors would pay water tax to the Government from the amount appropriated by them from the farmers as water charges.

A lively discussion on this option soon revealed to the farmer that such a contractor could become an exploitative middle man looking only after the interests of influential farmers who could pay higher water charges under the table. The initial naivety of the approach was soon overcome by the pragmatic farmers, who began to realize that such an operation on the ground would certainly not solve their problems or bring them closer to their desired objectives, but would cause further inequity in water distribution.

(c) Farmer Management: After discovering flaws in the above two options, the discussion

moved on to the novel approach of farmer-managed surface water supply. Farmers were confident that if the management of the distributary / minor was given to them, they would be able to manage the water adequately. They emphasized that the preconditions for such a farmer-managed approach would be at least;

- an agreed upon discharge with safeguards ensuring the correct amount of water emanating from canal to distributary / minor
- complete lining and strengthening of embankments throughout the length of the distributary / minor
- formation of village committees empowered to fine defaulters with police recognition of these committees
- election to these committees should be by the farmers only and be non political
- the time frame and validity of these committees should be for a maximum period of two years - preferably one year
- monopoly on such committees by influential and big farmers should be avoided and ensured by law.

G.3.6 Institutional Reforms and Farmers Organization - A Proposal Jointly Evolved with Farmers:

Discussions moved on to the final phase of modalities and mechanisms required for farmer managed distributaries and minors. The discussion encompassed a wide variety of related themes including the composition and constitution of committees both at the water course and at the distributary level; responsibilities, powers, privileges and remuneration to the office bearers of such committees; the linkage of such committees to the line departments and their standing as a legal body.

The farmer consensus resulted in the formation of a tentative plan for farmer management of water resources up to the distributary / minor level. This plan is outlined below. Framers created and agreed to this plan with the three main reservations that;

- comprehensive training and initial technical assistance was to be provided to them by neutral people (such as you (JICA team))
- the plan should enjoy complete legal cover under notification by law
- the farmers committee should have funds for operation and maintenance of the distributaries.

(i) The Farmer's Character:

There would be two-tiered committee structure, the apex committee being in charge of the distributary / minor and the base committees dealing with all watercourses emanating from a specified distributary / minor.

(a) Water Users Association: Each water course taking off from a distributary / minor will have a 3-member (one Chairman and two members) Water Users association (WUA)

voted in by an electorate consisting of the share holders in the watercourse CCA. Each share holder will have one vote, regardless of size of holding. The committee will be elected for a maximum period of 2 years.

The WUA will be registered with the Corporate Law Authority (CLA) and a bank account will be opened in the name of the WUA, carrying the name of watercourse. The account will be operated by cheques bearing all three signatures of the WUA members.

Such committees will be constituted for all the watercourses taking off from a distributary, regardless of their number.

(b) Farmer Organization: The Chairmen of the WUAs will become members and will constitute the electorate of the Farmer Organization (FO) and will have one vote each. Voting will be in two rounds: one round of voting will select the Chairman, second round will select member finance, member technical and four FO members in such a way that out of the total of seven members at least four are from the lower half of the distributary including the member of finance..

The FO will also be registered with the CLA and joint bank account will be opened in the name of the FO with the title identical to the name of the distributatry. The operation of the account will be possible only with the signatures of all three office bearers members.

(c) Powers of FO: The powers of the Chairman of apex committee (FO) would be identical to the powers currently held by a Divisional Canal Officer (DCO) of the Irrigation Department and that of member technical will be analogous to Subdivisional Canal Officer (SDCO).

The validity of all elections under this process would not exceed two years, nor would previously elected candidates be allowed to run for any subsequent office. However, to keep some experienced members in the new FO, 50% of the WUA members could be retained for three years for the first time only. As to which of WUA should be for three year may be decided by a draw.

(d) Auditing Arrangements: Both the Watercourse Committees (WUAs) and the Farmers Organizations (FOs) will be subject of audit by the Office of the Auditor General, Pakistan Revenue or any other competent authority of the Provincial or Federal Government.

(e) Meetings: The meeting of the seven member Executive of the FO will be mandatory once a month. The complete FO will meet at least every three months and will be paid a

specific attendance honorarium. During the FO general body meeting, the FO Chairman will present a statement of income and expenditure to the general body for information and de facto audit. This would also forestall any incidence of corruption at FO level. In order to reduce expenses and make attendance effective the outlets in a village or adjoining villages may be grouped togather to chose one group leader for FO meetings.

(ii) Water Supply Contract:

The relevant line departments would be bound by contract containing checks and balance to ensure a mutually agreed upon regular discharge at distributary head. This contract would be negotiated every two years between the relevant line department and apex committee.

All subsequent maintenance, repair and other upkeep of the distributary / minor and watercourses would be the responsibility of the respective committees constituted for this purpose.

(iii) Water Charges:

Presently the water rates are charged on the basis of crops grown with in the command of a canal, irrespective of the fact whether it has been irrigated by canal water or from a private tube well. Instances in the tail areas of these distributaries were available where the water rates were charged on crops entirely irrigated by tube wells as no water was stated to have been received during the last 10 years. Further, the irrigation Department employs a large staff for assessment of water charges in each cropping season allocating a large Operation & Maintenance budget to this operation.

On the other hand, however, the water is supplied on Rota system in accordance with land holding of the farmers irrespective of what crops they grow. The system is, thus, anomalous and contradictory to the extent that water charges has no relationship with the water supplied but is related to the crop grown by the farmer. This was highly resented by the farmers and they wanted that water charges should be related to the supply of commodity . It was discussed in great detail by the farmers among themselves and with the team . The consensus was that since the quantity of water supplied was proportional to land holding only it will be rational to charge water rates on the same basis. Where as, it will make the assessment and collection much easier, it will also do away with the present system of charging water rates for crops grown by the farmers from their own tube wells. This system will also substantially reduce the cost on assessment and make it very easy for the farmers to assess and collect water charges themselves with out involving any seasonal or yearly assessment . Since the rates will be charged seasonally on the basis of land owner ship it will remain constant

unless there is a change in water rates or a change in the owner ship of the farmers . This system was very much preferred by the farmers. This preference when translated to operational terms would mean that the water charges assessed per season at the time of transfer of the distributary will be divided by the total C.C.A of the distributary to arrive upon flate rate for that season. The same process will be repeated for the ensuing season. In this way the water charges will be fixed per acre and recovered accordingly. It will have the advantage that the manipulation by the assessor will be eliminated and so will be the assessor himself.

(iv) Financial Arrangements:

The maintenance of distributaries and watercourse requires funding. In addition, the functionaries elected from the farmers will have to be paid a regular salary or perdiem.

Currently, the Irrigation Department is responsible for distributary maintenance with a large number of functionaries, whose salaries are also paid by the department. All these expenses are perceived by farmers to be realized from the water charges.

Under the new proposed financial arrangements, the water charges will be paid by the Farmers Organization (FO) to the relevant department after deduction of maintenance and repairs costs and salaries currently being paid to Irrigation Department staff working on the distributary. A mathematical relationship will be established between the expenses on distributary and that on the parent canal system for future use.

These savings will constitute a generated fund to be used by the farmers' elected functionaries at the distributary level. The expenditure will include maintenance costs and functionary salaries.

The Chairmen of the Watercourse Users Associations will pay themselves a salary equivalent to 2% of the water charges levied on his watercourse, while a further 3% would be paid into the account of the WUA. This amount (5%) is currently being paid as a commission to the Numberdar, whose services would not be required once such an organization is in place.

The remaining 95% of the amount collected as water charges would be paid to the FO who after deduction of its agreed share, would pay the amount to the Irrigation Department / P.I.D.A. This deduction would ensure the salaries of staff and upkeep of the distributary by the Farmer Organization.

G.4 Institutional Development Plan for O&M

G.4.1 Basic Institutional Development Concept

As stated earlier under NDP-I, the Government of Pakistan, the Government of the Provinces and the donor agencies are presently debating the transformation and reorganization of the irrigation departments of the four provinces into autonomous Provincial Irrigation and Drainage Authorities (PIDAs) who should have equally autonomous Area Water Boards for each canal command or a group of canal commands. The Farmers' organization on a pilot basis should be set up at each of the distributary / minor with equal autonomy for the area under the distributary. These bodies should be self financing after an initial period of 3 to 7 years.

While this top-bottom institutional reform presently being considered by a task force, falls in line with the concept of JICA study team, the team would recommend the setting up of the farmer's organizations at the distributary level on pilot basis in the pilot project of Lining of Distributeries and Minors in Punjab. It would concentrate on the formation of farmers' organizations, their method of election and selection of office bearers, their registration under the corporate law as non profit entities, their structures with appropriate checks and balances, the legal requirements for delegation of suitable legal and financial powers and the transfer of facilities from Irrigation department to the FOs. This bottom-top approach could be introduced irrespective of the fact whether the over all system remains with irrigation department or it is transformed into PIDAs/Area water boards - an issue which may take some time to resolve. However, the transfer of the secondary distribution system and the lining of distributaries and minors should be so linked that the institutional reforms become a compulsory part of the lining project. Since both the interventions are being tried on pilot basis it would be necessary to finance both the interventions together making the hard ware (lining of distributories & minors) as incentive for the institutional reforms (soft ware)

4.2 Proposed Farmers Organization

It is proposed that farmers should be organized at two levels for operation and maintenance of irrigation system at distributary level;

1) Water users' associations at water course level (WUAs).
2) Distributary Farmers' organizations (FOs).

During the meetings with the farmers along the 12 selected distributaries some of them suggested that instead of each out let represented on the distributary farmers association

(FO) one member from a group of outlets irrigating a village or a chuk, may represent such group of out lets. This was particularly a view of the farmers where the distributary was very long and had many outlets. The augment has a weightage on the following seven out of the 12 distributaries which have more than 70 out lets each.

Distributary	Length in Km	CCA Acres	No. of out lets	No. of group members
Huggen	80.13	62,359	122	28
Kirana	107.13	89,754	188	52
Nasrana	81.42	85,686	175	49
Mungi	41.29	47,347	97	28
Pir Mahal	82.13	46,196	103	28
Killianwala	52.71	51,938	114	34
China	33.27	40,498	88	23

Since the number of out lets are large, the distances are long and the communication facilities are poor it will be very difficult and costly for the farmers to attend the meetings of the FO. Besides such a big gathering of farmers can barely make any cogent and serious decisions and their meeting will turn into social gathering rather than putting out any concrete work.

The out lets on these seven distributaries have therefore been so grouped together that each group will represent one two or three villages comprising of three to six out lets and the three to six water users associations will select one group leader among themselves to represent them at the level of farmers organization.

However this arrangement will only be used to make meetings more convenient for the farmers and the distributary farmers organization more compact and workable. Reference is made to the schematic diagrams of these seven distributaries (Figure G-9) in which a preliminary grouping based on the villages/chuks has been made and thus the number of working members of FO has been reduced to 23 to 52 members per distributary. This grouping will be finally decided by the farmers themselves and in case they decide against the grouping it may not be pushed as farmers should be given full freedom to make their own decisions.

1) Water Users Associations (WUAs):

The water courses usually serve 20 to 100 farmers. The water course Farmers' associations to be called the Water users' association (WUAs) should have all the farmers of the water courses as its members. The formation of the water users associations will be a compulsory requirement for lining of the distributary. The farmers shall include the owner farmers and the lessee farmers and not the share croppers.

The owner farmers shall be defined to be the farmer in whose name the land is recorded in the revenue record. In case of a deceased farmer where the land has not yet been transferred, only one member of that family shall be considered as the farmer. All members of the Water users' associations will have one vote each irrespective of the size of the land (for example, farmers having a land of two acres and having land of 200 acres will have one vote each).

Election of Managing Committee by WUAs:

The member of the Water users' associations (WUAs) will elect their Chairman, Secretary and three members Managing committee for a period of two years. The Secretary during the 1st term may be elected for a period of one year so that their term is staggered and experience is passed on to the next elected body. The Chairman, Secretary and members of the Managing committee should be on rotation so that a farmer once elected should not be re-elected unless 100% of the farmers vote for the same person.

Duties, Responsibilities and Powers of the Water users' Association:

i) To elect their Chairman, Secretary and Managing Committee.

ii) To keep the water course and the field drains in a good state of operation.

iii) To decide the warabundi (water turns) cases by majority in pursuance of the rules under canal & drainage act.

iv) To collect the water rates from farmers according to agreed rates on flat rate basis and transfer the major amount to distributary Farmers' association. Some portion of the water rates to the agreed between WUAs and FOs shall be retained by them for emergency repairs to the water courses and paying commission to the collector of water charges.

v) The funds shall be kept by the Secretary of the association and the books should be available to be checked by any farmer.

vi) The Chairman of the Water users' association should have the same powers as hither to exercised Numberdar of the village.

vii) Since the water charges will be recovered on flat rate basis the Secretary of the association shall have the basic land record of owner ship of all

the farmers and the water charges based on the area shall be payable once in six months, i-e, in June and December.

viii) In case of default in payment of Abiana or theft of water by any farmer, a meeting of the association shall decide by majority regarding the punishment to be given to the farmer. In case of a split the Chairman shall have the casting vote.

ix) Any expenditure from the funds shall be decided by the Managing committee in emergency but such decision shall be placed before the water users association in their next meeting.

x) Ordinarily decision regarding the deployment of funds shall be done by majority of the farmers attending the meeting of the association. However, for such decision the quorum shall be more than 50 % of the farmers, whereas for ordinary meeting the quorum shall be 33 % of the farmers.

2) Distributary Farmers' Organization:

i) The distributary level Farmers' organization should be called FOs. In order to give equal participation to all farmers' associations at the distributary level the Chairman of the water course Water users' association shall be the member of the distributary Farmers' organization. However, in cases where the distributary is very long and is having more than 70 water users associations, 3 to 6 out lets will be grouped together to avoid crowding at the level of farmers organization. A group leader may be elected by the chairman of water users associations from among themselves. Thus FOs will be federation of basic Water users' associations. This will save them from involving in politics and at the same time it will give equal representation to all the water users. The members of the distributary Farmers' organization will elect their Chairman, member technical, member finance and four more member to form Managing committee subject to the conditions that at least four members of the seven members of the managing committee are to represent the tail half of the distributary. All the members should have a two years term or a term of his own election at the water course level which ever is earlier. The Managing committee will however, continue for a period of three months after fresh elections, without any powers, to smoothly transfer their responsibilities to the new committee.

The members of the Managing committee including the Chairman member technical and member finance should be elected on rotation so that a farmer once elected should have the chance of re-election after a long time.

