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GUJARAT

POLICY OPTIONS FOR PARTICIPATORY IRRIGATION MANAGEMENT

Farmer Organisations and
Organisational and Procedural Changes

WALMI

**WATER AND LAND MANAGEMENT
INSTITUTE, ANAND**

in collaboration with

ISPAN

**IRRIGATION SUPPORT PROJECT
FOR ASIA AND THE NEAR EAST**

Sponsored by the U.S. Agency for International Development

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October 1994

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EXECUTIVE SUMMARY

Introduction

About 75 percent of India's population lives in rural communities and is employed in agriculture and related sectors. With urbanisation and industrialisation, the proportion is likely to decline to 60percent but due to rapid population growth, the absolute numbers employed on agriculture will substantially grow. The productivity of irrigated agriculture (IA) has been relatively low. Rural poverty, lack of adequate inputs, small holdings and social divisions due to caste-religion-politics have been some of the identified maladies.

Economic development of rural societies through peoples' participation and co-operative movement has been attempted by farmers and their leaders in several sectors of development. However, though considered as absolute necessity for productivity, IA has not received adequate attention. Water management (WM) culminating into irrigation management (IM) has been practised through Governments in Irrigation Departments (ID) because surface water development was carried out through IDs during the last 40 years.

Farmers remained as recipients only, while several deficiencies surfaced. In case of ground-water resources the development took place mostly in private sector. Only a small portion is under Government administration. All government managed and a few privately managed systems cover several land holdings which have to share the available water supplies.

It is widely recognised that if such farmers are organised into FOs, the sharing can become more equitable, less wasteful and more productive. For this purpose, organisational and procedural changes (OPC) are necessary, so that the IM systems can be turned over (TO) to FOs. The National and State water policies have incorporated these concepts during the last decade. Along with this managerial change, the IDs have recognised that RWS, volumetric measurement and appropriate pricing of water are necessary to enable removal of various identified deficiencies.

Programmes

The Gujarat State has been one amongst several States where the governments have taken active steps to introduce the concept and experiment in setting up FOs. The GOG has pronounced its commitment and has initiated OPC through CADA, GWRDC and WALMI. Non government Organisations (NGOs) like Sadguru Water Development Foundation (SWDF) and Agha Khan Rural Support Programme (AKRSP) have provided catalytic action in surface lift

schemes and medium irrigation projects. External funding through World Bank (WB) was instrumental in introduction of Rotational Water Supply (RWS) and three tier users' committees for better IM.

The Action Research Programme (ARP) launched under the aegis of USAID was conducted in the State with some significant results. All these efforts have not necessarily culminated into successes. There have been some failures. But the spread of the efforts has been practically all over the State covering all the agro-climatic sub-zones and both surface and ground-water sectors. The coverage has been less than 1 percent of irrigated command but qualitatively, experiences have been wide ranging throwing up useful indicators. The present enumeration and analysis of the work done is taken up under Irrigation Support Programme for Asia and Near East (ISPAN) as a follow up of ARP.

The irrigated area in the State will ultimately comprise 3.94 M ha through major, medium and minor surface water schemes and 2.55 M ha through ground-water schemes. About 50 percent coverage through surface waters is to be realised through the Sardar Sarovar Project (SSP). Potential development so far is about 53 percent. If the concept of FOs succeeds, it has a sizeable potential for adoption through viable models and approaches.

Projects

In surface water sector, experiences have been generated in Ukai-Kakrapar projects of South Gujarat, 5 projects between rivers Tapi and Narmada where AKRSP has acted as a catalytic agent for four, 2 projects viz. Mahi and Panam in central Gujarat and projects like Fatewadi, Khari-cut, Dantiwada and Dharoi in North Gujarat. In Saurashtra, Machhu-I and Uben projects have tried out the concept. SWDF has successfully experimented in central Gujarat in Panchmahals district in setting up, operating and maintaining surface lift schemes. Informal FOs have been successfully managing IM, albeit partially for a long time as in Kharicut in central Gujarat and Lalpari projects in Saurashtra. In ground-water sector, GWRDC has made serious efforts with partial success. It has been observed that farmer managed systems performed about 1.5 times better than adjoining systems managed by Government. Chapter 2 enumerates these experiences and provides analysis to arrive at conclusions, findings and lessons on each component of the effort, viz. FO, OPC, and TO.

Farmer Organisations

Certain minimum conditions on ground help initiation of the process of formation of FOs. The improvement of IA through better IM and WM has to

be at the core of the objectives. It must be a felt need of the farmers who want to remove the deficiencies like inequitable distribution of water, over irrigation and wastage resulting into degeneration of land and low productivity. A multidisciplinary catalytic team is necessary. It should have the confidence and support of government. The line department must be enthusiastic and should have co-operation of Agriculture and Co-operation Departments (AD & CD). The climate has to be built up consciously and painstakingly by the ID through appropriate incentives and motivating factors.

The entry point for a formal FO in any irrigation system has to be such that financial and organisational viability is assured while it does not cause unwieldiness. Registration process does take long initially, but with good models around, diffusion is faster. Help of CD is useful in accelerating the process.

The FO must become financially viable. It should be able to buy irrigation water on a whole-sale basis (volumetric) and distribute it to members on say crop-area basis in retail. If retail collections are more than whole-sale price, the FO becomes financially viable. Such FO can then become organisationally also viable, making democracy function. Collection of water rates and payment to government has to be the central aim of sustainability. Once this is achieved, the FO can diversify in other fields of IA.

The human resources development (HRD) has to be taken care by institutes like WALMI and NGOs. They have to reorient the ID staff for taking on this vital task. They have also to train NGOs, farmer leaders and grass root level workers who wield influence with the masses. Ultimately the experiences and experiments should throw up feasible approaches which can be utilised in expanding the FO concept.

Turnover

Turnover has been considered as a process for transfer of management of infrastructure and O&M of irrigation system to FOs while bestowing appropriate authority and functional autonomy through a MOU between ID and the FO. It aims at replacing ID from the system almost totally, save, the ownership. It also presupposes that the FO has become financially viable and is on way to become financially and organisationally sustainable. In Gujarat systems, TO has not been necessary in SWDF area because of own efforts at building the system. In ground-water schemes, TO has been effected in various schemes, while in surface water sector, TO has taken place only in twenty five schemes. The experience has been rather limited.

Organisational and Procedural Changes

Various changes are called for in O&P matters to make a FO viable and then sustainable. These include legal changes which empower ID itself, its line staff and the FOs. GOG had promulgated an ordinance in 1989 modifying the Bombay Irrigation ACT, 1879 (BIACT) as amended from time to time. It however lapsed in absence of its adoption by the State Legislature. The bill is now under reconsideration of the State. Pending its enactment, the present act needs to be amended to enable the thrusts to IM through FO, OPC and TO. It is obvious that legal provision by themselves do not bring about change in administration. Strong political backing is required to implement such provisions.

Meanwhile, the GOG has issued administrative orders to help efforts in this direction. A working group has been set up under the Chairmanship of the Chief Secretary to adopt and implement these concepts. A Standing Committee under the Chairmanship of the Secretary, NWRD will act on behalf of the Working Group. It is hoped that these developments will hasten OPC.

The organisational changes include restructuring of ID at lower level, as FOs are formed. It would comprise reduction of lower level staff and their redeployment. It would also mean employment of required persons in FOs without increasing financial burden. The procedural changes required for a smooth change over would comprise adoption of RWS, volumetric measurement and distribution; identification of duties of FOs; and reorientation of ID line staff to face new situations.

Recommendations

The experiences though relatively limited in coverage have thrown up various ideas which if adopted could lead to a wider spread of the concepts of FO, OPC and TO. The important recommendations are as follows. Specified research agenda to probe unanswered questions is also recommended.

- If adoption of a comprehensive legislation is likely to take time, the present Bombay Irrigation Act, 1879 may be amended to provide for formation of FOs with a specific stipulation that the irrigation water supply would be made available only to FOs. Volumetric supply and RWS being in overall interest of farmers, should be incorporated in the Act. Wherever necessary, a transition period of one or two years may be prescribed.

- NGOs' catalytic role would remain limited to promotion of FOs as models. The primary responsibility for forming FOs in irrigated areas would be with ID for which the line staff may be trained, motivated and assigned the tasks of catalyst.
- The catalyst should not withdraw before FO's viability is established; nor should it stay too long to cause over dependence.
- The ID should launch multi-media mass awareness programme amongst target water users.
- A three tier FO comprising (i) informal set up at outlet level (ii) a formal FO at minor level catering upto 500 ha, and (iii) a federation at distributary level is recommended.
- Water rates should reflect its scarcity value from time to time. They should be based on volumetric bulk supplies to FOs.
- A generalised model MOU based on experience generated so far may be issued early to serve as a guide for intending FOS. Alternative models may be considered.
- Appropriate HRD programme should be devised for ID line staff and farmers for co-operative participation.
- Superintending Engineers may be empowered to grant approval to formation of FOs as per government guidelines.
- Government policy may be revised to ensure construction and maintenance of field channels by FOs while assuring continued technical guidance.
- Incentives may be provided for motivating line staff through performance appraisal.
- The role to be performed by ID, CADA and WALMI in future may be assessed and studied in depth to enable their effective transformation.
- Efforts may be made to revive non functioning FOs after removing the causes through suitable remedies.

Next Steps

The report suggests a practicable action plan for the next three years. It is felt that these steps if taken will take care of some short term concerns while setting up pace for action for long term possibilities. In brief, following steps are suggested for the next three years:

- 1995** Launching all pilot projects; Moving the new bill or proposals to amend BIACT. Issue of policy-model MOU/MOA - volumetric water rates. Modification of policy about field channels. Simplification of registration process. Training of catalysts, line staff and farmer leaders of pilot project commands. Setting up of task forces. Starting work on research agenda. Setting up of co-ordination mechanism between ID-AD-CD.
- 1996** Review of role of ID - CADA - WALMI and reorientation training of farmer leaders and line staff. Feedback on causes of failures and proposals for future. Identification of catalysts. Restructuring of ID to suit new role. Setting up of diffusion targets in 4 different categories of projects. Setting up federations on Mahi and Tapi commands. Public awareness campaign.
- 1997** Finalise targets for ninth Five Year Plan. Set up confederation on at least Mahi and Tapi systems. Trials for privatisation. Start with Narmada FOs in a concentrated manner. Set up a conflict management mechanism outside government fold. Attempt diffusion on a large scale and provide mid course corrections.

ACRONYMS AND TERMS

ADC	:	Area Development Commissioner
AD	:	Agriculture Department
AI/DC	:	Area Irrigated per Day Cusec
AKRSP	:	Agakhan Rural Support Project
ARP	:	Action Research Project
BIACT	:	Bombay Irrigation Act
CADA	:	Command Area Development Agency
CCA	:	Culturable Command Area
CD	:	Cooperation Department
CE(C)& JS	:	Chief Engineer (CAD) and Joint Secretary
CE(D)& JS	:	Chief Engineer (Damanganga) and Joint Secretary
CE(IP)& JS	:	Chief Engineer (Irrigation Projects) and Joint Secretary
CE(P)& JS	:	Chief Engineer (Panchayat) and Joint Secretary
CE(QC)&JS	:	Chief Engineer (Quality Control) and Joint Secretary
CE(S)&JS	:	Chief Engineer (Saurashtra) and Joint Secretary
cusec	:	Cubic feet per second
DEE	:	Deputy Executive Engineer
EE	:	Executive Engineer
FC	:	Field Channels
FO	:	Farmers Organisation
FYP	:	Five Year Plan
GEB	:	Gujarat Electricity Board
GERI	:	Gujarat Engineering Research Institute
GOG	:	Government of Gujarat
GOI	:	Government of India
GO	:	Government Order
GWRDC	:	Gujarat Water Resources Development Corporation
ha	:	Hectare
HRD	:	Human Resources Development
IA	:	Irrigated Agriculture
ICAR	:	Indian Council of Agriculture Research
ID	:	Irrigation Department
IM	:	Irrigation Management
IRMA	:	Institute of Rural Management, Anand
ISPAN	:	Irrigation Support Programme for Asia and Near East
LI	:	Lift Irrigation
LLF	:	Lower Level Functionaries

M&R	:	Maintenance and Repairs
MAFT	:	Million Acre Feet
MC	:	Managing Committee
M cft	:	Million Cubic Feet
M cum	:	Million Cubic Metre
M ha	:	Million Hectare
MD	:	Managing Director
MIS	:	Management Information System
MOA	:	Memorandum of Association
MOU	:	Memorandum of Understanding
N&WRD	:	Narmada and Water Resources Department
NABARD	:	National Bank for Agricultural and Rural Development
NAP	:	National Agriculture Policy
NGO	:	Non Government Organisation
NWP	:	National Water Policy
O&M	:	Operation and Maintenance
OFD	:	On Farm Development
OPC	:	Operational and Procedural Changes
PLWMC	:	Project Level Water Management Committee
RWS	:	Rotational Water Supply
SE	:	Superintending Engineer
SO	:	Sectional Officer
SSNNL	:	Sardar Sarovar Narmada Nigam Limited
SSP	:	Sardar Sarovar Project
SWDF	:	Sadguru Water Development Foundation
TCD	:	Training Cum Demonstration
TO	:	Turnover
TW	:	Tubewell
USAID	:	United States Agency for International Development
VA	:	Voluntary Agencies
VSA	:	Village Service Area
VSAC	:	Village Service Area Committee
WALMI	:	Water and Land Management Institute
WB	:	World Bank
WM	:	Water Management
WMC	:	Water Management Committee
WRM&T	:	Water Resources Management and Training

Chapter 1

BACKGROUND

Introduction

The present series of reports covering States of Gujarat, Maharashtra, Tamilnadu, Bihar and Himachal Pradesh tries to capture various experiences with FO promotional sustainability generated so far, enumerates the efforts made and brings out recommendations for strengthening this movement. Common deficiencies noticed in the existing systems in Gujarat relate to low water rates inadequate to cover even O&M costs, crop area based water-supplies and rates, and low level of water use efficiency. This situation has resulted in a lag between utilisation and potential, inequity in distribution, structural deficiencies in distribution network, over-irrigation and consequent ill-effects, and low level of recovery of water charges.