The distributary farmers' organization should also form a vigilance committee of three members to over see the working of the managing committee and to report to the FO. at the time of its meeting. They should also participate in the meeting of the managing committee but should have no voting rights.

ii) Terms of Appointments:

The Chairman, member technical & Member finance shall be salaried office bearers of the organization paid out of the funds of the distributary at rates to be decided by the FOs in the absence of office bearers. The other four members shall be paid their daily and transport allowance for the meetings to be decided by the farmers organizations.

iii) Responsibilities and Powers of FOs:

a) To operate, manage and improve the irrigation and drainage infrastructure comprising of, minors, distributaries and drains together with any structure thereon located within the Area relevant to the FO concerned.

b) To obtain irrigation water from the PID. or its successor concerned at the head of the distributary and to supply the same to their members and other water users, if any. For this purpose they shall enter into negotiations with the PID for fixation of water charges after they have obtained the views of the farmers at the water course and distributary level. The charges to be paid to the PID for supply of water and disposal of drainage shall be commensurate with the services provided by the PID. The agreement with the PID shall also stipulate that the PID will supply water at the distributary head in accordance with a predecided schedule which should normally follow the authorized supply of the distributary or the last ten years hydrological record. The agreement should clearly indicate that any reduction in water supply, for example, by more than 5 % shall effect a corresponding reduction in water charges which

reduction should be twice the reduction in water. A gauge shall be fixed at the head of each distributary and the gauge register maintained which will show the total discharge of the distributary each day. The register will be posted and signed by the representative of the PID and the authorized representative of the FO at a predecided fixed time each day.

c) To receive the drainage effluent from their water users and to convey the same through field / collector drains to the designed nodal points of the drainage system.

d) To engage, hire or employ any consultants, advisors and employees as may be deemed necessary or be otherwise reasonably required for the due and effective performance of various powers and functions on such terms and conditions as may be prescribed including terms and conditions relevant to the continuation or premature termination of such engagement etc. of any consultants, advisors or employees, as the case may be.

e) To collect the agreed water charges and other dues from its water users and pay the agreed consideration for the supply of irrigation water and conveyance of drainage affluent to the PID. concerned.

f) The Chairman Farmers' organization shall have the same legal powers as that of Divisional canal Officer (D.C.O) and the member techanical as that of a subdivisional canal officer (S.D.C.O)with in the jurisdiction of the distributary to deal with defaulters committing unauthorized use of water, interference with outlets, cuts in distributary banks, use of siphons, willful damage or ponding of water by animals and non payment of dues etc. Any other power and functions, not being inconsistent with the functions and powers given in the statue, may be vested in the FOs under the Bye-Laws and Regulations framed by the authority / government.

iv) <u>FOs To Be Bodies Corporate:</u>

FOs shall be bodies corporate under the normal law who may own and dispose off moveable and immovable property, and sue and be sued in their own names. All the proprietary rights of the Irrigation department

with in the jurisdiction of the distributary including land, structures and buildings shall be transferred to the FOs. The FOs may own, buy or dispose off any property provided that the property transferred to FOs from Irrigation department / or its successor shall not be disposed off without the later's consent.

v) Resolution of Disputes:

In order to resolve any disputes between the farmers organization & irrigation department/PIDA or among the farmers themselves, water commissioners should be appointed under the law in the three zones who may be the session judges of the distract in which the dispute takes place or the director of agriculture of the zone and their decision shall be final and binding on both parties.

G.4.3 Logic of Proposal for the Project

The logic of the proposal may be summarized as follows:

- The FO has to undertake the O&M of the Project Distributary and collection of water charges ; therefore, the O&M and water charge collection process are the basis for the functions, staffing, structure and financing of the FO.
- As the FO is a non-existent entity, a process of organization development has to be undertaken by the project to create and establish the FO and enable it to take over the distributary system.
- A process of technical assistance, including design and implementation phases, is needed to undertake the organizational development of the FO, as neither the Irrigation Department nor the farmers themselves are in a position to do this.

The conceptual basis of the design is, therefore, defined by three key processes, namely, O&M, Organization Development and Technical Assistance. Related to these, two additional processes are also outlined for action by the Government within the context of the proposed Project of Lining of Distributaries and Minors in Punjab. These are referred to as Provincial Government Policy Actions, and System Turnover. Together, these five processes completely describe the general prototype in terms of what is to be done, who will do it, at what stage of the project, and with what kind of resources.

- For the prototype of the O&M process, the benchmark is the standard operating procedures of the Irrigation Department, suitably modified for a new management system with farmer participation.

- For the prototype of the FO, the benchmarks for staffing and resource mobilization are the staffing and financing patterns associated in the Irrigation Department with the O&M of a distributary, while the benchmark for governance is that of an elected, two-tier local body managing its own human and financial resources.

- For the prototype of technical assistance, the benchmark is a project type technical assistance which may engage Pakistani resources from the private sector under a expatriate leader for organizing and setting up of FOs & WUAs.

The Key Processes

1. Provincial Government Policy Actions emphasize legal and institutional changes, and Government policy approvals for 'The Project' at certain key steps during design and implementation.

2. Technical Assistance in its Feasibility Phase consists of developing a general prototype (as in this report), and obtaining the Government's agreement to the proposed prototype. The Feasibility Phase is expected to conclude in May 1997. The detailed area specific prototype will be developed at the stage of Basic Design.

3. Technical Assistance in the Implementation Phase of the Project will include two stages—before and after establishing the FO—of intense communication (testing), focusing on user acceptance of the prototype. After the first round of communication and motivation within the Project Area, the TA team will finalize the procedures of the FO and help establish the FO as a functioning, legal entity (within an expected time frame of 21 months after the commencement of the TA). It will assist the new entity at all stages of organization development, enable it to take over the Project Distributaries, and then concentrate on testing and improving the standard operating procedures for O&M.

4. The Organization Development of the FO will be facilitated by Technical Assistance during the entire period of the Project, starting from the formation of WUAs and the establishment of the FO and its offices, and including staffing, training, taking over of relevant records and documents, resource mobilization for the first year, taking over of the Project Distributary, and testing and improving the standard operating procedures.

5. The process of System Turnover describes the second set of Government responsibilities in the Project. Specific FO performance measures will guide the step-wise transfer of appropriate parts of the system, particularly, the buildings, vehicles, records and documents, financial resources for the first year of the FO, and the Project Distributary itself, from the Government to the new FO.

6. The Operation and Maintenance process commences in the Project once the lined (improved) Project Distributary is handed over to the FO. It includes the well-known functions of O&M, such as water acquisition, monitoring of water distribution, routine maintenance, special maintenance, assessment of water charges, collection of water charges, and the rendering of accounts and accountability. Standard operating procedures relating to these functions will be tested and improved with Technical Assistance after the take-over.

G.4.4 Provincial Government Role

Policy Actions

Policy Actions required in support of the proposed Project fall into two categories, namely legal cover and Government approvals for the Project.

Legal Cover

This includes:

1. Legal steps enabling the establishment of WUAs and FO as described in this proposal.

2. The delegation of appropriate powers to WUAs and FO under the Canal and Drainage Act 1973, including its sections 20 and 68.

3. Legal changes allowing farmers to trade water available to them below the outlet on competitive market principles.

Approvals for Project

Government approvals will be needed at the following stages during the life of the proposal:

1. When the interim report is ready for discussion with the Government (already approved in October 1996;)

2. When the draft final report is ready for discussion with the Government (in May 1997);

3. When the legal frame work and bye laws for WUAs and FO are prepared through Technical Assistance during project design /implementation;

4. When a draft System Turnover and Water aquisition Contracts between the FO and the Government are prepared through Technical Assistance during project implementation; and,

5. When project distributaries are to be handed over to the FOs upon satisfactory completion of the pre-requisites by the Government.

System Turnover

The first step in preparing for System Turnover will be undertaken during the Technical Assistance, Implementation Phase, when a draft System Turnover Contract will be prepared. It will be reviewed and approved by the Government. Thereafter, System Turnover is envisaged as a series of hand-over/take-over measures between the Government and the FO. Spread over 12-18 months, the process will start soon after the formalization of the FO and end with the take-over of the Project Distributary by the FO. Each step along the way would depend on the performance of the FO, for which performance measures have been specified. The completion of System Turnover would entail four main elements; these are elaborated below.

Turnover of Buildings and Vehicles

This element of System Turnover relates to the handing-over of those buildings (and vehicles and equipment, if any) that are being currently used by the Irrigation Department in the O&M of the Project Distributary. The pre-requisite (or performance measure) is that FO office-bearers must have been duly elected by a legally-constituted FO.

Turnover of Records

The turnover envisaged under this element relates to irrigation records, land revenue records, and the engineering, design documents and land plans pertaining to the Project Distributary. The pre-requisite for all of these is the conclusion of staff training by Pakistani consultants, and a short attachment of FO staff to the PID and Revenue Department.

Government Grant for First Year of FO Operations

During its first year, the FO will not take over the Project Distributary, but face the test of being the collection agent for PID or its successor(s). The pre-requisite for this is the formalization of the FO as a legal entity, as witnessed by the election of its office-bearers. The rationale for the grant is to provide bridge financing to the FO for a one-year (or two-season) period. The size of the grant would equal the assessment of water charges expected to be collected by the FO less the amount to the transferred to PID or its successor(s).

Turnover of Project Distributary

This is a milestone; its trigger is the recovery of water charges & O & M for its first year of operations. The achievement of this milestone would trigger the System Turnover process, and initiate the O&M process to be managed by the FO. At the same time, the Technical Assistance, Implementation Phase, will commence the testing and improvement of standard operating procedures for maintenance, resource mobilization and accountability.

G.4.5 The Operation & Maintenance Cycle and Staff

The proposed O&M cycle consists largely of well-understood, routinised tasks, and repeats itself every year: it starts the moment water enters the head of the distributary, and ends when the assessed water charges are recovered by the water-supplier from the land owners. Each such cycle includes routine maintenance and the annual rendering of accounts. Every two-to-three years special maintenance is also carried out. The main O&M functions, benchmarked from the standard operating procedures of the Irrigation Department, are specified as follows:

1. Water acquisition;
2. Monitoring water distribution;
3. Routine maintenance;
4. Special maintenance;
5. Assessment of water charges;
6. Collection of water charges; and,
7. Rendering accounts.

These functions are elaborated below. The FO will need the following staff (benchmarked mainly from the Irrigation Department, but modified where necessary for farmer participation) in order to discharge these functions:

1. In its Technical Wing, the FO will have:
   A Member Technical, elected by the farmers, who will head the Technical Wing;
   A Technical Supervisor (sub-engineer/overseer) responsible for day-to-day operations;
   One Canal Patrol for each 8-10 km length of the Project Distributary, for routine O&M;
   A Gauge Reader responsible for distributary regulation; and,
   Two Regulation Baildars assisting the Gauge Reader.

2. In its Revenue, accounts and administration Wing, the FO will have:
   A Member Revenue, elected by the farmers, who will head the Revenue Wing; and,
   A Revenue Supervisor / accountant responsible for day-to-day operations.

In addition to the above-mentioned personnel, the FO will contract the services of:
   A firm of chartered accountants, to be engaged for audit and corporate law matters;
   An O&M Consulting Engineer (short-term), for technical scrutiny during special maintenance;
   An O&M Contractor to undertake the special maintenance works; and,
   The WUAs, for collecting water charges.

Water Acquisition

The FO's objective in water acquisition is to acquire and monitor the authorized, discharge for the Project Distributary, or the average discharge for the last ten years, whichever is greater. The FO will sign a two years water supply contract for spacified 10 daily discharges with the PID. The FO will pay proportionately less if the actual discharge falls below the contracted amount by more than 5 per cent or any agreed figure. The PID may, if water is available, supply additional amounts to the FO at their request upon agreed terms. The FO's water supply contract with the PID will be reflected in its water supply contracts with the WUAs located on the distributary.

The overall (administrative) responsibility for water acquisition will rest with the Member Technical, while the Technical Supervisor will have technical responsibility for the subject. The steps involved in water acquisition are as follows:

1. Obtain the draft water supply contracts for the FO prepared through Technical Assistance. [Technical Supervisor]

2. Sign the contract for water supply with PID. [Office-bearers]

3. On the basis of this contract, sign the two years water supply contract with the WUAs. [Office-bearers]

Monitoring Water Distribution

The FO's objective in the monitoring of water distribution is to determine whether each outlet is receiving its designed discharge. The administrative responsibility will rest with the Member Technical, and the technical responsibility with the Technical Supervisor. The process involves the following steps:

1. Measure gauges at heads of distributary and minors daily, and co-sign the Gauge Book for the distributary with the roving gauge reader of the PID. [Gauge Reader]

2. Work out discharge at these sites and prepare gauge-discharge curves. [Technical Supervisor]

3. Check dimensions and setting of all outlets in relation to sanctioned parameters. [Technical Supervisor]

4. Check the supplies at heads of off-taking minors and adjust according to the supply. [Technical Supervisor]

5. Check for any leakages, overflow and unauthorized withdrawal on the way. [Canal Patrol]

6. Daily monitor the supply to individual outlets by observing the H-gauge fixed at the head of the outlets. [Canal Patrol]

7. Twice-monthly monitor the supply to individual outlets by observing the H-gauge fixed at the head of the water course. [Technical Supervisor]

Routine Maintenance of Distributary

The FO's objective in routine maintenance is to maintain the unobstructed flow of water in the distributary and minors. The administrative responsibility will rest with the Member Technical, and the technical responsibility with the Technical Supervisor. The process involves the following steps:

1. Patrol both banks of Project Distributary (and minors, if any) daily. [Canal Patrol]

2. Remove the floating debris from the canal. [Canal Patrol]

3. Clear bridges, falls and regulators of the obstruction, bushes and other debris. [Canal Patrol/Regulation Baildar]

4. Repair rain-cuts and clear weed growth and jungle. [Canal Patrol]

5. Check for leaks from banks and repair rodent holes. [Canal Patrol]

6. Check for overflow of banks and make up free board. [Canal Patrol]

7. Carry out killa-bushing (putting wooden stakes to check erosion) at ghat (Washing place) sites and at cattle crossing sites. [Canal Patrol]

8. Maintain service road along the Project Distributary (and the minors, if any). [Canal Patrol]

9. Lubricate gates and gearings of the regulator. [Regulation Baildar]

Special Maintenance of Distributary

Special maintenance is required:

- When there is deviation in "H" by more than +/- 0.1 foot; or,
- When free board is reduced to less than 0.5 feet; or,
- When the canal is silted, raising the FSL, resulting in over-drawal by outlets at head; or,
- When there is vast deviation between existing and designed parameters of canal prism/section.
- When the road along the distributary deteriorates.

The FO's objective under special maintenance is to restore and maintain the designed parameters of the Project Distributary. The administrative responsibility will rest with the Member Technical, and the technical responsibility with the Technical Supervisor. The work will be carried out:

- If its magnitude is not much, by pooling all the Canal Patrols, working under the supervision of the Technical Supervisor.

- Otherwise, through contract labour after going through the procedure of tendering.

In case tendering is required, the FO will follow a procedure with three main steps:

1. Preparation of estimate for contractor;

2. Tendering; and,

3. Contract management.

The important tendering procedure will be the responsibility of the FO's Technical supervisor. The overall responsibility for estimate preparation and contract management will rest with the Member Technical and his Technical Supervisor. An outside engineering consultant will also be involved in checking the estimates, and authenticating entries during contract management.

The detailed steps under each of the three main steps are elaborated as follows:

Steps for preparation of estimate for contractor:

1. Inspect and report on state of design [Technical Supervisor]
2. Order special maintenance [Member Technical]
3. Carry out hydraulic survey for the canal, observe cross section of every 1,000 feet apart and prepare long section. [Technical Supervisor]
4. Draw existing cross sections and L sections of the canal. [Technical Supervisor]
5. Calculate various quantities of works to be executed like earth work from outside, silt clearance, berm cutting, repairs to lining, etc. [Technical Supervisor]
6. Prepare bill of quantities. [Technical Supervisor]
7. Work out the cost of the work based on approved unit costs. [Technical Supervisor]
8. Prepare estimate for the work which includes justification, need, design criteria, specifications, quantities of works and costs. [Technical Supervisor]
9. Check the estimate, justification, design & specifications.[Consulting Engineer]
10. Send estimate for approval by Managing Committee. [Member Technical]
11. Accord approved after due satisfaction. [Managing Committee]

Tendering:

12. Invite tender from approved contractors. [Chairman / Member Technical]
13. Scrutinize the tender. [Chairman /Member Technical]
14. Award work. [Managing Committee]

Contract Management:

15. Measure the completed or portion of the work done in the Measurement Book (MB). [Technical Supervisor]

16. Effect field check to authenticate entries made by Technical Supervisor, and incorporate the permissible difference [Consulting Engineer]

17. Order preparation of the contractor's bill [Member Technical]

18. Insert the approved unit rates [Accountant]

19. Ascertain that funds are available [Accountant]

20. Prepare the contractor's bill. [Accountant]

21. Sign the bill in token of its correctness and authorize payment. [Member Technical]

22. Make payment to the contractor. [Accountant]

Assessment of Water Charges

The FO's objective is to assess water charges so as to cover the entire expenditure of the Distributary Farmer Organization, including the charges assessed for payment to the PID under the annual water supply contract. Based on a favourable response from the farmers of the Project Area (as already observed in parts of the Study Area), water charges will be assessed on a flat rate, per acre basis. The administrative responsibility within the FO will rest with the Member Revenue, and the technical responsibility with the Revenue Supervisor. The steps in the process are as follows:

1. Provide details of land ownership. [WUAs]

2. Check land ownership against Revenue records. [Revenue Supervisor]

3. Remove discrepancies through WUA meetings. [Revenue Supervisor]

4. Discuss/decide applications for remission by WUAs. [Member Revenue]

5. Check demand statement prepared by WUAs on flat rate basis. [Revenue Supervisor]

6. Enter remission and other charges granted. [Revenue Supervisor]

7. Authenticate the demand statement for WUAs. [Member Revenue]

Collection of Water Charges

The FO's objective is to collect the assessed water charges from the WUAs by contracting the latter to perform the collection function for a percentage of the amount recovered. The objective of the WUAs is to collect assessed water charges from individual farmers and deposit them with the FO. The FO will hold the WUA collectively responsible for the recoveries assessed under the annual water supply contract between the FO and the WUA. The WUA may nominate any one of its members by consensus, and upon such terms as the members may decide, to make the recoveries from individual farmers.

The administrative responsibility within the FO will rest with the Member Revenue, and the technical responsibility with the Revenue Supervisor. The steps in the process are as follows:

1. Send demand statement/for a water course to WUAs. [Revenue Supervisor]
2. Collect water charges from WUAs farmers. [Contracted WUAs]
3. Report and deposit the receipts with FO [Contracted WUAs]
4. Reconcile the receipts with the demand statement prepared by WUAs and identify the defaulters [Revenue Supervisor]
5. Consider and decide penalty recommended by WUAs for defaulters [Office-bearers]
6. Take action against defaulters [Office-bearers]

Rendering of Accounts

The FO's objective is to manage and render transparent, audited accounts to its office-bearers and the WUAs. The overall responsibility for this will be with the Chairman of the FO. The Accountant will have day-to-day responsibility. Chartered accountants will be engaged to conduct the annual (or any other external) audit, and to handle any corporate law matters. The main functions are expected to be as follows:

1. Select auditors for the FO. [Office-bearers]
2. Prepare the annual budget. [Accountant & Technical supervisor]
3. Approve the annual budget. [Office-bearers]

4. Prepare monthly financial statements of the FO. [Accountant]

5. Display the monthly financial statements at an accessible part of the FO office. [Accountant]

6. Make payment of monthly salaries. [Accountant]

7. Make approved payments to vendors. [Accountant]

8. Make approved payments to contractors. [Accountant]

9. Perform annual audit and handle corporate law matters. [Auditors]

10. Distribute audited accounts to WUAs. [Chairman]

G.4.6 Technical assistance required for institutional reforms

The TA Team responsible for the Organization Development of the FO would have the following long-term experts (for five years each), one of whom or an additional person may be the Team Leader:

A Sociologist, with responsibility including:

- executing a communication strategy, and providing feedback, to test the detailed, area-specific prototype in the Project Area before the FO is formed;
- executing a communication strategy for the FO for the period between FO office-bearer elections and taking over of the Project Distributary by the FO;
- improving the process of communication and accountability as part of the standard operating procedures of the FO after it takes over the Project Distributary; and,
- recruiting and supervising Pakistani ezperts or communication agency (or agencies) in support of the preceding functions.

A Management Specialist, with responsibility including:

- finalizing the detailed, area-specific prototype of the FO after the first round of communication with farmers in the Project Area;
- drafting the System Turnover Contract and getting it approved by the Government;
- selecting the Trustees of the FO, if required, and assisting them in organizing FO elections;

- assisting the office-bearers of the FO in staff recruitment and training procedures;

- through the Communication Specialist, testing the acceptance of the functioning FO among its users (farmers and employees), and modifying the design accordingly; and,

- executing a complete organization development strategy for the FO, including policies, procedures, job descriptions and information technology for all operations of the FO (except accounting and financial management).

A legal expert (2 years and mine months):

- preparation of law, rules and regulations regarding the elections, financial and technical powers of the FO's, its approval by Government, drafting agreements of water acquisition and distribution of financial resources between the FO & PIDA/ Area Water Boards/ Irrigation Department/ Registration of FOs & WUAs with the corporate law authority and giving legal advice and pursuing the cases if any on behalf of farmers.;

A Financial Management Specialist, with responsibility including:

- assisting the office-bearers of the FO in negotiating a grant /loan from the Government for the first year of operations of the FO;

- assisting the office-bearers of the FO in recruiting and training revenue and accounts staff;

- assisting the revenue staff of the FO in taking over the land revenue records from the Revenue Department;

- installing a complete system of accounting and financial management for the FO, including financial policies, procedures, job descriptions and information technology.

An Irrigation O&M Specialist, with responsibility including:

- assisting the office-bearers of the FO in recruiting and training technical staff;

- assisting the technical staff in taking over buildings from the PID;

- assisting the technical staff in taking over irrigation records, and engineering and design documents including Land plans from the PID;

- assisting technical staff in taking over forestation with in the right of way from the Forest Department

- documenting and analyzing the Irrigation Department's standard operating procedures for O&M before the FO takes over the Project Distributary; and,

- designing, testing and improving O&M SOPs for the FO after it takes over the Project Distributary.

Four social organizers one each for LJC, CBDC and two for LCC to be in constant contact with the village motivatiors and farmers of each distributary explaining the advantages of water users associations and the farmers organization, their internal inter action, their powers and responsibilities.

- registration of farmers on each water course, making record of their land holdings and checking it with irrigation and revenue record.

- helping in holding elections of WUA's & FO's, arranging office accommodations by inter action with the government;

- arranging and organizing the meetings of WUAs and FOs in accordance with a time table to be prepared by him and approved by the FOs;

- arranging and helping FOs to take over technical record of distoributary land plans buildings and tools and plants from the Government and training the farmers organization's staff to handle and store such record, arranging cabinets, chairs and tables for the FO offices;

- helping farmers in operation and maintenance of the distributary in the post take over period and assessment and collection of water charges.;

Twelve local Village Motivators - one for each distributary, with responsibilities including:

- explaining WUA and FO purposes and design to farmers;

- recording and analyzing feedback from farmers;

- assisting the Sociologist in preparing a communication strategy;

- explaining the highlights of the various procedures manuals of the FO to the farmers; and,

- making a list of WUAs and their members, and assisting WUAs with registration.

All the above experts could be engaged from amongst the local experts except the team leader who may be a foreigner.

Key Processes in Technical Assistance

Although outside the scope of work of the Institutional Study, the proposed Technical Assistance is key to the Organization Development of the FO. The key processes in which Technical Assistance will be engaged are introduced below as a summary of its role:

1. Establishing the TA Team in the Project Area.

2. First communication with farmers and stakeholders on the first distributary, including analysis of the feedback received from farmers.

3. Finalizing the management procedures in view of feedback from the farmers. These would include election procedures, registration procedures for WUAs and FO, staff training arrangements, bye laws and contracts.

4. Finalizing the financial management procedures in view of feedback from the farmers. These would include local assessment and collection procedures, and obtaining the first-year loan / grant from the Government.

5. Finalizing the irrigation O&M design and procedures in view of feedback from the farmers. These would include design changes recommended in view of the JICA Study, and improvements in the O&M procedures followed locally.

6. Establishing the FO. This would include communication of procedures to the farmers, selecting and supporting the FO Trustees, enabling them to organize elections, assisting the FO in obtaining a grant /loan from the Government and establishing its office, assisting the FO in staff recruitment and training, and preparing draft contracts for System Turnover and water supply.

7. Testing post-take-over farmer acceptance, and helping the FO improve its standard operating procedures in terms of FO and WUA management, irrigation O&M, assessment and collection, and farmer communication and accountability.

G.5 Implementation Program of Institutional Reforms

The Institutional Reforms, being an integral part of main project of Lining of Distributaries and Minors in Punjab, shall be implemented along with the main project. The initial work shall be so started that the farmers organizations (FOs) are not only in place but are capable of taking over the distributary from irrigation department on its completion.

The recruitment of staff and the legal aspect shall therefore start at the detailed design stage of the project to enable the formalization and some reasonable training of the FO's and its staff before the completion of each distributary.

Some of the distributaries which are of shorter length and pose no construction problems, are likely to be completed much earlier than the others. The spatial implementation of institutional reforms shall, therefore, be so organized that the FO's are in place to take over such distributaries even before the completion of the total project. The organization of institutional reforms should always be in close coordination with the construction organization. In cases where the FO's have been formed during the Construction Stage they should be consulted and associated with construction in a manner that a feeling of owner ship of the distributaries is developed among them.

The schedule of implementation is attached (Figure G-7).

G.6 Cost for institutional reforms

The institutional reforms in the Irrigation Sector as proposed in the project will be a new phenomenon with which the Irrigation Department is neither familiar nor they have shown any zeal and will to carry out these reforms. On the other hand the farmers have also perceived all along the history of irrigation that the problem of water supply was of an external nature and did not make a part of their responsibilities of every day lives. Water received from the distributaries and minors into their water courses was accepted as an external utility service for which the farmers paid the water charges regularly. It is therefore obvious that they have neither vision nor the training to organize themselves to take over the facility and the responsibility of its operation & maintenance.

The department of Agriculture has the experience of organizing the farmers at water course level but as described in other chapters it does not appear to be a very pleasant one as these water users associations disappeared soon after the improvement of the water courses.

In order to facilitate the W.U.As. and F.O's to be organized, the role of a catalytic outside agency can not be disputed. Such an agency must first persuade all the farmers of a distributary that getting organized is worth while and in their interest and then help them to do so. They will need advice on what organization structure to adopt, how to choose leaders, what laws need to be drafted, how to be registered, what powers should be given to them and how to use such powers. They will also need help in setting up the office, making rules and regulations, preparing registers and farms, employment of staff and negotiation of agreement regarding water supply and the sharing and fixation of water charges.

The farmers will need some one whom they trust and to train and guide them in these unfamiliar tasks. Since it will be the farmers first experience to form F.O's which will be their own entities and not be a part of the government, they consider it more effective to use a non-state organization such as a N.G.O or a good consultancy group. A major reason for the farmers to desire a consultancy technical help is that the inexperienced F.O. will need a strong support and better informed guidance in dealing with the state organizations such as irrigation department. Such dealings will involve negotiating water agreements, distribution of resources and division of responsibility. Farmers are unlikely to trust one state organization to help them in negotiating these issues with another nor there is any N.G.O available who are well informed and could help the farmers against the Government apparatus.

The technical assistance needs to be heavy in social organizers and such social organizers shall act as catalyst of the farmers ideas and experience rather than impose the " I know better than the ignorant farmers" attitude often found among government functionaries.

The project, therefore, shall provide the software of technical assistance for proper and organized implementation of the institutional reforms. Since the country has no experience of such institutions it will be appropriate to have foreign specialist in management who may cost about 40% of the total cost yet he will play the pivotal role of the chief motivator and organizer of the institutional reforms and therefore every success or failure will depend on the proper selection of this team leader.

The salaries and per diem expenses of local staff is also estimated on a higher scale as compared to government scales so as to solicit competent experts in the first instance and then to work with total indulgence once appointed. The recruitment of the local staff could be made strictly on merits with the one stipulation that they should be fully conversant in the local language and dialect. Experts from rural areas should be given preference. The local staff could be used as trainers for subsequent reforms.

The main items of cost (details given in Table G-14) are:

(1)	pay and allowances of foreign expert	=	$1,016,000
(2)	pay and allowances of local experts and staff	=	$874,950
(3)	cost of transport office & utilities	=	$272,820
(4)	publicity & meetings	=	$25,000
	Total		$2,238,770
	Contingencies -10%	=	$223,877
	Grand Total		$2,462,647
	Say		$2,460,000

The cost of 2.46 million dollars on institutional reforms will be about 2.7% of the total cost of the project which is nominal when considered in terms of its impact on the Pakistan irrigation system efficiency to be achieved through the involvement of the beneficiaries.