It has been recognised that these deficiencies can be substantially eliminated by increasing the water rates and levying the same on volumetric basis to groups of farmers and also by prudent on farm water management(WM) which could comprise construction and maintenance of field channels, fixing turns for receiving waters, avoidance of wastage and sharing of distress as well as surplus, assessment and collection of water fees and remittance to Government, drainage of excess waters, conjunctive use of surface and ground waters to maximise productivity and on farm development (OFD) works.

For this purpose, participation of farmers or community involvement in the process is important. The concept has been advocated in the country since launching of the sixth five year plan (FYP). The National Water Policy (NWP) in 1987 emphasised this need. Articles 10, 11, 12 of NWP are kept at Annex A for reference. They confirm this position alongwith need for removal of deficiencies in IM. For this purpose, it advocates rotational water supply (RWS), volumetric measurement- supply-charging of water, command area development (CAD) activities and raising of water rates.

The Gujarat State report describes efforts made by Government of Gujarat (GOG) in Narmada and Water Resources Department (NWRD) through its organisations, besides those made by farmers on their own or with the help of voluntary agencies (VA) and non Government organisations (NGOs). It covers the three thrust areas of formation of FOs, OPC for promoting and strengthening of FOs and the process of TO. Through this narration, the report aims at analysis of successes and failures, identifying the lessons learnt and making recommendations for future action.

Gujarat State and Its Irrigation Systems

The State of Gujarat lies in Western India between the rest of the peninsular region in the South and Indo-Gangetic plains in the North. It has a geographical area of about 19.6 M ha and falls in the agro-climatic zone 13 of the country. However, on the basis of climate, topography, soil types and rainfall it is further divided into 7 sub-zones (Figure 1). The State accounts for about six percent of area and five percent of population of the country.

It has a long coast-line along the Arabian sea in the West and low lying plains. Its mainland is encircled by hills in the South, East and North-West. The Saurashtra and Kachchh peninsulas comprise undulating topography with hills rising in the middle causing natural drainage in all the four directions. The districts of Kachchh, Banaskantha, Mehsana and Surendranagar comprise sizeable low lying desert land mass.

Four inter-State Rivers viz. Sabarmati, Mahi, Narmada and Tapi flow through Gujarat before they meet the Arabian sea. Besides, there are several rivers which originate in the State and meet the sea. Rainfall occurs during less than 100 days of monsoon and varies from 340 mm in the North-West to over 1800 mm in South. However, most areas of 11 out of 18 districts of the State, North of River Narmada are drought-prone. High evaporation rates accentuate the deficiency of soil moisture in these districts.

As against the total geographical area of 19.6 M ha, 10.7 M ha are reported under dry land farming, 3.8 M ha in the command of irrigation projects and 1.2 M ha as coastal saline lands. About 73 percent area is rain-fed. The harnessable water resources would provide irrigation to 6.5 M ha of which 4.0 M ha will have the facility of surface irrigation and 2.5 M ha can be irrigated by ground-water. Out of 4.0 M ha of surface irrigation, Narmada project would irrigate about half the area. Thus including Narmada about 6.5 M ha out of 12.5 M ha of cultivable land of Gujarat will have irrigation facility. Source-wise, ground-water would provide irrigation to nearly 20 percent, canals 29 percent, tanks and other sources 3 percent of cultivable area.

South Gujarat upto river Tapi (sub-zone 1) is surplus in available surface waters. Central Gujarat between Tapi and Mahi Rivers (sub-zones 2 and 3) has adequate resources. Areas North of Mahi (sub-zone 4) have increasing water deficit towards North. Saurashtra peninsula (sub-zones 6 and 7) is mostly water deficit excluding sub-zone 7 south of Girnar hills. Kachchh peninsula (sub-zone 5) is again water deficit. Ground-water potential is very limited South of Tapi and is confined to plains North of Tapi. Sizeable aquifers enabling sinking of tubewells exist in this area. But as one enters in water deficit regions, one finds that aquifers are being mined. In Saurashtra, ground-water availability is very limited. In Kachchh, there are some good aquifers with limited potential.

Irrigation development has taken place through 10 major schemes each covering irrigation command more than 10000 ha, 90 medium schemes (each between 2000 and 10000 ha) and over 5000 minor irrigation schemes (each less than 2000 ha). About 10, 40 and 3500 numbers of schemes respectively in these categories are yet to be built. Sardar Sarovar Project (SSP) on River Narmada is designed to irrigate about 1.8 M ha. Irrigation schemes based on surface waters cover large areas covering thousands of land holdings. Minor irrigation schemes relatively have very small numbers of land holdings. The reliability of water availability however reduces as the size of the scheme reduces. There are some lift irrigation schemes based on reservoirs or canals. Some are based on small weir schemes built on tributaries and rivers which carry adequate post- monsoon flow and are mostly restricted in sub-zones 1, 2 and 3.

Dug-wells and shallow bores have given way to deep tubewells over the last three decades. A small proportion of about 15 percent irrigation from ground-water is done through Government owned tubewells. Table 1 indicates the area irrigated alongwith ultimate potential both in surface and groundwater sectors.

Table 1
Status of Irrigation Potential and Coverage by FOs

(Lakh ha)

Sr.No.	Item	Ultimate Irrigation Potential	Created Potential (June 1993)	Area covered Under FOs	<u>Col.5x100</u> Col.4	6
1	2	3	4	5		6
A. Surface Water						
1.	Major & Medium Schemes (without Narmada)	18.00	12.72	0.06	0.47	
2.	Narmada Project (including conjunctive use)	17.92	-	-	-	
3.	Minor Irrigation Schemes.	3.43	1.98	0.01	0.51	
	Sub total (A)	39.40	14.70	0.07	0.48	
B. Based on ground water						
4	WRD		2.83			
5	Private Sector	25.48	17.17	0.12	0.60	
	Sub total (B)	25.48	20.00	0.12	0.60	
	Grand Total	64.88	34.70	0.19	0.55	

Depending on adequacy of water supply from irrigation schemes, cropping pattern has evolved. In south and central Gujarat besides some areas of Saurashtra, perennials and cash crops can be grown which give the IA substantial financial viability. In Saurashtra, Kachchh and North Gujarat (sub-zone 4), farmers rely on cereals and two seasonals. Obviously, such schemes aim at providing protective irrigation in monsoon and maximum possible support for winter crops. The agro-climate of a region undoubtedly has a profound impact on irrigation supplies and farm produce.

A surface flow irrigation project comprises a dam or a weir to store and divert flow into a main canal. The water reaches a farm through a distribution system carrying and distributing the flow, enroute comprising branch canals, distributaries, minors, water courses and finally field channels. Size of the main canal depends on the size of the irrigation scheme. A water course is the smallest in the system carrying 0.5 to 1.5 cusecs of flow. Entire system upto water courses is maintained by ID. The field channels take off from water courses and terminate at farm gates. At present they are constructed and maintained by ID, although originally it was the responsibility of farmers. Figure 2 indicates a typical distribution system. The irrigation water is supplied to farmers on crop-area basis as per sanctioned applications. The GOG has accepted the principle of RWS and also of volumetric supply for implementation. A gradual changeover is taking place.