G.7 Recommendations for Institutional Reforms

In pursuance of the national policy indicated in the report of the agriculture commission (1988), national conservation strategy 1992, Eighth five years plan (1993) and the recent Punjab Ordinance of May 29, 1997 on reorganization of Irrigation institutions --- the world wide recognition that participation of the beneficiaries in the development of national resources has proved to be more beneficial then public sector unilateral handling, it is a great opportunity to introduce the institutional reforms into this project of lining of distributaries and minors in Punjab on pilot basis . The lining component (hardware) will serve to be a great incentive to the farmers to organize and prepare them selves for this responsibility which has hitherto been considered as an external utility run by the state for which they have been paying service charges .It will also relieve the provincial governments of subsidizing the O&M of the irrigation and drainage system and release its resources for other important social welfare sectors such as education, health and domestic water supply etc. which are starved because of the extreme necessity of diverting resources to keep this life line[irrigation system] of rural Pakistan in reasonable state of operation. It will also improve the investment efficiency on the O&M of the distributaries because of direct and immediate accountability. The greatest social benefit will accrue from the equitable distribution of water among all the farmers irrespective of their geographic position along the length of the distributay. It is our firm belief that if the FOs and Water Users Association are set up according to our recommendations it will be possible to achieve the same standard of equity as is available on the water courses. The success of these institutional reforms will give a very strong signal, both to the government departments and the farmers, that it is in their interest to replicate the same reforms all over the country. The present skepticism that the farmers are ignorant and they will not be able to handle and operate complicated engineering works - a myth created by interested parties, will be dampened and farmers of other distributaries will come forward with the request for similar reforms. On the analogy of improvement of water courses under OFWM project , there is a strong likelihood of financial participation by the farmers in the future improvement of distributaries in the country. However, the implementation of these reforms in this pilot project is of paramount importance as it is feared that if left to government departments to implement the reforms, the vested interests, the lathery and the "I know all" attitude of the government officials on one side and the lake of trust of the farmers in the present institutions on the other, there is much less likely-hood of its success.

It is, therefore, essential that an independent team as given in the report [technical assistance require for institutional reforms]is organized to handle these reforms at the grass root level. It will interact with the goverament on be-half of the farmers as a well informed body to plead their cause.. The drafting of by laws, rules and regulations, the water supply and financial agreements can not be left to the government departments who, the farmers feel, to be

biased against the farmers as the opposite party. The farmers will only trust and confide in a party whom they consider to be speaking on their behalf. It is, therefore, recommended that the institutional reforms to be implemented by an independent body should be made an integral rather an essential component of the project . Without such reforms the investment efficiency even in this project would be doubtful as the outlets will be broken again and even the banks of the distributaries will be breached by vested interests.

TABLES

Table G-1(I/13) Statement of G.C.A, C.C.A Area Irrigated with Revenue Assessed in L.J.C. Circle (1984-1994)

Year	G.C.A	C.C.A	Area Irrigated in Acres			Revenue Assessed in Rupees		
	Acres	Acres	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 1985	1,638,228	1,518,401	855,268	988,649	1,843,917	40,951,315	38,159,627	79,110,942
85 - 86	"	"	874,986	1,015,296	1,890,282	39,412,795	36,971,563	76,384,358
86 - 87	"	"	875,569	1,025,448	1,901,017	41,479,615	37,961,563	79,441,178
87 - 88	"	"	875,218	1,006,746	1,881,964	38,774,333	34,681,616	73,455,949
88 - 89	"	"	896,390	1,004,543	1,900,933	40,136,090	34,825,967	74,962,057
89 - 90	"	"	896,680	1,012,425	1,909,105	39,355,541	34,272,716	73,628,257
90 - 91	"	"	888,451	1,001,141	1,889,592	41,402,048	38,016,026	79,418,074
91 - 92	"	"	893,179	994,014	1,887,193	43,991,207	31,986,993	75,978,200
92 - 93	"	"	888,794	975,814	1,865,608	37,050,585	31,614,044	69,664,629
93 - 94	"	"	876,062	971,317	1,847,379	45,705,643	33,374,850	79,080,493

Table G-1(2/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

PINDI DISTRIBUTARY

Authorized Full Supply Discharge (in cusec) : 16.34

Culturable Commanded Area (in acres) : 5,646

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	3,451	3,114	6,565	88,212	100,429	188,641
1985 - 86	4,178	4,258	8,436	98,203	104,418	202,621
1986 - 87	4,097	4,803	8,900	112,774	128,373	241,147
1987 - 88	4,122	4,591	8,713	115,395	119,742	235,137
1988 - 89	4,077	4,641	8,718	109,529	124,989	234,518
1989 - 90	4,245	4,991	9,236	110,571	136,169	246,740
1990 - 91	4,176	4,797	8,973	113,642	125,364	239,006
1991 - 92	3,869	4,823	8,692	105,665	130,064	235,729
1992 - 93	4,377	4,863	9,240	116,059	141,155	257,214
1993 - 94	4,426	4,906	9,332	148,393	172,638	321,031
1994 - 95	4,584	5,033	9,617	177,222	193,655	370,877
Total	45,602	50,820	96,422			
Avg. per Year	4,146	4,620	8,766			
Cropping Intensity	73.43%	81.83%	155.25%			

Table G-1(3/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

HUJJAN DISTRIBUTARY INCLUDING MINORS

Authorized Full Supply Discharge (in cusec) : **182.23**

Culturable Commanded Area (in acres) : ***62,359***

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	50,488	51,270	101,758	1,869,332	1,805,344	3,674,676
1985 - 86	50,733	51,506	102,239	1,875,713	1,830,778	3,706,491
1986 - 87	50,534	51,582	102,116	1,895,141	1,838,819	3,733,960
1987 - 88	50,704	52,599	103,303	1,923,309	1,849,263	3,772,572
1988 - 89	50,984	52,715	103,699	1,919,566	1,877,187	3,796,753
1989 - 90	50,968	52,831	103,799	1,925,384	1,869,182	3,794,566
1990 - 91	50,977	52,658	103,635	1,928,465	1,871,185	3,799,650
1991 - 92	51,187	52,656	103,843	1,936,875	1,874,675	3,811,550
1992 - 93	52,279	54,045	106,324	2,574,223	2,490,404	5,064,627
1993 - 94	52,391	54,040	106,431	3,237,375	2,785,882	6,023,257
1994 - 95	52,484	53,971	106,455	3,551,091	3,332,931	6,884,022
Total	563,729	579,873	1,143,602			
Avg. per Year	51,248	52,716	103,964			
Cropping Intensity	82.18%	84.54%	166.72%			

Table G-1(4/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

KIRANA DISTRIBUTARY INCLUDING MINORS

Authorized Full Supply Discharge (in cusec) : **421.00**

Culturable Commanded Area (in acres) : **89,754**

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	59,015	68,558	127,573	2,060,942	1,696,005	3,756,947
1985 - 86	58,993	68,582	127,575	2,063,453	1,698,556	3,762,009
1986 - 87	59,005	68,710	127,715	2,071,939	1,729,455	3,801,394
1987 - 88	58,919	67,681	126,600	2,064,243	1,721,530	3,785,773
1988 - 89	59,026	67,470	126,496	2,063,796	1,722,601	3,786,397
1989 - 90	59,029	68,218	127,247	2,069,345	1,729,600	3,798,945
1990 - 91	59,486	68,277	127,763	2,060,465	1,718,392	3,778,857
1991 - 92	59,585	68,691	128,276	2,073,842	1,723,973	3,797,815
1992 - 93	60,065	69,848	129,913	2,289,603	1,974,912	4,264,515
1993 - 94	59,200	69,885	129,085	2,808,121	2,427,904	5,236,025
1994 - 95	59,930	69,389	129,319	3,171,096	2,652,357	5,823,453
Total	652,253	755,309	1,407,562			
Avg. per Year	59,296	68,664	127,960			
Cropping Intensity	66.06%	76.50%	142.57%			

Note:- Part of DHABIAN MINOR is being cut off and will be placed under another Distributary reducing its C.C.A by about 2,684 acres. However, for the above table we assume the existing areas.

Table G-1(5/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

SARANG WALA DISTRIBUTARY

Authorized Full Supply Discharge (in cusec) : 70.21

Culturable Commanded Area (in acres) : 16,374

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	14,868	13,806	28,674	493,051	323,186	816,237
1985 - 86	15,020	14,045	29,065	497,025	325,744	822,769
1986 - 87	14,944	14,340	29,284	494,118	328,236	822,354
1987 - 88	15,070	13,828	28,898	496,837	329,242	826,079
1988 - 89	15,197	13,544	28,741	496,128	325,972	822,100
1989 - 90	15,182	13,836	29,018	474,800	319,429	794,229
1990 - 91	15,262	13,663	28,925	496,798	318,338	815,136
1991 - 92	15,259	13,633	28,892	491,550	318,307	809,857
1992 - 93	14,847	14,360	29,207	583,248	330,282	913,530
1993 - 94	14,445	11,475	25,920	490,132	335,984	826,116
1994 - 95	15,332	13,156	28,488	656,455	416,098	1,072,553
Total	165,426	149,686	315,112			
Avg. per Year	15,039	13,608	28,647			
Cropping Intensity	91.85%	83.11%	174.95%			

Table G-1(6/13) Statement of C.C.A.Area Irrigated & Revenue Assessed

NASRANA DISTRIBUTARY

including minors

Authorized Full Supply Discharge (in cusec) : 247.9

Culturable Commanded Area (in acres) : 85,686

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	56,425	54,970	111,395	1,842,195	1,164,098	3,006,293
1985 - 86	56,653	55,562	112,215	1,885,261	1,185,143	3,070,404
1986 - 87	57,334	57,559	114,893	1,966,674	1,230,607	3,197,281
1987 - 88	57,006	55,172	112,178	2,044,254	1,182,023	3,226,277
1988 - 89	58,659	57,942	116,601	2,012,655	1,260,904	3,273,559
1989 - 90	61,230	58,256	119,486	1,960,548	1,270,437	3,230,985
1990 - 91	61,611	56,978	118,589	2,042,400	1,257,830	3,300,230
1991 - 92	59,680	58,787	118,467	2,035,980	1,297,855	3,333,835
1992 - 93	63,191	59,060	122,251	2,070,583	1,310,305	3,380,888
1993 - 94	63,536	57,783	121,319	2,583,303	1,594,135	4,177,438
1994 - 95	63,282	57,487	120,769	2,931,436	1,741,504	4,672,940
Total	658,607	629,556	1,288,163			
Avg. per Year	59,873	57,232	117,106			
Cropping Intensity	69.88%	66.79%	136.67%			

Table G-1(7/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

GOJRA DISTRIBUTARY

Authorized Full Supply Discharge (in cusec) : 57.79

Culturable Commanded Area (in acres) : 15,475

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	9,749	10,833	20,582	347,882	258,354	606,236
1985 - 86	9,462	11,383	20,845	319,949	272,652	592,601
1986 - 87	10,334	11,567	21,901	347,001	275,842	622,843
1987 - 88	10,746	10,893	21,639	377,457	259,591	637,048
1988 - 89	10,869	11,468	22,337	367,058	278,022	645,080
1989 - 90	11,595	11,616	23,211	366,802	282,880	649,682
1990 - 91	11,380	11,537	22,917	383,734	331,524	715,258
1991 - 92	11,480	11,980	23,460	378,202	288,367	666,569
1992 - 93	12,287	11,886	24,173	386,981	288,388	675,369
1993 - 94	12,029	11,441	23,470	464,315	350,216	814,531
1994 - 95	11,762	11,293	23,055	550,092	380,615	930,707
Total	121,693	125,897	247,590			
Avg. per Year	11,063	11,445	22,508			
Cropping Intensity	71.49%	73.96%	145.45%			

Table G-1(8/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

MUNGI DISTRIBUTARY

including minors

Authorized Full Supply Discharge (in cusec) : 142.99

Culturable Commanded Area (in acres) : 47,347

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	30,437	33,748	64,185	777,671	777,486	1,555,157
1985 - 86	36,352	35,230	71,582	1,359,254	721,230	2,080,484
1986 - 87	36,832	36,164	72,996	1,196,144	801,586	1,997,730
1987 - 88	37,118	33,507	70,625	1,108,833	863,723	1,972,556
1988 - 89	37,760	33,607	71,367	1,425,318	913,694	2,339,012
1989 - 90	37,284	33,642	70,926	1,373,030	913,947	2,286,977
1990 - 91	36,781	36,155	72,936	1,022,844	897,006	1,919,850
1991 - 92	37,573	34,640	72,213	1,194,379	853,660	2,048,039
1992 - 93	37,631	34,632	72,263	1,294,945	853,437	2,148,382
1993 - 94	35,468	32,112	67,580	1,179,417	814,642	1,994,059
1994 - 95	32,576	32,136	64,712	1,862,175	965,889	2,828,064
Total	395,812	375,573	771,385			
Avg. per Year	35,983	34,143	70,126			
Cropping Intensity	76.00%	72.11%	148.11%			

Table G-1(9/13) Statement of C.C.A.Area Irrigated & Revenue Assessed

JANI WALA / HAMZA DISTRIBUTARY

Authorized Full Supply Discharge (in cusec) : 46.36

Culturable Commanded Area (in acres) : 16,093

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	11,084	10,086	21,170	405,913	236,225	642,138
1985 - 86	11,063	11,318	22,381	403,888	339,669	743,557
1986 - 87	11,705	10,802	22,507	411,394	247,119	658,513
1987 - 88	12,325	11,815	24,140	406,423	286,330	692,753
1988 - 89	12,604	13,576	26,180	404,704	305,575	710,279
1989 - 90	12,172	12,757	24,929	444,914	309,517	754,431
1990 - 91	11,935	11,822	23,757	383,329	286,565	669,894
1991 - 92	12,167	12,104	24,271	393,891	303,098	696,989
1992 - 93	13,982	11,948	25,930	452,650	268,932	721,582
1993 - 94	12,442	11,703	24,145	486,372	329,416	815,788
1994 - 95	13,662	11,658	25,320	615,484	364,665	980,149
Total	135,141	129,589	264,730			
Avg. per Year	12,286	11,781	24,066			
Cropping Intensity	76.34%	73.20%	149.55%			