Institutions, Legislations, and Policies

The subjects of irrigation and agriculture are looked after by different departments of GOG as in Government of India (GOI). The NWRD carries out the role as Irrigation Department (ID) and looks after the entire sector in an integrated manner. Agriculture Department (AD) similarly looks after all agricultural activities. In ID, major and medium schemes are looked after by regional or project officers at State level, whereas minor flow irrigation schemes are looked after by district Panchayats as per policies, procedures and financial support of GOG through deputed staff. These activities are supervised by Superintending Engineers of GOG responsible to Chief Engineer (Panchayats) and Joint Secretary [CE(P) and JS] in NWRD. Ground-water is entrusted to Gujarat Water Resources Development Corporation (GWRDC) which acts directly under the NWRD. CAD activities are co-ordinated by Chief Engineer (CAD) and Joint Secretary [CE (C) and JS] in NWRD and are managed through regional Area Development Commissioners (ADCs). Organisation chart is given in Figure 3 and a typical organo-gram for management of an irrigation command is kept at Figure 4.

As far as the IM is concerned, the CE(C) and JS plays a key role at GOG level. He is assisted on field by regional ADCs through whom irrigation is

administered. The CAD programme launched in Dec 1974 had following main objectives in context of the thrust of the present report, besides others, encompassing integrated development of rural communities:

- modernisation, maintenance and efficient operation of irrigation systems down to the outlet of one cusec capacity
- development and maintenance of main and intermediate drainage system
- development of field channels and field drains within the command of each outlet
- implementation of an appropriate system of RWS for realising equity
- development of ground-water for conjunctive use and adoption and introduction of suitable cropping pattern

The autonomous Water and Land Management Institute (WALMI) for Gujarat was set up along with similar institutes in other States to train ID line staff and farmer leaders in IM and irrigated agriculture. The role of WALMI has thus been tailored to provide useful inputs for CAD activities. The GOI has been supporting both by way of funding and co-ordination of national effort.

The state irrigation systems are administered and managed under the Bombay Irrigation Act 1879 (BIACT), as amended from time to time. The act and the Gujarat Canal Rules framed thereunder do not provide for formation of FOs. In accordance with NWP, the GOG promulgated in 1989 the Gujarat Irrigation and Drainage Ordinance. Rules were also framed thereafter for supply of water to groups and associations as a follow-up. The Ordinance however lapsed six months later because, it could not be passed by the State Legislature. The Ordinance, interalia, provided for:

- involvement of farmers in WM
- promotion of groups and associations of farmers
- volumetric supply and pricing of irrigation waters
- optimum use of waters, equity in supplies through RWS and improved performance efficiency of irrigation systems ;

The GOG took several steps (Annex O) before the Ordinance lapsed and geared up the line staff to take on the identified tasks. With the lapsing of the Ordinance, the old BIACT remains in operation.

However, the steps taken in the interregnum have resulted into a basic pattern for FOs. Meanwhile a bill to revive the provisions of the ordinance and replace the act is under consideration. However strong political backing will be needed to enforce such provisions.

The irrigation areas are covered basically by World Bank (WB) assisted projects and some other project areas where RWS is applied. A list of such projects is kept at Annex B. The Government Order (GO) dated 29 July 1987 envisages setting up a three tier hierarchy of committees with farmers' representation comprising:

- a Village Service Area Committee (VSAC) chaired by Sectional Officer (SO) of ID
- a Water Management Committee (WMC) and a Project Level Water Management Committee (PLWMC) at Executive Engineer level. The committees are chaired by ID officers. They include corresponding officers from AD and comprise selected progressive farmers and Panchayat representatives. The composition has to be approved by higher officers in ID. The functions and responsibilities assigned to the committees include the following:

VSAC - monitoring of water delivery schedules, assistance in water charges recovery, resolution of disputes, taking unresolved disputes to higher committees, making suggestions and initiation of formal FOs.

WMC - monitoring canal functioning and supplies, advise on water allocation, monitoring VSACs, conflict resolution.

PLWMC - decide water allocation and RWS schedules, assist in water management planning, monitoring WMCs, conflict management.

These committees thus basically help NWRD, manage water delivery in a more effective manner. They have farmers' representation and participation but have no legal status, nor any powers.

The VSACs have been active in model areas like Panam and Karjan commands because of special attention by ID staff, but, elsewhere they have remained dormant. The viability of these committees is assured with continued ID involvement. In other projects Canal Advisory Committees (CACs) comprising officials, farmers, and elected representatives of people have been set up with similar objectives for each project separately under several government orders.

The concept of farmer managed irrigation systems was adopted by the country right from the sixth Five Year Plan. It was formally introduced in NWP and

followed up in seventh and eighth Five Year Plan. In Gujarat, the Chief Minister reiterated the intentions of the GOG in 1988 while addressing the 2nd Indian Engineering Congress (Annex Q). The Gujarat 8th FYP categorically incorporates a) introduction of RWS and b) setting up of water co-operatives. The SSP stipulates in its 8th FYP, the same policy. The pronouncements of GOG thus clearly bring out a commitment to form FOs, to adopt volumetric water rates and change over to RWS. While the RWS is expected to improve equity in supplies, volumetric supplies would reduce overuse and its ill-effects while making bulk supplies. Charging to FOs will be much less cumbersome and would improve total IM and hence IA. The GOG has recently constituted a Working Group under the chairmanship of the Chief Secretary and comprising NGOs besides government officials to promote FOs and give shape to government policies. A Standing Committee under the chairmanship of Secretary NWRD is also set up to assist the group. In SSP the policy of supplying water in bulk only to groups of farmers i.e. not to individuals, has been adopted right from the beginning for optimising the efficient use of water.

The FOs are being formed not only for the sake of organisation but for the larger goals of IA. Irrigation systems have on one hand realised food security for the country. The irrigation supplies however have not been generally priced even to account for the O&M costs. The States have not been able to raise the price of water due to well known reasons. The inability to remove inequities in supply and to provide assured and timely supply form the core of the problem. Better IA therefore revolves around RWS, volumetric measurements, supply and appropriate pricing. In Gujarat, specific water rate is prescribed for each crop on area basis. The rates were periodically revised. Unfortunately such revision has not been made since 1981 causing decreasing returns from the irrigation sector.

The Vaidyanathan committee set-up by GOI as a follow-up of NWP has made recommendations in 1992 regarding pricing policy. The Gujarat State Finance Commission in its report in 1994 has recommended acceptance of these recommendations by GOG (Annex P). It has recognised the need for raising of water rates alongwith volumetric supply and have recommended gradual increase of rates over a 5 year period to cover O&M costs and a 5 percent return on capital investments. A statutory autonomous Board also has been proposed for this purpose (Annex P). Both these reports merit early acceptance and implementation.

Comparative efficiency of farmer managed canals vis-a-vis their adjoining parent systems has been assessed recently. The results of two such studies for canal irrigation projected in Annex C indicate that the water use efficiency of farmer managed systems is about 50 percent more. Third case study in respect of tube wells also shows that the efficiency of private company managed tube wells is 50 percent more than even tube well co-operatives. Thus, farmers' participation

in irrigation management can be expected to increase irrigation efficiency and help in narrowing the gap between potential created and its equitable utilisation. Water use efficiency of farmer managed system is found 50 percent higher than the government managed systems.

Present Status of Farmer Participation

Apart from the committees set-up in WB assisted projects and in all other projects efforts have been made in setting up FOs in irrigation systems lying in different agro-climatic sub-zones of the State and in different types of projects. The ID undoubtedly has acted on different fronts through ADCs of CADA, WALMI and line officers. The support of WB has been important. The Action Research Project (ARP) supported by United States Aid for International Development (USAID) has enabled a systematic approach and has resulted into viable FOs. The NGOs like Sadguru Water Development Foundation (SWDF) and Agha Khan Rural Support Programme (AKRSP) have played a significant role in chosen projects. While the former has developed the sources and the FOs, the latter has relied upon resources developed by ID and which were waiting for IM. All these efforts have indicated importance of catalytic agents comprising persons/institutions. The catalysts can be from the line staff or can be from amongst the farmers themselves or could be from NGOs or institutions like WALMI. Their presence and active role has proved invaluable. Another important input in these efforts has been that of ID itself. Its complete involvement and commitment is necessary. Where it was present the efforts succeeded, where it lacked failure took place.

Efforts of formation of FOs in surface water systems have been made in:

- South Gujarat, on Ukai-Kakrapar and on projects between Tapi and Narmada Rivers
- Central Gujarat, on Mahi-Kadana, Panam and Fatewadi Systems
- North Gujarat, on Dantiwada and Dharoi Projects
- Saurashtra on Machhu-I, Uben, and Bamanbore Projects.

All these relate to major, medium and minor projects. Individual FOs take care of areas from about 1000 to 200 ha. There has been hardly any efforts in forming FOs in minor irrigation projects. There are two exceptions. The first is the case of Lalpari tank of Saurashtra where an informal FO is working successfully for the last 100 years sharing water among farmers. In the other, AKRSP converted a canal surface irrigation scheme in the village Bamanbore in Surendranagar District to a pipeline irrigation scheme which has been working

successfully for the last 8 years. It is an informal FO which is right now in the process of getting itself registered. Another instance of an informal FO is of Kharicut system in central Gujarat. It has acted as a pressure group for establishing its riparian rights and partial management of irrigation supplies.

In Panchmahals district of central Gujarat, the SWDF has organised FOs on a large scale in lift irrigation based on weirs built on streams having post-monsoon flows. Some lift schemes are based on reservoirs of medium irrigation projects. These efforts are very special and are largely successful. They cover irrigated areas of about 80 ha each.

The GWRDC has attempted formation of FOs on tubewell commands on a fairly large scale mostly in Kheda, Banaskantha and Mehsana districts. Each covers an area of about 80 ha.

The coverage of irrigated commands through these FOs is indicated in table 1. Although 25 FOs on canal systems are working at present, 46 have remained dormant or have become nonfunctional due to various reasons. Efforts have been made at preparation of a memorandum of understanding (MOU) for the FOs. Some already have one which is operational. A model MOU is under consideration of GOG for circulation. Several FOs are in operation under an administrative order of GOG for such functioning. TO has taken place to a substantial level in about 350 FOs. OPC is under consideration and under debate in various fora.

Prospects

The efforts made in Gujarat State cover a wide range of projects set in different agro-climatic sub-zones. Different catalysts have worked for this purpose. Areal coverage so far is less than one percent of irrigated command but qualitatively important experiences have been generated. There have been both successes and failures. But all of them indicate findings, conclusions and lessons for future. They indicate the prospects for FO, TO, and OPC. The report in following chapters tries to capture these.

Recommendations have emerged from the limited experiences which can smoothen the path for future. The Eighth FYP review is started. Working groups will soon embark upon conceptualisation and formulation of ninth FYP. The report therefore aims at identifying next steps, short term as well as those which are important for long term goals.

Chapter 2

EXPERIENCES WITH FARMER ORGANISATIONS

Range of Experience on Farmer Organisations

The participatory irrigation management started more than 100 years ago by formation of an informal group in Lalpari minor irrigation project of Saurashtra by farmers on their own in Saurashtra. After independence in the years 1968-70, ID encouraged farmers of the Fatewadi command to form cooperative societies to lift canal water for irrigating high lands in the initial reaches of the main canal. The SWDF, an NGO promoted surface lift cooperative societies in Panchmahals district for overall welfare of the tribals. Recognising the need of the farmers' participation in IM, ID organised cooperative societies in the command of the major and medium projects namely Ukai-Kakrapar, Mahi, Dharoi, and Machhu-I under CAD programme during 1978-89. WALMI entered into the field in 1987 and organised cooperative societies in ARP area in Mahi command and developed a systematic model for forming FOs. The GWRDC decided in 1989 to handover tube wells to the cooperative societies of beneficiaries on token rent basis. The AKRSP joined with the ID from 1990 for motivating farmers of four specifically identified medium irrigation projects in Bharuch and Surat districts to utilise unused storage behind the reservoirs.

This status is summarised in Table 2. Out of 464 FOs 92 came into being because of the presence of catalytic agencies and 372 came up as a result of efforts of dedicated Government officials. Out of 92 FOs, 89 are functional whereas out of 372 FOs, 262 are functional at present. The mortality in case of government promoted FOs is relatively large.

The area covered by FOs is not even one percent of total area being irrigated in the state. (Table 1). Such a limited experience spread over the long span of 20 years can not be considered as conclusive. However, if analysed qualitatively at micro level, it can capture the relevant lessons. Analysis of experiences spread over a reasonable period has been possible largely in cases of two major projects viz. Mahi and Ukai- Kakrapar, and in case of surface lift irrigation schemes of SWDF in Panchmahals district. The experiences of FO on these projects are analysed for following specific aspects which are considered helpful in realising the set out objectives: factors facilitating FOs, role of catalysts, incentives or motivational factors, level and structure of FO, registration of FO, water rates and recovery, turnover/memorandum of understanding, viability, human resource development, replicability, and organisational and procedural changes.

Table 2
Status of Working FOs in Gujarat

Sr. No.	Category	Number of Registered Cooperatives			Traditional informal group	Catalyst
		Working	Non working	Total		
1.	Major and medium irrigation projects	25	46	71	1	ID WALMI AKRSP Farmer
2.	Minor irrigation projects	-	-	-	1	
3.	Surface lift irrigation schemes.	97	-	97	-	SWDF
4.	Ground water lift irrigation schemes.	242	66	308	-	GWRDC
Total		364	112	476	2	

Apart from experiences on these projects treated individually, experience and lessons drawn from other projects are described collectively but separately. These FOs are at initial stages after formation. Experience has not yet been generated for each project on every aspect.

Table 3 shows the spread of 25 working FOs on major and medium projects out of 71 registered FOs.