Table G-1(10/13) Statement of C.C.A.Area Irrigated & Revenue Assessed

PIRMAHAL DISTRIBUTARY

including minors

Authorized Full Supply Discharge (in cusec) : 136.97

Culturable Commanded Area (in acres) : 46,196

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	29,712	29,541	59,253	1,226,814	788,044	2,014,858
1985 - 86	31,602	31,220	62,822	1,236,074	843,224	2,079,298
1986 - 87	31,866	30,621	62,487	1,327,666	831,635	2,159,301
1987 - 88	33,042	30,511	63,553	1,363,723	813,090	2,176,813
1988 - 89	33,660	30,843	64,503	1,364,101	816,431	2,180,532
1989 - 90	35,411	30,854	66,265	1,396,439	816,513	2,212,952
1990 - 91	39,104	32,727	71,831	1,393,165	864,910	2,258,075
1991 - 92	34,220	35,132	69,352	1,335,047	912,006	2,247,053
1992 - 93	35,730	36,792	72,522	1,388,397	946,595	2,334,992
1993 - 94	35,449	34,431	69,880	1,719,310	976,246	2,695,556
1994 - 95	30,379	29,633	60,012	1,858,274	1,100,870	2,959,144
Total	370,175	352,305	722,480			
Avg. per Year	33,652	32,028	65,680			
Cropping Intensity	72.85%	69.33%	142.18%			

Table G-1(11/13) Statement of C.C.A.Area Irrigated & Revenue Assessed

KILLIAN WALA DISTRIBUTARY

including minors

Authorized Full Supply Discharge (in cusec) : 138.62

Culturable Commanded Area (in acres) : 46,196

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	50,660	50,084	100,744	1,617,342	1,137,003	2,754,345
1985 - 86	52,799	51,629	104,428	1,609,961	1,174,257	2,784,218
1986 - 87	53,581	51,894	105,475	1,658,762	1,172,260	2,831,022
1987 - 88	54,603	50,232	104,835	1,754,994	1,139,371	2,894,365
1988 - 89	55,116	49,637	104,753	1,745,036	1,123,151	2,868,187
1989 - 90	54,022	47,923	101,945	1,679,447	1,092,118	2,771,565
1990 - 91	54,286	46,964	101,250	1,761,103	1,063,802	2,824,905
1991 - 92	53,347	45,613	98,960	1,746,781	1,030,466	2,777,247
1992 - 93	47,380	44,048	91,428	1,826,310	920,846	2,747,156
1993 - 94	43,673	41,849	85,522	1,679,851	1,155,524	2,835,375
1994 - 95	45,488	41,162	86,650	1,978,200	1,257,148	3,235,348
Total	564,955	521,035	1,085,990			
Avg. per Year	51,360	47,367	98,726			
Cropping Intensity	111.18%	102.53%	213.71%			

Table G-1(12/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

THAMAN DISTRIBUTARY

Authorized Full Supply Discharge (in cusec) : **256.68**

Culturable Commanded Area (in acres) : **12,882**

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	7,396	2,548	9,944	196,457	193,154	389,611
1985 - 86	7,419	9,580	16,999	197,680	195,182	392,862
1986 - 87	7,468	9,582	17,050	199,455	195,222	394,677
1987 - 88	7,584	9,648	17,232	201,804	197,282	399,086
1988 - 89	7,621	9,665	17,286	203,258	197,589	400,847
1989 - 90	7,540	9,264	16,804	201,597	189,397	390,994
1990 - 91	7,347	9,293	16,640	195,604	189,248	384,852
1991 - 92	6,639	9,040	15,679	174,615	184,552	359,167
1992 - 93	6,740	9,152	15,892	214,588	186,168	400,756
1993 - 94	6,753	9,056	15,809	238,508	229,621	468,129
1994 - 95	6,711	9,991	16,702	322,473	270,854	593,327
Total	79,218	96,819	176,037			
Avg. per Year	7,202	8,802	16,003			
Cropping Intensity	55.90%	68.33%	124.23%			

The C.C.A given above differs from the C.C.A given in other tables. Since here it is to be corelated to the area irrigated and revenue assessed, we may use the figures given in the raw dat

Table G-1(13/13) Statement of C.C.A. Area Irrigated & Revenue Assessed

CHHINNA DISTRIBUTARY INCLUDING KALA MINOR

Authorized Full Supply Discharge (in cusec) : **127.28**

Culturable Commanded Area (in acres) : **40,498**

Year	Area Irrigated (in Acres)			Revenue Assessed (in Rupees)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
1984 - 85	21,404	24,737	46,141	571,960	544,214	1,116,174
1985 - 86	22,134	21,954	44,088	591,260	482,988	1,074,248
1986 - 87	21,043	23,229	44,272	566,170	511,038	1,077,208
1987 - 88	20,713	26,548	47,261	555,903	578,940	1,134,843
1988 - 89	23,433	23,206	46,639	694,653	494,308	1,188,961
1989 - 90	20,066	26,705	46,771	535,749	572,264	1,108,013
1990 - 91	23,119	26,256	49,375	674,788	562,333	1,237,121
1991 - 92	23,120	24,722	47,842	675,802	526,796	1,202,598
1992 - 93	22,608	25,026	47,634	657,169	531,856	1,189,025
1993 - 94	22,625	24,865	47,490	824,218	668,671	1,492,889
1994 - 95	22,635	24,473	47,108	832,112	713,996	1,546,108
Total	242,900	271,721	514,621			
Avg. per Year	22,082	24,702	46,784			
Cropping Intensity	54.53%	61.00%	115.52%			

Table G-2(1/14) Water Charges Assessment (Rs. in Thousands)

BARALA DIVISION

C.C.A = 458789 Acres

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges
Sugar Cane	43,937	64.00	2,812	63,255	80.00	5,000	81,197	88.00	7,145
Sanctioned Garden	3,365	50.40	170	3,397	63.00	214	3,332	69.30	231
Vegetable Garden	9,369	41.60	390	9,005	52.00	468	9,093	57.20	520
Cotton/Tobacco	130,393	33.60	4,381	50,453	42.00	2,119	29,551	46.20	1,365
Rice Special	1,286	56.00	7	993	70.00	69	310	77.00	24
Rice	17,027	32.00	545	26,251	40.00	1,050	28,005	44.00	1,232
Medicinal/Chillies	683	28.00	19	625	35.00	22	640	38.50	25
Oil Seeds	7,138	23.20	166	5,459	29.00	158	5,023	31.90	160
Forests	12,250	22.40	274	12,246	28.00	343	12,240	30.80	377
Jantar	6,641	22.60	150	7,038	27.00	190	2,363	29.70	70
Maize	93,242	19.20	1,790	115,872	24.00	2,781	128,667	26.40	3,397
Millets	606	16.00	10	820	20.00	16	1,734	22.00	38
Fodder	65,066	13.60	885	78,226	17.00	1,330	87,103	18.70	1,629
Nursery	12	8.00	_	31	10.00	_	5	11.00	_
PrePlantation	35	5.60	_	17	7.00	_	16	7.70	_
R.R	198	33.60	7	72	42.00	3	25	46.20	1
Total	391,248		11,606	373,760		13,763	389,304		16,214

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sanctioned Garden	3,488	50.40	176	3,498	63.00	220	3,453	69.30	239
Vegetable Garden	7,881	41.60	328	7,239	52.00	376	6,905	57.20	395
Medicinal Crops	120	28.00	3	16	35.00	5	40	38.50	2
Oil Seeds	27,032	23.20	627	24,039	29.00	697	25,300	31.90	807
Forests	906	22.40	20	896	28.00	25	906	30.80	28
Wheat	234,423	21.60	5,063	220,714	27.00	5,959	218,519	29.70	6,492
Wheat B.Schdule	3,044	19.20	58	3,809	24.00	91	3,942	26.40	104
Millets	130	16.00	2	200	20.00	4	149	22.00	3
Fodder	58,740	13.60	799	66,347	17.00	1,128	66,343	18.70	1,241
Nursery	19	8.00	_	11	10.00	_	15	11.00	_
PrePlantation	104	5.60	1	27	7.00	_	22	7.70	_
Total	335,887		7,077	326,796		8,505	325,594		9,311
G.Total (K & R)	727,135		18,683	700,556		22,268	714,898		25,525
Average Rate/Acre									
KHARIF			29.66			36.82			41.65
RABI			21.07			26.03			28.60
Annual/Crop Acre			25.69			31.79			35.70
Flate Rate/Season			20.36			24.27			27.82

Table G-2(2/14) Water Charges Assessment (Rs. in Thousands)

HAFIZABAD DIVISION

C.C.A = 329290 Acres

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sugar Cane	51,411	61.00	3,290	54,869	80.00	4,389	58,193	88.00	5,121
Sanctioned Garden	3,411	50.40	172	3,353	63.00	211	3,403	69.30	236
Vegetable Garden	8,155	41.60	339	8,242	52.00	429	7,718	57.20	441
Cotton	11,476	33.60	386	5,232	42.00	220	3,856	46.20	178
Rice	21,914	32.00	701	24,824	40.00	993	23,033	44.00	1,013
Rice Special	1,363	56.00	76	960	70.00	672	14	77.00	1
Melons etc.	1,078	28.00	30	774	35.00	27	838	38.50	32
Oil Seeds	5,097	23.20	118	4,385	29.00	127	3,707	31.90	118
Forests etc.	1,039	22.40	23	1,098	28.00	31	1,123	30.80	35
Barley/Gram etc.	9,190	21.60	199	7,881	27.00	213	5,940	29.70	176
Maize	54,409	19.20	1,045	50,043	24.00	1,201	49,003	26.40	1,294
Pulses	10,761	16.00	172	11,649	20.00	233	10,971	22.00	241
Fodder	38,705	13.60	526	43,317	17.00	736	43,215	18.70	808
Nursery	527	8.00	4	564	10.00	6	272	11.00	3
PrePlantation	174	5.60	10	–	–	–	41	7.70	3
Sugar Cane Ratoon	170	86.40	15	110	108.00	12	5	118.80	1
Fish Farm	4	210.00	1	4	262.00	1	4	288.00	1
Total	218,884		7,107	217,305		9,501	211,336		9,702

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Fish Farm	4	210.00	1	12	262.50	3	4	288.75	1
Sanctioned Garden	3,554	50.40	179	3,483	63.00	219	3,522	69.30	244
Vegetable Garden	8,576	41.60	357	8,273	52.00	430	7,808	57.20	447
Tobacco	18	33.60	1	28	42.00	1	14	46.20	1
Medicinal Crops	835	28.00	23	855	35.00	30	536	38.50	20
Oil Seeds	16,629	23.20	386	15,413	29.00	447	16,727	31.90	534
Forests etc.	588	22.40	13	602	28.00	17	565	30.80	17
Wheat/Barley etc.	149,111	21.60	3,220	145,007	27.00	3,915	144,955	29.70	4,305
Gram	508	16.00	8	613	20.00	12	779	22.00	17
Fodder	36,252	13.60	493	36,856	17.00	627	36,438	18.70	681
Nursery	1,111	8.00	9	493	10.00	5	253	11.00	3
PrePlantation	96	5.60	1	89	7.00	1	45	7.70	1
Total	217,282		4,691	211,724		5,707	211,646		6,271
G.Total (K & R)	436,166		11,798	429,029		15,208	422,982		15,973
Average Rate/Acre									
KHARIF			32.47			43.72			45.91
RABI			21.59			26.95			29.63
Annual/Crop Acre			27.05			35.45			37.76
Flate Rate/Season			17.91			23.09			24.25

Table G-2(3/14) Water Charges Assessment (Rs.in Thousands)

PINDI DISTRIBUTARY

Cultureable Commanded Area (in acres) : 5,646

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	197	12,608	225	18,000	241	21,208
Sanctioned Garden	38	1,915	70	4,410	57	3,933
Vegetable Garden	1,340	51,567	1,239	66,036	1,440	81,283
Cotton/Tobacco	170	5,780	76	3,192	130	5,980
Rice Special	–	–	–	–	–	–
Rice	120	3,840	128	5,120	145	6,380
Medicinal/Chillies	45	1,260	37	1,295	28	1,092
Oil Seeds	1	23	3	87	–	–
Forests	–	–	–	–	–	–
Jantar	56	1,232	63	170	23	690
Maize	714	13,566	619	14,856	799	21,573
Millets	734	11,744	935	18,700	835	18,370
Fodder	844	11,816	931	15,827	875	16,625
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
R.R	118	708	100	700	11	88
Total	4,377	116,059	4,426	148,393	4,584	177,222

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessd	Water Charges	Area Assessd	Water Charges	Area Assessd	Water Charges
Sanctioned Garden	69	3,478	71	4,473	30	2,079
Vegetable Garden	1,408	65,554	1,576	81,298	1,602	92,473
Medicinal Crops	–	–	19	665	12	462
Oil Seeds	39	905	20	580	29	928
Forests	–	–	–	–	–	–
Wheat	3,192	68,947	3,072	82,944	3,153	93,644
Wheat B.Schdule	–	–	–	–	–	–
Millets	68	1,088	54	1,080	60	1,320
Fodder	87	1,183	94	1,598	147	2,749
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
Total	4,863	141,155	4,906	172,638	5,033	193,655
G.Total (K & R)	9,240	257,214	9,332	321,031	9,617	370,877
Average Rate/Acre						
KHARIF		26.52		33.53		38.66
RABI		29.03		35.19		38.48
Annual/Crop Acre		27.84		34.40		38.56
Flate Rate/Season		22.78		28.43		32.84

Table G-2(4/14) Water Charges Assessment (Rs.in Thousands)

HUJJAN DISTRIBUTARY INCLUDING MINORS

Cultureable Commanded Area (in acres) : **62,359**

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	3,516	358,730	3,831	496,971	3,825	529,026
Sanctioned Garden	527	44,331	527	55,332	527	60,895
Vegetable Garden	19,763	1,348,215	18,657	1,624,325	19,097	1,794,694
Cotton/Tobacco	1,871	101,158	1,707	113,363	1,701	123,754
Rice Special	–	–	–	–	22	1,496
Rice	1,585	99,395	2,091	155,270	2,208	167,414
Medicinal/Chillies	281	13,221	249	14,471	233	15,539
Oil Seeds	98	4,431	61	3,236	81	4,687
Forests	–	–	–	–	95	4,752
Jantar	765	24,301	1,341	63,146	852	39,050
Maize	4,198	127,347	4,194	168,063	4,533	196,710
Millets	2,200	56,902	2,364	77,316	2,829	100,362
Fodder	15,318	376,797	15,447	454,036	14,884	482,589
Nursery	–	–	–	–	–	–
PrePlantation	2,075	18,235	1,927	23,132	1,697	30,123
Total	52,197	2,573,063	52,396	3,248,661	52,584	3,551,091