Table 3
FOs Formed on Major and Medium Projects

Sr. No.	Project/Region	No. of formal FOs			Informal FOs
		Working	Non Working	Total	
1.	Mahi	2	10	12	-
2.	Ukai Kakrapar	10	15	25	-
3.	Fatewadi	10	2	12	-
4.	Between River Tapi and Narmada	3	-	3	-
5.	Saurashtra and North Gujarat				
	i. Dharoi	-	12	12	-
	ii. Machhu - I	-	7	7	-
	iii. Dantiwada	-	-	-	-
6.	Khariicut (Kalambandhi)	-	-	-	1
7.	Sardar Sarovar Project	84 village area service committees (VSAC) are formed which are not included in the total			
Total (1 to 6)		25	46	71	1

Mahi Right Bank Canal Project

The project located in Mahi river basin comprises a major reservoir at Kadana; a pick up weir at Wanakbori and a major canal system taking off from Wanakbori (Plate 5). Under this project with CCA of 2.12 lakh ha, 12 FOs covering an area of 4600 ha have been registered so far under the Gujarat Co-operative Societies Act 1961. Out of these, seven FOs formed under CAD activity between 1983 and '87 have remained dormant after registration (Annex D). Five FOs were registered during 1991-93 (Annex E).

Two FOs at Sr. Nos. (1) and (2) were initiated under the Action Research Programme (ARP) of the Water Resources Management and Training (WRM&T) project sponsored by USAID. For Sardar Krishi Vikas Piyat Sahakari

Mandali (Sr.No. 1) on Ankalav minor, WALMI, has brought out a comprehensive process document (Annex K) as the experiences generated have been extremely valuable. They are now recounted and analysed against various aspects listed earlier.

Factors Facilitating FO

Two types of facilitating factors were found to work. Under the social interventions, it was found necessary to approach farmers in forming small informal groups under one chak or sub chak. These group sizes were cohesive as each comprised upto 40 farmers. They were convinced through visits by catalysts' team about controlled use of water required under RWS. They were informed about better water application methods and better methods of crop management. This exercise brought about a change in attitudes and encouraged cooperation.

But this effort had to be fully supported by physical interventions without which the farmers' groups would not get assured water supply. It comprised initial inspection of the distributary and minor to identify structural deficiencies which if removed would allow requisite water flow. Later on preparation of plans and estimates for restructuring and start of construction to facilitate right flows to meet the needs of crops as presently adopted and resectioning of the distribution system was taken up. Wherever outlets were not suitably located vis-a-vis command, regrouping was found necessary.

For both interventions farmers were brought together and they publicly shared their grievances, identified remedies and worked towards implementation in co-ordination of catalysts and line staff through a series of seminars/workshops.

The project command lies in Kheda district and has rich soils, good proportion of cash crops, reliable rainfall (about 900 mm annual average) and assured and adequate availability of water through Kadana-Wanakbori system. The farmers are dynamic, progressive, educated and the rural society is relatively advanced, socio-economically. This background combined with social and physical interventions described earlier have been major factors responsible for promotion of the FOs.

Role of Catalyst

The social interventions necessary for promotion of the FO were handled entirely by a multidisciplinary catalyst team of WALMI comprising extension specialist, irrigation engineer and agronomist. Informal visits to common meeting places in villages were made to ascertain the perception of the farmers about the ID, their irrigation methods, leadership potential within the villages.

physical condition of canals and difficulties faced by farmers. A plan of action to conduct outletwise group meetings was prepared and carried out. Efforts were made to involve ID staff at each stage. About 100 such meetings were held over a period of five years before going in for formal registration in consultation with farmers. In retrospect, WALMI feels that due to undue long presence of the catalyst team, the farmers did not take action on their own for organisation. They used to wait for catalysts' intervention, whether required or not. After registration of FO in 1992, the catalytic role however was discontinued rather abruptly which created a sudden frustration amongst farmers and they started becoming indifferent and reverting to individualistic behaviour. Realising need for further support, WALMI once again stepped in under ISPAN aegis in Sept 1993. Fortunately and with little effort, the FO has revived its interest and spirit.

Incentives or Motivational Factors

The catalyst team talked to the farmers about the effect and need for changing over to volumetric water rate for the FO. They were convinced about retail recovery from FO's members on crop-area based water rate as fixed by the government so that FO could generate its own finance.

Farmers accepted that by efficient management through RWS, irrigated area could be increased with same quantity of water. Thus, RWS, volumetric measurement at receiving point and water economy efforts encouraged the farmers.

Level and Structure of FO

Initial effort was to form informal groups of farmers below each outlet. This necessitated subdividing the group into sub groups each covering an area of 8 to 10 ha of a sub-chak covering about 15 holdings. The group leaders were identified by consensus to represent the interest of the group at the minor level(1000 ha) , where a formal FO was formed. Small informal groups facilitated quick consensus on all issues including identification of their leaders. The process therefore could facilitate relatively easy formation of the formal FO.

Formal Registration of FO

The FOs were registered under the Gujarat Co-operative Societies Act 1961. The formal registration took about two years due to the cumbersome registration process in case of Ankalav FO. The registration took less time in case of Kosindra society because of the keen interest evinced by the Joint Registrar of CD. A cooperative society for IM needed government concurrence.

These powers could be easily passed on to SEs as formation of FO is an accepted policy of government. Such delegation would further quicken the registration.

Water Rates and Recoveries

The prevailing water rates of ID are on crop area basis for supplying water to individual farmer and Rs. 0.30/10,000 litres for supplying water in bulk to FOs. For the ARP area, volumetric water rates were worked out for each season separately. For this purpose, the total water charges on crop area basis and volume of water supplied to the farmers of Ankalav sub-minor for the last five years were considered. Based on this data, equivalent volumetric rates for various seasons were derived as Rs. 0.14 for kharif, Rs. 0.21 for Rabi and Rs. 0.30 for hot weather per 10,000 litres and were explained to FO. They were separately got approved from the government. The rates are found workable and acceptable to the FO. The charging to individual farmers by FO continued on crop area basis, leaving sufficient margin for the FO to manage the affairs.

In past, the recovery was low before the system was adopted. After TO in 1993, the entire water charges for the rabi season are recovered and paid to the ID.

Turnover and Memorandum of Understanding

Ankalav and Kosindra FOs took 18 and 6 months respectively for TO after registration. Joint inspection of physical system was made as a pre-requisite and mutually agreed modifications were done by the ID to create confidence amongst the farmers. A draft MOU was discussed with the FO and agreed upon. Before actual taking over canal management, the farmers were given an opportunity to practice the new procedure for one cropping season. The TO formality took place on November 2, 1993 by signing of TO document and MOU by the Executive Engineer and the office bearers of the FO. Since the TO has been made recently and for two societies only, adequate experience is not generated so far.

Viability

A FO can be considered viable on two aspects, financial and institutional. The wholesale and retail water rates are so fixed that some margin is realised by FO for financial viability. A certain proportion of cash crops ensures this.

Water is normally available for all the three seasons in Mahi system. The farmers were trained in improved irrigation methods which increased irrigated area and productivity in the FOs. Comparative income estimates of the ARP area and

MRBC project representative area for the year 1989-90 are reported in Table 4.

Table 4
Comparative Net Income of FO and Non-FO Areas in Mahi Project
Income in rupees per ha.

Sr. No.	Area	Seasons		
		Kharif	Rabi	Hot Weather
1.	ARP area	9929	9906	13906
2.	MRBC Project representative area	6090	6390	5642
3.	Ratio of 1/2	1.63	1.55	2.46

(Source: Economic Appraisal of ARP:1992)

Institutional structure of a formal FO comprises representatives of informal FOs to constitute Executive Committee which comprises a Chairman, a Secretary and a Treasurer. These are democratically elected representatives of Members. For realising institutional viability one or two days training were conducted in two tiers for progressive leaders of groups and sub-groups and office bearers and prospective leaders of these groups. Farmers actively participated and suggested holding field oriented training. Accordingly 34 field visits to trial-cum-demonstration (TCD) farms, water co-operative, agriculture markets, farms of progressive farmers, location of adaptive trials and well managed irrigation projects were arranged. Such visits created remarkable confidence amongst the participants for adopting new techniques. The lessons learnt by participants were communicated to their fellow farmers in follow up field meetings. The process helped in creation of the right climate of progressive attitudes and positive approach.

Training of FOs and Line Staff

The organisation of ID comprising line staff from chowkidar to sectional officer were given two training exposures of one day duration each in the areas of operation plan, RWS system and changed duties of these functionaries on account of formation of FO followed by TO. Training period of only one day was found insufficient by the participants. For future it could be extended to about three days.

Replicability

As a result of diffusion effect, one such FO has come up on its own in the adjoining Kosindra minor. Similarly, in the neighbouring sub-minors, farmers themselves initiated the process of forming FOs. Awareness has been created in distant villages in the Mahi command. Also several requests are received from farmers indicating their readiness for organisation by WALMI. It therefore transpires that the present model has good replicability potential in surrounding command area which has similar socio-economic environment. WALMI however cannot provide catalysts for all such proposals. ID will have to perform such supporting role. Special efforts are required for this purpose.

Ukai Kakrapar Project

The project (CCA 3.31 lakh ha) has been providing irrigation since 35 years to commands lying in two districts namely Surat and Valsad of South Gujarat. It comprises a reservoir at Ukai and a diversion weir at Kakrapar on river Tapi with major canal systems taking off from both. The command comprises heavy and deep soils. Rainfall is of the order of 1500 mm annually. Ground water table is fairly high. Cash crops like sugarcane and hence sugar factories have come up in the area, transforming the socio-economic conditions of people. Still several areas need rabi irrigation and some times kharif protection. Like Mahi area, the farmers are educated and pragmatic.

Twenty five FOs covering an area of 13824 ha were registered between 1978 and 1989 but only 10 covering an area of 4460 ha are presently functioning (Annex H). ID is now planning to revive some of the 15 dormant FOs. The experiences generated are now discussed against the identified aspects.

Factors Facilitating FOs

The canal system was improved to enable supply of irrigation water to all farmers. But modifications remained incomplete in case of some FOs where inaction started setting in. In case of some, interest of farmers reduced after completion of modifications and FOs became dormant.

Role of Catalysts

After CADA came into being, it launched a campaign to improve water utilisation in Ukai-Kakarpar command as a part of their activity and started actions involving farmers in IM as one of the measures of system improvement. Accordingly, line staff started exploring feasibility of forming FOs

in 1975. As a result, Mohini Cooperative society and some other societies like Rayma, Saras, Gadat, Wanskui, and Hathuka were registered. ID motivated the farmers through system modifications, managerial assistance, assurance to reimburse losses for two years and assured water supply. Mass awareness about the long term benefits however, was not brought about because the catalytic role of ID ceased after registration of the FOs.

Incentives or Motivational Factors

Canal system modifications to ensure assured supply of water and volumetric water rate to FOs form the two main incentives. Both were attractive and because they were carried out expeditiously, proved as effective factors.

Level and Structure

The area covered under each FO ranges from 300 ha to 1200 ha spread over one or more (upto six) villages. Each FO territory is not based on extent of command of a minor. It therefore receives water from one or more subminors which may not be necessarily offtaking from a common minor. This arrangement was found unnecessarily expensive and is not conducive to homogeneous FO. For future, it would be advisable to match FO's jurisdiction with hydraulic unit.

Registration

Cooperative department personnel working on deputation in CAD organisation facilitated the process of registration.

Water Rates and Recovery

Volumetric water fees at Rs. 0.30 per 10000 litres chargeable to society on wholesale basis as agreed to by ID were less compared to fees on crop area based water rates to be recovered by FO from its members. This arrangement enabled generation of surplus. Over and above such margin, the volumetric rate induced more efficient water use because only the used quantity was charged. Saving of water enabled bringing more area under irrigation which otherwise was not getting water. Such additionality provided a direct net additional gain to the FO.

Turnover and Memorandum of Understanding

The TO was effected only by issuing a formal letter by the ID, contents of which had been discussed with farmers. A MOU on lines of Mahi would be a better formal arrangement for future FOs.

Viability

Assured water supply for all the three seasons is available in the FO. Cash crop like sugar cane is predominant covering more than 50 percent area. Assured marketing facilities are established. Managerial subsidy in the initial three years was given under the CAD programme. The profit from growing sugar cane is much more than that from cereals and pulses. There is therefore a substantial surplus through which if a FO wants, it can take on socio-economic activities and/or diversification in other sectors. The recovery is easy, but even if there are defaulters, the dues are recovered through sugar cooperatives where almost every farmer has dealings. The water charges of individual members of some FOs are recovered through sugar factories.

Formal status as FO was conducive in development of a viable pattern of management. Selfless, committed leaders have played significant role. The organisational structure has been found workable and acceptable by farmers.

Some of the FOs (Annex F) formed about ten years ago have proven their viability and have sustained themselves and realised the objectives in a good measure. Analysis indicates that the following factors played an important role in their sustenance: good leadership; continued support of ID; efficient organisational management, conflict resolution, field channels, maintenance and observance of cooperative societies' rules; availability of farm equipment on rental basis and healthy relations with sugar factories; and water as the major binding force.

While some FOs recorded success, others (Annex G) did not. Following main reasons caused reduced interest which hampered sustenance of FOs:

- There was a lack of awareness about all the objectives and long term benefits of FO.
- Farmers' interest in forming FO was limited to get the system improved and to get assured water which was the only difficulty they were facing.
- There were incomplete modifications of some canal system and lack of simultaneous organisational approach.
- Some FOs covered more subminors and hence required a number of measuring devices. It meant deployment of more workers for measurement which became expensive.

- Government policy of waiving farmers' dues was misunderstood. The farmers thought that their dues will not be waived if FO existed. Actually water charges had not been waived in the policy at any stage and hence the feeling was unjustified.
- After formation of FOs, ID withdrew.
- Egoistic leadership and its involvement in many other activities was another cause for decline. Motivational or organisational effort therefore lacked a thrust.

Training

Neither before, nor after formation of FOs, programmes for training, skill development, consultations, or workshops were held. Had these programmes been conducted, results would have helped better sustenance. Even and when the dormant FOs are being considered for revival, HRD on lines of Mahi would prove extremely useful.

Surface Lift Irrigation Schemes

The lift irrigation schemes operated through co-operative societies are located in Panchmahals district which is identified as economically, educationally and socially backward due to its tribal and other backward class population of about 40 percent. The tribals generally migrate after almost every monsoon to urban areas or to construction projects in search of employment as their small holdings do not support dry farming. They return back before monsoon to their lands only to move out again when rains come to end. During monsoon they grow corn and millets.