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Assessd	Charges	Assessd	Charges	Assessd	Charges
Sanctioned Garden	527	45,635	527	55,416	527	60,282
Vegetable Garden	19,330	1,358,024	19,249	1,591,562	19,038	1,802,010
Medicinal Crops	5	330	1	72	6	460
Oil Seeds	200	6,097	251	10,548	372	18,868
Forests	–	–	–	–	–	–
Wheat	23,743	879,729	23,279	834,547	21,729	1,069,675
Wheat B.Schdule	–	–	5	360	–	–
Millets	48	1,364	177	6,651	250	10,156
Fodder	9,076	194,559	9,426	284,168	10,583	350,891
Nursery	–	–	–	–	–	–
PrePlantation	1,113	11,244	1,130	14,558	1,456	20,589
Total	54,042	2,496,982	54,045	2,797,882	53,961	3,332,931
G.Total (K & R)	106,239	5,070,045	106,441	6,046,543	106,545	6,884,022
Average Rate/Acre						
KHARIF		49.30		62.00		67.53
RABI		46.20		51.77		61.77
Annual/Crop Acre		47.72		56.81		64.61
Flate Rate/Season		40.65		48.48		55.20

Table G-2(5/14) Water Charges Assessment (Rs.in Thousand)

KIRANA DISTRIBUTARY INCLUDING MINORS

Cultureable Commanded Area (in acres) : **89,754**

	1992-93		1993-94		1994-95	
KHARIF	Area	Water	Area	Water	Area	Water
Name Of Crops	Assessed	Charges	Assessed	Charges	Assessed	Charges
Sugar Cane	9,740	764,706	10,106	982,293	10,210	1,113,630
Sanctioned Garden	585	42,937	562	50,489	595	59,527
Vegetable Garden	9,303	509,654	9,227	644,310	9,131	698,079
Cotton/Tobacco	7,685	271,372	4,239	198,101	5,149	260,843
Rice Special	–	–	–	–	–	–
Rice	2,469	97,236	3,171	153,334	2,771	155,501
Medicinal/Chillies	507	16,309	421	16,860	575	24,752
Oil Seeds	110	3,183	130	3,963	171	5,852
Forests	–	–	–	–	–	–
Jantar	716	43	483	14,962	464	15,923
Maize	13,041	311,317	12,879	380,555	13,870	448,246
Millets	3,243	56,683	3,511	74,797	3,083	74,123
Fodder	10,674	182,041	12,504	265,378	12,640	290,910
Nursery	–	–	–	–	–	–
PrePlantation	2,092	16,842	2,369	23,165	2,194	23,710
Total	60,165	2,272,323	59,602	2,808,207	60,853	3,171,096

	1992-93		1993-94		1994-95	
RABI	Area	Water	Area	Water	Area	Water
Name Of Crops	Assessd	Charges	Assessd	Charges	Assessd	Charges
Sanctioned Garden	595	43,962	594	54,174	579	59,120
Vegetable Garden	8,418	472,039	8,431	581,006	8,546	643,280
Medicinal Crops	8	265	11	388	9	371
Oil Seeds	2,039	48,144	3,644	109,268	3,235	107,024
Forests	–	–	–	–	–	–
Wheat	43,837	1,119,711	45,097	1,434,691	44,886	1,570,305
Wheat B.Schdule	4,649	89,165	–	–	–	–
Millets	397	6,894	498	10,071	484	10,712
Fodder	9,005	157,556	10,670	229,712	10,683	251,798
Nursery	–	–	–	–	–	–
PrePlantation	899	7,182	940	8,594	967	9,747
Total	69,847	1,944,918	69,885	2,427,904	69,389	2,652,357
G.Total (K & R)	130,012	4,217,241	129,487	5,236,111	130,242	5,823,453
Average Rate/Acre						
KHARIF		37.77		47.12		52.11
RABI		27.85		34.74		38.22
Annual/Crop Acre		32.44		40.44		44.71
Flate Rate/Season		23.49		29.17		32.44

Note:- Part of DHABIAN MINOR is being cut off and will be placed under another Distributary reducing its C.C.A by about 2,684 acres. However, for the above table we assume the existing areas.

Table G-2(6/14) Water Charges Assessment (Rs. in Thousand)

SARANG WALA DISTRIBUTARY

Cultureable Commanded Area (in acres) : **16,374**

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	3,693	293,100	3,026	234,352	3,908	342,383
Sanctioned Garden	412	25,918	411	25,949	410	28,331
Vegetable Garden	781	39,389	709	33,412	670	37,176
Cotton/Tobacco	120	4,969	356	11,594	149	6,366
Rice Special	139	9,742	227	12,694	–	–
Rice	253	10,118	237	7,496	246	10,801
Medicinal/Chillies	85	2,905	118	3,155	105	3,784
Oil Seeds	38	1,113	12	253	46	1,456
Forests	–	–	–	–	–	–
Jantar	188	5,088	257	5,613	149	5,305
Maize	4,638	110,636	6,021	120,917	5,177	136,012
Millets	463	9,161	408	6,435	585	12,752
Fodder	3,970	67,308	2,597	25,346	3,873	71,936
Nursery	9	92	–	–	12	135
PrePlantation	–	–	–	–	2	18
R.R	39	1,649	53	1,767	–	–
I.R	19	2,060	13	1,149	–	–
Total	14,847	583,248	14,445	490,132	15,332	656,455

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessd	Water Charges	Area Assessd	Water Charges	Area Assessd	Water Charges
Sanctioned Garden	436	21,908	401	25,316	421	28,982
Vegetable Garden	955	38,539	886	43,984	826	45,463
Medicinal Crops	–	–	12	427	21	817
Oil Seeds	1,286	29,756	1,092	31,364	1,090	34,541
Forests	–	–	–	–	–	–
Wheat	10,418	222,932	8,205	219,954	9,713	286,246
Wheat B.Schdule	–	–	–	–	–	–
Millets	23	341	40	677	49	797
Fodder	1,240	16,788	836	14,232	1,026	19,140
Nursery	2	18	3	30	10	112
PrePlantation	–	–	–	–	–	–
Total	14,360	330,282	11,475	335,984	13,156	416,098
G.Total (K & R)	29,207	913,530	25,920	826,116	28,488	1,072,553
Average Rate/Acre						
KHARIF		39.28		33.93		42.82
RABI		23.00		29.28		31.63
Annual/Crop Acre		31.28		31.87		37.65
Flate Rate/Season		27.90		25.23		32.75

Table G-2(7/14) Water Charges Assessment (Rs. in Thousand)

NASRANA DISTRIBUTARY
including minors

Cultureable Commanded Area (in acres) : 85,686

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	15,971	1,021,222	17,408	1,391,497	19,854	1,744,784
Sanctioned Garden	659	33,184	659	41,544	661	45,866
Vegetable Garden	1,780	74,023	1,853	96,041	1,703	97,371
Cotton/Tobacco	7,510	1,911,727	3,677	154,422	2,228	102,437
Rice Special	176	9,881	116	8,149	17	1,281
Rice	638	20,213	896	35,012	982	42,989
Medicinal/Chillies	175	4,902	117	4,087	162	6,220
Oil Seeds	4,505	104,528	3,696	107,177	2,876	91,731
Forests	–	–	–	–	–	–
Jantar	534	5,539	426	11,462	205	6,086
Maize	19,934	382,673	19,865	476,742	18,622	491,633
Millets	421	6,736	450	9,007	430	9,444
Fodder	10,817	147,091	14,265	241,921	15,493	289,656
Nursery	8	57	7	68	13	144
PrePlantation	–	–	–	–	3	21
R.R	50	1,696	33	1,396	30	1,382
I.R	13	1,111	44	4,778	3	391
Total	63,191	3,724,583	63,512	2,583,303	63,282	2,931,436

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessd	Water Charges	Area Assessd	Water Charges	Area Assessd	Water Charges
Sanctioned Garden	643	32,381	673	42,327	675	46,848
Vegetable Garden	1,650	68,643	1,336	69,418	1,321	74,939
Medicinal Crops	42	1,179	41	1,422	2	71
Oil Seeds	8,897	206,389	9,754	282,887	8,796	280,545
Forests	–	–	–	–	–	–
Wheat	43,951	949,035	41,687	1,125,305	42,401	1,259,064
Wheat B.Schdule	–	–	–	–	–	–
Millets	–	–	–	–	4	69
Fodder	3,871	52,630	4,275	72,701	4,266	79,753
Nursery	6	48	4	36	14	155
PrePlantation	–	–	6	39	8	60
Total	59,060	1,310,305	57,776	1,594,135	57,487	1,741,504
G.Total (K & R)	122,251	5,034,888	121,288	4,177,438	120,769	4,672,940
Average Rate/Acre						
KHARIF		58.94		40.67		46.32
RABI		22.19		27.59		30.29
Annual/Crop Acre		41.18		34.44		38.69
Flate Rate/Season		29.38		24.38		27.27

Table G-2(8/14) Water Charges Assessment (Rs. in Thousand)

GOJRA DISTRIBUTARY

Cultureable Commanded Area (in acres) : **18,632**

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	1,690	108,132	2,409	192,714	3,162	278,156
Sanctioned Garden	354	17,825	365	22,957	366	25,231
Vegetable Garden	613	25,489	652	33,918	604	34,586
Cotton/Tobacco	3,589	120,583	1,066	44,782	796	36,773
Rice Special	179	10,014	139	9,734	81	6,224
Rice	86	2,725	78	3,129	75	3,369
Medicinal/Chillies	110	3,101	105	3,685	125	4,746
Oil Seeds	387	9,004	679	19,685	459	14,620
Forests	–	–	2	14	9	68
Jantar	177	3,787	107	2,924	117	3,549
Maize	2,559	49,146	3,257	78,196	3,153	83,278
Millets	179	2,853	229	4,576	228	4,987
Fodder	2,251	30,616	2,397	40,713	2,435	45,548
Nursery	–	–	–	–	–	–
PrePlantation	1	14	–	–	–	–
R.R	36	1,196	60	2,508	61	2,849
F.R	5	396	21	2,155	27	3,220
Fish Form	1	2,100	1	2,625	1	2,888
Total	12,217	386,981	11,567	464,315	11,699	550,092

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessd	Water Charges	Area Assessd	Water Charges	Area Assessd	Water Charges
Sanctioned Garden	373	18,718	364	22,940	369	25,551
Vegetable Garden	1,217	50,735	1,319	68,702	1,313	75,060
Medicinal Crops	25	703	26	888	15	588
Oil Seeds	1,340	31,077	1,352	39,240	1,276	40,707
Forests	–	–	–	–	–	–
Wheat	8,093	174,781	7,443	200,921	7,392	219,574
Millets	2	27	–	–	2	50
Fodder	752	10,241	877	14,892	866	16,197
Fish Form	1	2,100	1	2,625	1	2,888
PrePlantation	1	6	1	8	–	–
Total	11,804	288,388	11,383	350,216	11,234	380,615
G.Total (K & R)	24,021	675,369	22,950	814,531	22,933	930,707
Average Rate/Acre						
KHARIF		31.68		40.14		47.02
RABI		24.43		30.77		33.88
Annual/Crop Acre		28.12		35.49		40.58
Flate Rate/Season		18.12		21.86		24.98

Table G-2(9/14) Water Charges Assessment (Rs. in Thousand)

MUNGI DISTRIBUTARY
including minors

Cultureable Commanded Area (in acres) : 47,317

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	2,771	220,254	3,895	259,262	10,136	1,106,116
Sanctioned Garden	1,453	72,348	1,449	73,035	1,229	72,810
Vegetable Garden	2,916	121,329	2,909	122,016	2,511	129,400
Cotton/Tobacco	20,263	692,623	1,098	378,917	820	67,910
Rice Special	38	2,139	–	–	–	–
Rice	215	8,514	1,576	50,441	1,708	95,141
Medicinal/Chillies	46	1,300	95	2,672	70	2,710
Oil Seeds	582	13,502	1,404	32,584	407	20,940
Forests	4	80	–	–	47	1,438
Jantar	404	10,823	414	8,960	395	15,730
Maize	5,263	102,985	7,100	139,102	7,527	203,937
Millets	54	863	119	1,981	29	648
Fodder	3,640	48,186	5,409	80,447	7,727	145,395
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
R.R	–	–	–	–	–	–
I.R	–	–	–	–	–	–
Total	37,649	1,294,946	25,468	1,149,417	32,606	1,862,175

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Assessd	Charges	Assessd	Charges	Assessd	Charges
Sanctioned Garden	1,412	71,447	1,404	79,951	1,370	95,695
Vegetable Garden	1,251	52,041	1,247	61,485	1,359	70,449
Medicinal Crops	177	3,277	390	20,192	149	5,760
Oil Seeds	5,076	117,756	3,450	91,615	4,440	141,330
Forests	29	644	–	–	71	2,188
Wheat	24,182	573,349	22,656	514,220	22,594	609,175
Wheat B.Schdule	–	–	–	–	–	–
Millets	17	278	5	114	28	612
Fodder	2,548	34,645	2,960	47,065	2,125	40,680
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
Total	34,692	853,437	32,112	814,642	32,136	965,889
G.Total (K & R)	72,341	2,148,383	57,580	1,964,059	64,742	2,828,064
Average Rate/Acre						
KHARIF		34.40		45.13		57.11
RABI		24.60		25.37		30.06
Annual/Crop Acre		29.70		34.11		43.68
Flate Rate/Season		22.69		20.74		29.87

Table G-2(10/14) Water Charges Assessment (Rs. in Thousand)

JANI WALA / HUMZA DISTRIBUTARY

Cultureable Commanded Area (in acres) : **16,093**

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges
Sugar Cane	1,691	64.00	108,224	2,478	80.00	198,240	3,308	88.00	291,104
Sanctioned Garden	98	50.40	4,939	98	63.00	6,174	98	69.30	6,791
Vegetable Garden	277	41.60	11,523	314	52.00	16,328	194	57.20	11,097
Cotton/Tobacco	6,385	33.60	214,536	1,905	42.00	80,010	2,037	46.20	94,109
Rice Special	191	56.00	10,696	87	70.00	6,090	201	77.00	15,477
Rice	27	32.00	864	49	40.00	1,960	51	44.00	2,244
Medicinal/Chillies	518	28.00	14,504	433	35.00	15,155	226	38.50	8,701
Oil Seeds	721	23.20	16,727	1,154	29.00	33,466	1,187	31.90	37,865
Forests	163	22.40	3,651	162	28.00	–	162	30.80	4,990
Jantar	166	21.60	3,586	102	27.00	2,754	141	29.70	4,188
Maize	2,218	19.20	42,586	3,603	24.00	86,472	3,434	26.40	90,658
Millets	22	16.00	352	70	20.00	1,400	44	22.00	968
Fodder	1,505	13.60	20,468	1,987	17.00	33,779	2,529	18.70	47,292
Nursery	–	–	–	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–	–	–	–
R.R	–	–	–	–	–	–	–	–	–
I.R	–	–	–	–	–	–	–	–	–
Total	13,982		452,656	12,442		481,828	13,612		615,484

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sanctioned Garden	94	50.40	4,738	92	63.00	5,796	98	69.30	6,791
Vegetable Garden	408	41.60	16,973	437	52.00	22,724	382	57.20	21,850
Medicinal Crops	15	28.00	420	27	35.00	945	8	38.50	308
Oil Seeds	1,552	23.20	36,006	1,459	29.00	42,311	1,652	31.90	52,699
Forests	–	–	–	3,649	27.00	98,523	3,644	30.80	112,235
Wheat	9,552	21.60	206,323	5,637	29.00	163,473	5,538	29.70	164,479
Wheat B.Schdule	–	–	–	–	–	–	–	–	–
Millets	16	16.00	256	16	20.00	320	6	22.00	132
Fodder	311	13.60	4,230	386	17.00	6,562	330	18.70	6,171
Nursery	–	–	–	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–	–	–	–
Total	11,948		268,946	11,703		340,654	11,658		364,665
G.Total (K & R)	25,930		721,602	24,145		822,482	25,270		980,150
Average Rate/Acre									
KHARIF			32.37			38.73			45.22
RABI			22.51			29.11			31.28
Annual/Crop Acre			27.83			34.06			38.79
Flate Rate/Season			22.42			25.55			30.45

Table G-2(11/14) Water Charges Assessment (Rs. in Thousand)

PIR MAHAL DISTRIBUTARY
including minors

Cultureable Commanded Area (in acres) : **46,196**

KHARIF	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessed	Water Charges	Area Assessed	Water Charges	Area Assessed	Water Charges
Sugar Cane	4,620	322,966	6,416	555,509	7,247	731,992
Sanctioned Garden	611	32,907	603	52,486	640	60,465
Vegetable Garden	1,393	64,585	1,457	88,186	1,399	90,239
Cotton/Tobacco	15,237	578,330	6,588	290,588	3,630	194,745
Rice Special	–	–	–	–	–	–
Rice	5,378	224,950	9,707	448,976	9,350	550,415
Medicinal/Chillies	93	2,376	39	2,597	6	459
Oil Seeds	129	3,495	305	9,833	430	14,885
Forests	–	–	54	9,218	–	–
Jantar	976	27,518	2,338	74,683	1,539	51,874
Maize	2,871	62,830	3,636	99,791	3,330	99,927
Millets	4	59	–	–	–	–
Fodder	4,418	68,381	4,306	87,439	2,807	63,273
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
R.R	–	–	–	–	–	–
I.R	–	–	–	–	–	–
Total	35,730	1,388,397	35,449	1,719,306	30,378	1,858,274

RABI	1992-93		1993-94		1994-95	
Name Of Crops	Area Assessd	Water Charges	Area Assessd	Water Charges	Area Assessd	Water Charges
Sanctioned Garden	590	35,267	590	42,282	591	43,149
Vegetable Garden	1,244	57,185	1,010	49,318	1,178	74,446
Medicinal Crops	366	18,045	143	4,992	337	22,680
Oil Seeds	2,466	84,136	4,210	125,245	2,822	97,212
Forests	–	–	37	1,036	–	–
Wheat	24,818	681,378	25,600	666,044	23,067	831,144
Wheat B.Schdule	–	–	–	–	–	–
Millets	2	33	5	93	–	–
Fodder	7,306	58,851	2,836	47,236	1,638	32,239
Nursery	–	–	–	–	–	–
PrePlantation	–	–	–	–	–	–
Total	36,792	934,895	34,431	936,246	29,633	1,100,870
G.Total (K & R)	72,522	2,323,292	69,880	2,655,552	60,011	2,959,144
Average Rate/Acre						
KHARIF		38.86		48.50		61.17
RABI		25.41		27.19		37.15
Annual/Crop Acre		32.04		38.00		49.31
Flate Rate/Season		25.15		28.74		32.03

Table G-2(12/14) Water Charges Assessment (Rs. in Thousand)

KILLIAN WALA DISTRIBUTARY

Cultureable Commanded Area (In acres) : 46,196 including minors

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges
Sugar Cane	4,814	64.00	308,096	7,654	80.00	612,320	10,211	88.00	898,568
Sanctioned Garden	764	50.40	38,506	750	63.00	47,250	705	69.30	48,857
Vegetable Garden	2,116	41.60	88,026	1,895	52.00	98,540	2,035	57.20	116,402
Cotton/Tobacco	20,157	33.60	677,275	6,843	42.00	287,406	4,550	46.20	210,210
Reclaimation	52	33.60	1,747	–	–	–	–	–	–
Rice Reclaimation	229	56.00	12,824	219	70.00	15,330	–	–	–
Rice	529	32.00	16,928	815	40.00	32,600	907	44.00	39,908
Jute / Mellons	89	28.00	2,492	82	35.00	2,870	80	38.50	3,080
Oil Seeds	1,016	23.20	23,571	1,071	29.00	31,059	1,126	31.90	35,919
Forests	–	–	–	–	–	–	–	–	–
Jantar	1,805	21.60	38,988	1,960	27.00	52,920	157	29.70	4,663
Maize	11,292	19.20	216,806	16,967	24.00	407,208	18,190	26.40	480,216
Millets / Pulses	27	16.00	432	84	20.00	1,680	37	22.00	814
Fodder	4,455	13.60	60,588	5,333	17.00	90,661	7,490	18.70	140,063
Nursery	1	8.00	8	–	–	–	–	–	–
PrePlantation	4	5.60	22	1	7.00	7	–	–	–
R.R	–	–	–	–	–	–	–	–	–
I.R	–	–	–	–	–	–	–	–	–
Total	47,350		1,486,310	43,674		1,679,851	45,488		1,978,700

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sanctioned Garden	786	50.40	39,614	784	63.00	49,392	705	69.30	48,857
Vegetable Garden	1,845	41.60	76,752	1,831	52.00	95,212	1,806	57.20	103,303
Medicinal Crops	2	28.00	56	1	35.00	35	–	–	–
Oil Seeds	317	23.20	7,354	3,381	29.00	98,049	3,749	31.90	119,593
Forests	–	–	–	–	–	–	–	–	–
Wheat	33,512	21.60	723,859	30,331	27.00	818,937	30,244	29.70	898,247
Wheat B.Schdule	–	–	–	–	–	–	–	–	–
Pulses	15	16.00	240	30	20.00	600	19	22.00	418
Fodder	5,361	13.60	72,910	5,485	17.00	93,245	4,638	18.70	86,731
Nursery	2	8.00	16	–	–	–	–	–	–
PrePlantation	8	5.60	45	7	7.00	49	–	–	–
Total	41,848		920,846	41,850		1,155,519	41,161		1,257,148
G.Total (K & R)	89,198		2,407,156	85,524		2,835,370	86,649		3,235,848
Average Rate/Acre									
KHARIF			31.39			38.46			43.50
RABI			22.00			27.61			30.54
Annual/Crop Acre			26.99			33.15			37.34
Flate Rate/Season			26.05			30.69			35.02

Table G-2(13/14) Water Chages Assessment (Rs. in Thousand)

THAMAN DISTRIBUTARY

Cultureable Commanded Area (in acres) : 12,882

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges
Sugar Cane	799	65.62	52,430	575	82.02	47,162	882	90.22	79,574
Sanctioned Garden	110	52.11	5,732	110	65.14	7,165	110	78.82	8,670
Vegetable Garden	171	42.46	7,261	188	53.07	9,977	262	64.23	16,828
Cotton/Tobacco	427	34.74	14,834	565	43.42	24,532	316	52.55	16,606
Rice Special	–	–	–	–	–	–	–	–	–
Rice	2,936	32.82	96,360	2,221	41.00	91,061	2,906	49.63	144,225
Medicinal/Chillies	47	30.87	1,451	15	38.60	579	50	46.71	2,336
Oil Seeds	25	25.08	627	15	31.33	470	30	37.95	1,139
Forests	–	–	–	–	–	–	–	–	–
Jantar	–	–	–	–	–	–	–	–	–
Maize	1,553	17.37	26,976	1,245	21.71	27,029	1,552	26.27	40,771
Millets	97	13.50	1,310	117	16.89	1,976	80	20.44	1,635
Fodder	565	13.50	7,628	1,693	16.89	28,595	523	20.44	10,690
Total	6,730		214,607	6,744		238,546	6,711		322,473

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sanctioned Garden	110	52.11	5,732	110	65.14	7,165	110	78.82	8,670
Vegetable Garden	96	42.46	4,076	69	53.07	3,662	110	64.23	7,065
Medicinal Crops	–	–	–	–	–	–	–	–	–
Oil Seeds	492	25.09	12,344	416	31.33	13,033	412	37.95	15,635
Forests	–	–	–	–	–	–	–	–	–
Wheat	6,435	21.23	136,615	6,505	26.54	172,643	5,865	32.11	188,325
Wheat B.Schdule	–	–	–	–	–	–	–	–	–
Millets	65	15.50	1,008	38	19.30	733	62	23.35	1,448
Fodder	1,954	13.50	26,379	1,918	16.89	32,395	2,432	20.44	49,710
Total	9,152		186,154	9,056		229,632	8,991		270,854
G.Total (K & R)	15,882		400,761	15,800		468,178	15,702		593,327
Average Rate/Acre									
KHARIF			31.89			35.37			48.05
RABI			20.34			25.36			30.12
Annual/Crop Acre			25.23			29.63			37.79
Flate Rate/Season			15.56			18.17			23.03

Table G-2(14/14) Water Chages Assessment (Rs. in Thousand)

CHHINNA DISTRIBUTARY INCLUDING KALA MINOR

Cultureable Commanded Area (in acres) : 40,498

KHARIF	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges	Area Assessed	Rate	Water Charges
Sugar Cane	4,254	65.62	279,147	5,066	82.02	415,513	4,712	90.23	425,164
Sanctioned Garden	100	52.11	5,211	100	65.14	6,514	100	71.65	7,165
Vegetable Garden	600	42.46	25,476	600	53.07	31,842	600	58.39	35,034
Cotton/Tobacco	1,500	34.74	52,110	1,550	43.47	67,379	1,550	47.77	74,044
Rice Special	–	–	–	–	–	–	–	–	–
Rice	600	32.81	19,686	650	41.01	26,657	650	45.11	29,322
Jute / Mellons	160	30.88	4,941	160	38.60	6,176	160	42.46	6,794
Oil Seeds	100	25.09	2,509	110	31.36	3,450	110	34.50	3,795
Forests	–	–	–	–	–	–	–	–	–
Jantar	30	21.23	637	30	26.54	796	52	29.19	1,518
Maize	4,900	17.37	85,113	4,870	21.71	105,728	4,869	23.88	116,272
Millets / Pulses	–	–	–	–	–	–	–	–	–
Fodder	10,374	13.51	140,153	9,489	13.51	128,196	9,845	13.51	133,006
Total	22,618		614,983	22,625		792,250	22,648		832,112

RABI	1992-93			1993-94			1994-95		
Name Of Crops	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges	Area Assessd	Rate	Water Charges
Sanctioned Garden	100	52.11	5,211	100	65.14	6,514	100	71.65	7,165
Vegetable Garden	750	42.46	31,845	780	53.07	41,395	666	58.39	38,888
Medicinal Crops	100	30.88	3,088	150	38.60	5,790	100	42.46	4,246
Oil Seeds	2,000	25.09	50,180	2,500	31.36	78,400	2,400	34.50	82,800
Forests	–	–	–	–	–	–	–	–	–
Wheat	18,535	21.23	393,498	18,210	26.54	483,293	17,627	29.19	514,532
Wheat B.Schdule	–	–	–	–	–	–	–	–	–
Millets	100	15.44	1,544	120	19.30	2,316	90	21.23	1,911
Fodder	3,441	13.51	46,488	3,013	16.81	50,649	3,469	18.58	64,454
Total	25,026		531,854	24,873		668,357	24,452		713,996
G.Total (K & R)	47,644		1,146,837	47,498		1,460,607	47,100		1,546,108
Average Rate/Acre									
KHARIF			27.19			35.02			36.74
RABI			21.25			26.87			29.20
Annual/Crop Acre			24.07			30.75			32.83
Flate Rate/Season			14.16			18.03			19.09

Table G-3 Area Irrigated, Assessed and Remissions of Water Charges in Two Typical Divisions of Lower Chanab Canal

BARALA DIVISION

No. of Distributaries = 38
Culturable Command Area = 458789 Acres

Area Irrigated & Assessed (in Acres)

Years		Area Irrigated	Area Assessed	Remission
1992-93	Kharif	392,817	391,248	1,569
	Rabi	336,329	335,887	442
	Total	729,146	727,135	2,011
1993-94	Kharif	387,524	373,770	13,754
	Rabi	326,888	326,795	93
	Total	714,412	700,565	13,847
1994-95	Kharif	389,810	389,304	506
	Rabi	325,672	325,594	78
	Total	715,482	714,898	584
Average of 3 years	Kharif	390,050.33	384,774.00	5,276.33
	Rabi	329,629.67	329,425.33	204.33
	Total	719,680.00	714,199.33	5,480.67

Average Area Irrigated with Sugar cane counted twice =		782,719.67
Intensity of Irrigation with Sugar cane counted once	=	156.87%
Intensity of Irrigation with Sugar cane counted twice	=	170.61%
Remission as Percentage of Cropped Area	=	0.70%

HAFIZABAD DIVISION

No. of Distributaries = 24
Culturable Command Area = 329290 Acres

Area Irrigated & Assessed (in Acres)

Years		Area Irrigated	Area Assessed	Remission
1992-93	Kharif	219,883	218,884	999
	Rabi	217,298	217,282	16
	Total	437,181	436,166	1,015
1993-94	Kharif	217,508	217,305	203
	Rabi	211,728	211,724	4
	Total	429,236	429,029	207
1994-95	Kharif	211,465	211,336	129
	Rabi	212,305	211,646	659
	Total	423,770	422,982	788
Average of 3 years	Kharif	216,285.33	215,841.67	443.67
	Rabi	213,777.00	213,550.67	226.33
	Total	430,062.33	429,392.33	670.00

Average Area Irrigated with Sugar cane counted twice =		485,031.00
Intensity of Irrigation with Sugar cane counted once	=	130.60%
Intensity of Irrigation with Sugar cane counted twice	=	147.30%
Remission as Percentage of Cropped Area	=	0.14%

Table G-4 Datails of C.C.A, Area Assessed, Remission & Water Charges in 12 Selected Distributaries of L.J.C., L.C.C. & C.B.D.C.

Item	Pindi Disty	Hujjan Disty & Minors	Kirana Disty & Minors	Sarang wala Disty	Nasrana Disty	Gojra Disty	Mungi Disty	Janiwala/ Hamza Disty	Pir Mahal Disty	Killian wala Disty	Thaman Disty	Chhinna Disty & Minors	Total
1. Culturable Commanded Area (C.C.A.) in acres	5,646	62,359	89,754	16,374	85,686	18,632	47,347	16,093	46,196	46,196	12,882	40,498	487,663
2. Area Assessed (3 Yrs. Av. (1992-1995))	9,563	106,039	129,268	27,872	121,436	23,301	68,185	25,132	67,471	87,867	15,801	47,411	729,346
3. Remission (3 Yrs. Av. (1992-1995))	-	365	171	-	10	265	969	110	236	741	-	-	2,867
Remission as % of area assessed	0.00	0.34	0.13	0.00	0.01	1.14	1.42	0.44	0.35	0.84	0.00	0.00	0.40
4. Total Water Charges in 1,000 Rs. (1995)	371	6,884	5,823	1,073	4,673	931	2,828	980	2,959	3,236	593	1,546	31,897
5. Water Charges per Cropped Acre (1995)													
K	38.66	67.53	52.11	42.82	46.32	47.02	57.11	45.22	61.17	43.50	48.05	36.74	
R	38.48	61.77	38.22	31.63	30.29	33.88	30.06	31.28	37.15	30.54	30.12	29.20	
6. Water Charges on Flate Rete per Season (1995)	32.84	55.20	32.44	32.75	27.27	24.98	29.87	30.45	32.03	35.02	23.03	19.09	

Table G-5

Statement Regarding Yard stick, Demand and Release of Funds for O & M of L.J.C.

(Rs in million)

Year	Yard stick	Demand	Funds Released	Short fall	Commulative Short fall
1991 - 1992	19.90	19.90	9.74	10.16	10.16
92 - 93	19.90	21.49	7.75	13.74	23.90
93 - 94	19.90	23.21	13.20	10.01	33.91
94 - 95	19.90	25.06	15.77	9.29	43.20
95 - 96	19.90	27.07	3.50	23.57	66.77

Table G-6 Statement of Annual Expenditure
Lower Jehlum Canal (Rs.in Millions)

i) STAFF

a) ENGINEERING / EXECUTIVE STAFF :

TITLE	PAY AND ALLOWNCES	UTILITIES, TANSPORT, COMMUNICATION, etc.	
CIRCLE OFF	1.18	0.30	
SARGODHA DIVISION	10.04		
KIRANA DIVISION	9.28	3.83	
SHAHPUR DIVISION	7.78		
RASUL DIVISION	11.28		
TOTAL	39.56	4.13	
TOTAL ENGR / EXEC STAFF			43.69

b) REVENUE STAFF :

SARGODHA DIVISION	6.51		
KIRANA DISION	8.62	7.50	
SHAHPUR DIVISION	3.17		
RASUL DIVISION	2.92		
TOTAL	21.22	7.50	
TOTAL REVENUE STAFF			28.72
GRAND TOTAL (a & b)			72.41

ii) M AND R EXPENSES OF L.J.C

YEAR	1991-92	1992-93	1993-94	1994-95	AVERAGE
DEMAND	19.90	21.50	23.50	25.10	22.50
RELEASE	9.70	7.70	13.20	15.70	11.58

COST OF STAFF AND MAINTENANCE OF WORKS (i & ii)	=	83.99
PERCENT EXPENDITURE ON WORKS	=	13.78%
PERCENT EXPENDITURE ON STAFF	=	86.22%

Table G-7 Statement of Annual Expenditure
Lower Jehlum Canal (Rs.in Millions)

i) **STAFF**

a) ENGINEERING / EXECUTIVE STAFF :

TITLE	L.C.C EAST	L.C.C WEST	TOTAL
PAY & ALLOWNCES	28.58	38.63	67.21
UTILITIES etc.	0.98	1.25	2.23
SUB TOTAL	29.56	39.88	69.44

b) REVENUE ASSESSMENT STAFF :

PAY & ALLOWNCES	22.73	18.15	40.88
UTILITIES etc.	2.09	1.95	4.04
SUB TOTAL	24.82	20.10	44.92
G.TOTAL (a & b)	54.38	59.98	114.36

ii) **M AND R EXPENSES (WORKS) OF L.C.C**

YEAR	1993-94
DEMAND	31.80
RELEASE	5.91

COST OF STAFF AND MAINTENANCE OF WORKS (i & ii)	=	120.27
PERCENT EXPENDITURE ON WORKS	=	4.91%
PERCENT EXPENDITURE ON STAFF	=	95.09%

Table G-8 Statement of Expenditure and Staff Strength
Central Bari Doab Canal

STAFF STRENGTH

TOTAL STAFF EXCLUDING TUBE WELL STAFF: 696

ANNUAL EXPENDITURE

a) STAFF :

YEAR	1993-94	1994-95	1995-96	AVERAGE
ENGR / EXEC	12.27	14.99	12.56	13.27
REVENUE	9.21	8.91	9.59	9.24
TOTAL	21.48	23.90	22.15	22.51

b) WORKS :

EXPENSES	8.00	10.83	9.69	9.51
G.TOTAL (a & b	29.48	34.73	31.84	32.02

PERCENT COST OF M AND R	=	29.69%
PERCENT OF STAFF	=	70.31%

Table G-9 Statement of Annual Expenditure in 12 Selected Distributaries of L.J.C, L.C.C. & C.B.D.C.

(1994-95)

Title	Pindi Disty	Hujjan Disty & Minors	Kirana Disty & Minors	Sarang wala Disty	Nasrana Disty	Gojra Disty	Mungi Disty	Janiwala/ Hamza Disty	Pir Mahal Disty	Killian wala Disty	Thaman Disty	Chhinna Disty & Minors	Total (%)
a) STAFF:													
Engineering/Maintenance Staff	50,000	1,760,000	2,400,000	388,512	426,276	202,000*	364,980	196,140	413,040	260,036	436,820	488,715	7,386,519 44.0%
Revenue Staff	150,000	1,100,000	1,500,000	287,073	880,812	168,000*	338,160	225,180	338,160	274,920	368,425	412,795	6,043,525 36.0%
Total	200,000	2,860,000	3,900,000	675,585	1,307,088	370,000*	703,140	421,320	751,200	534,956	805,245	901,510	13,430,044 80.0%
b) Annual M & R**	70,000	500,000	800,000	_	144,678	96,000*	_	_	476,549	270,000	947,200	58,872	3,363,299 20.0%
Grand Total (a & b)	270,000	3,360,000	4,700,000	675,585	1,451,766	466,000*	703,140	421,320	1,227,749	804,956	1,752,445	960,382	16,793,343
Annual Assessed Water Charges (1994-95)	370,877	6,884,022	5,823,453	1,072,553	4,672,940	930,707	2,828,064	980,150	2,959,144	3,235,848	593,327	1,546,108	31,897,193

* Estimated.

** Average of two years where available

Table G-10 Statement of Staff Strength
Lower Jelum Canal

STAFF STRENGTH

a) ENGINEERING / EXECUTIVE STAFF :

TITLE	CIRCLE OFFICE	SARGODHA DIVISION	KIRANA DIVISION	SHAHPUR DIVISION	RASUL DIVISION	TOTAL
S.E	1	_	_	_	_	1
XEN	_	1	1	1	1	4
A.Es	_	3	4	3	2	12
SUB ENGRs	_	14	15	11	10	50
S.TOTAL	1	18	20	15	13	67

b) OTHER STAFF :

FIELD STAFF	_	154	141	101	149	545
OFF / MISC	31	181	150	149	236	747
S. TOTAL	31	335	291	250	385	1292
G. TOTAL (a & b)	32	353	311	265	398	1359

c) REVENUE ASSESSMENT STAFF :

STAFF	_	202	247	87	96	632
TOTAL L.J.C STAFF (a,b & c)	32	555	558	352	494	1991

Table G-11 Statement of Staff Strength
Lower Chanab Canal

STAFF STRENGTH

a) ENGINEERING / EXECUTIVE STAFF :

TITLE	L.C.C EAST	L.C.C WEST	TOTAL
S.E	1	1	2
XEN	3	4	7
A.E	9	9	18
SUB ENGR	38	50	88
SUB TOTAL	51	64	115

b) OTHER STAFF :

MAINTENANCE STAFF	966	1188	2154
TOTAL O & M STAFF (a & b)	1017	1252	2269

c) REVENUE STAFF:

STAFF	678	554	1232
G.TOTAL (a, b & c)	1695	1806	3501

Table G-12 Statement of Staff Strength

(12 Selected Distributaries)

a) ENGINEERING / EXECUTIVE MAINTENANCE STAFF :

Title	Pindi Disty	Hujjan Disty & Minors	Kirana Disty & Minors	Sarang wala Disty	Nasrana Disty	Gojra Disty	Mungi Disty	Janiwala/ Humza Disty	Pir Mahal Disty	Killian wala Disty	Thaman Disty	Chhinna Disty & Minor
A.Es	–	1	1	1	1	–	1	–	1	0.50	0.40	0.25
Sub Engrs.	–	2	3	1	2	–	1	2	1	1	0.75	0.75
Gauge Readers	1	4	8	1	5	–	2	2	3	2	1	1
Baildars	1	30	55	2	9	–	9	2	10	9	10	14
Clerks	–	1	1	2	2	–	–	–	–	0.50	0.40	0.25
Peons	–	1	1	1	1	–	–	–	–	0.50	0.40	0.25
Drivers	–	3	4	–	–	–	–	–	–	0.17	0.40	0.25
Total	2	42	73	8	20	–	13	6	15	13.67	13.35	16.75

b) REVENUE STAFF :

Zilladars	1	2	3	1	2	–	1	1	1	1	1	1
Patwaries	3	18	27	5	14	–	7	3	7	13	8	10
Basta Bardars	–	2	4	–	–	–	1	1	1	1	–	–
Clerks	–	–	–	–	–	–	–	–	–	–	1	1
Peons	1	2	3	1	2	–	1	1	1	1	1	1
Total	5	24	37	7	18	–	10	6	10	16	11	13
Grand Total (a+b)	7	66	110	15	38	–	23	12	25	29.67	24.35	29.75

Table G-13 Tube Well Data in 12 Selected Distributaties of L.J.C., L.C.C. & C.B.D.C.

	Title	Pindi Disty	Hujjan Disty & Minors	Kirana Disty & Minors	Sarang wala Disty	Nasrana Disty	Gojra Disty	Mungi Disty	Jani wala/ Humza Disty	Pir Mahal Disty	Killian wala Disty	Thaman Disty	Chhinna Disty & Minor
i)	No. of Private Tube Wells	21	366	228	104	85		505	41	31	757	–	–
	Total Approximate Discharge Capacity (in cusecs)	13	475	379	–	63.75		6" , 5" Dia	6",5.5",5" Dia	5" , 4.5" Dia	–	–	–
	Total Annual Pumpage	–	–	–	–	–		–	–	–	–	–	–
ii)	No. of Public Tube Wells	–	–	–	–	–		–	–	20	–	–	–
	Total Approximate Discharge Capacity (in cusecs)	–	–	–	–	–		–	–	6" , 5" Dia	–	–	–
	Total Annual Pumpage	–	–	–	–	–		–	–	–	–	–	–

Table G-14 Estimate of expenditure on technical services for institutional reforms. (in US$)

		No.	Unit (US$)	months/days	Total cost
1. Pay & emoluments					
(a)	pay of expatriat expart	1	15,000	60	900,000
	Air fare (1 trip per year)	1	4,000	5trips	20,000
	House rent allowance	1	1,000	60	60,000
	per diem allowance asumig 15days in field/month	1	40/day	900	36,000
	Total				1,016,000
(b) pay of Local staff					
(i)	comunity organizer	1	2,500	57	142,500
(ii)	Legal expert	1	2,000	33	66,000
(iii)	Irrigation Engineer	1	1,500	54	81,000
(iv)	finance expert	1	1,000	54	54,000
(v)	social organizers	4	750	51	153,000
(vi)	village motivators	12	200	51	122,400
(vii)	office Asst / computor operator	1	400	60	24,000
(viii)	drivers	3	200	60	36,000
(ix)	office boys / watchman	2	150	60	18,000
	Total				696,900
(c) per Diam allowance Local staff					
(i)	comunity organaizer (asuminy 20days in field per month)	1	30	1,140	34,200
(ii)	Irrigation Enginner (20days)	1	25	1,080	27,000
(iii)	financial enpert (10days)	1	25	540	13,500
(iv)	Legal expert (5 days)	1	30	165	4,950
(v)	social organizers (25 days)	4	4	1,275	20,400
(vi)	travelling allowance of village motivators (25days)	12	4	1,275	61,200
(vii)	drivers (25 days)	3	4	1,400	16,800
	Total				178,050
	Total Pay and Emoluments				1,890,950
2. Transport & Vehicles					
	3 No pajeros 4 x 4 @ $50,000 per unit =				150,000
	4 No motor cycles @ $4,000 per unit =				16,000
	office equipment including telephone, computors, printers, fax machine, photo copier, office furniture, etc.	L.S			25,000
	operation & maintenance of vehicles @ $300/pM each				49,500
	operation & maintenance of motor cycles @ $40pM/vehicle				8,160
	Total transport cost				248,660
3. Offices					
	rent of central office for 5 experts @ $400pM				24,000
	rent of 4 no field offices @ $40 pM/unit				8,160
	Electricty & hot & cold weather charges @ $300pM				18,000
	office stationary, mail including telephon bills @ $400pM				24,000
	Total Offices expenditure				74,160
4.meetings & publicity L.S @ $5,000/year					25,000
	Total office maintenance and publicily				347,820
Grand Total					2,238,770
	contingenecies @ 10%				223,877
	Total				2,462,647
	Say				2,460,000