It was in this environment that a voluntary organisation, Navinchandra Mafatlal Sadguru Water and Development Foundation (SWDF) was set up at Dahod, a tribal taluka headquarters. Its objectives comprised improvement of conditions of tribals through development of land and water resources programmes. The SWDF initiated its activities in 1975 organising farmers in two talukas. Its various economic development activities have by now spread over to more than 40,000 families and a tribal population of about 2 lakhs. The SWDF has set up about 85 FOs to develop water resources on a micro-scale.

The work done has been extensive and intensive both. The schemes are based on post monsoon flow in rivers of the region temporarily impounded behind weirs and water lifted to irrigate areas through pumping systems. Each scheme

typically covers an area of 80 ha. There are some schemes put up even on reservoir back waters.

AKRSP has constructed 12 lift irrigation schemes, of which 10 are in Bharuch District and 2 in Junagadh District. All of them are registered co-operatives and are in working condition.

The experiences are significant, although the types of structures are not typical of the state. Analysis of the experiences and lessons generated on various identified aspects are as follows:

Factors Facilitating FOs

The SWDF initiated work only when demand from local people arose. So far 85 LI schemes have been established. Before putting up each system for formation of FO, it was ensured that it was satisfactory in respect of design, the quality of motors and pumps, workmanship, and laying of underground pipes.

Role of Catalysts

In order to be acceptable by the people, the SWDF spent the first few years to build up rapport and confidence amongst rural tribals. The SWDF began by rendering free medical services and tried to gain confidence of the local resource persons like sarpanch and teachers. It inducted women motivators to influence women folk and carefully selected link men between the agency and beneficiaries. It mobilised local branches of banks to advance interest free loans or provide subsidy for agriculture and animal husbandry. All round family welfare approach was adopted while tackling the core issue of water. This proved to be an effective way of building confidence as it sought to replace the control of money lenders, merchants and land lords on the lives of poor tribals.

Incentives or Motivational Factors

Developing and providing water resources for irrigated agriculture through all round welfare of family units proved an effective incentive to the tribal farmers.

Level and Structure of FO

The farmers are organised on the basis of each scheme, which covers about 40 to 100 ha. They are managed by managing committees (MC) , which consist of elected or nominated Chairman and Members. The tenure of these office bearers is three years. The ex-officio Members include Directors of the SWDF, the District Rural Development Agency , Assistant District Registrar of

Co-operatives and representatives of financial institutions. The MC is assisted by a secretary, pump operator, water distributors and watchman.

Formal Registration of FO

The FOs have been registered under the Gujarat Co-operative Societies Act with the help of SWDF. There was little difficulty in registration.

Water rates and recoveries: The FOs are managed without any subsidy from any quarters. The farmers bear the full cost of irrigation which is almost five times higher than the flow irrigation system. In many LI schemes, the farmers paid water charges in advance for payment to the Gujarat Electricity Board (GEB). This provides a sharp contrast to government Organised systems where even subsidised water charges are not recovered fully.

Turnover and Memorandum of Understanding

No TO is involved, since the systems are developed and managed by FOs with NGO support. The experience shows competence of farmers to manage irrigation systems.

Viability

The total expenses on maintenance, operation and management are shared on area basis. The organisation is well constituted having support of the relevant agencies which add to the organisational viability. The FOs have put behind years of successful O and M and have proven that they have attained sustenance and success in realising the objectives.

Training

Staff members of FOs have been given training in their respective fields by the SWDF in the initial period. Their functioning was monitored by the MC. The SWDF arranged 3 to 4 day workshops of Secretaries of all the LI societies at regular intervals to discuss their problems in dealing with water distribution, record keeping and recoveries. The farmers have been trained by SWDF in cooperative management, agriculture and irrigation.

Replicability

Since its inception with few FOs, the experiment has been enlarged to about 85 FOs by now. Some of the LI schemes are established even in Madhya Pradesh across the State boundary. The SWDF has successfully demonstrated replicability potential of the experiment.

Organisational and Procedural Changes

The electric power connection in case of some FOs took long time due to poor response from the Gujarat Electricity Board. Also, the power supply is erratic. The GEB procedures need a fresh look to enable speedy connections and regular power supply for FO managed irrigation system of this category.

ID issues formal permission for lifting and using water from all streams and rivers notified under Bombay Irrigation Act. SWDF had to wait long years to get such permission for drawing water from reservoir for a few lift irrigation projects.

Other Projects

Fatewadi Irrigation Project

The irrigated agriculture in this area is about 100 years old. In the year 1900, some 180 tanks were constructed in low lying land mass on the right bank of river Sabarmati. After 1947, these tanks were connected by an inundation canal from the right bank of the river. Later, in 1967-68 the canal system was improved and in 1977 Vasna barrage was constructed to augment the system just down stream of Ahmedabad. Dharoi reservoir about 160 km in upstream of the barrage was completed in 1978 causing increased reliance of command on Vasna diversion barrage. Presently, it is a kharif oriented scheme having CCA of 36000 ha.

The initial reach of the main canal is in deep cutting flanked by agricultural land at higher elevation. The farmers initially parted with their land for construction of canal. Later they wanted to grow paddy and they approached ID for allowing lifting of water from the canals. ID agreed to consider their request on the condition of forming cooperative societies for the purpose, basically, to restrict the number of lifting points on canals. The condition was readily accepted by the farmers, who organised themselves in compact areas of about 50 ha each and registered about 12 lift FOs for 584 ha between 1967 and 1971. Ten societies covering 484 ha are working at present (Annex H). Other conditions laid down by ID for the FOs are as follows:

- FO is to pay deposit and token rent.
- FO is to follow restriction prescribed by ID for drawing only limited quantity of water required to raise short term paddy.
- All members are to clear their past dues if any, and then to apply directly to ID before taking water.

- FO is to distribute water proportionately to all its members.

The lift systems on Fatewadi Project are installed and operated by FOs on no profit no loss basis. Water rates chargeable to each member are worked out on the basis of the actual expenses which are converted per member on area basis. These include water charges payable to the ID. If a member goes in arrears, water supply is stopped. Each member has to purchase a share of Rs 50. Managing committee (MC) is an elected body of seven persons including a chairman and a secretary.

These FOs have proved viable but basically came into existence only because Government made it conditional for allowing lift from canals.

Irrigation Projects between Rivers Tapi and Narmada

There are four medium and one major irrigation projects under which FOs have been attempted. AKRSP started working on Pingot Medium Irrigation Project during 1990 at the instance of senior officers of ID and soon extended their activities to 3 more projects in the area viz. Baldeva, Lakhigam and Chopadvav between 1990 and '94. The FOs have been registered in two projects namely Pingot and Baldeva. The MOU draft is under finalisation with ID. The systems are however turned over to the FOs under formal orders from ID which cover issues of agreement. The other two societies are under process of registration. The status of FOs is given in Annex 1.

Pingot Medium Irrigation Project. The scheme is situated in tribal area of Bharuch district. Pingot dam was constructed more than 15 years ago. It has irrigation command on both banks. Water could not be released into Right Bank Canals (CCA 600 ha) due to non completion of canal works. The Chief Executive (AKRSP) perceived the possibility of participatory irrigation management in this area and had discussions with senior officers in ID. As a result, AKRSP initiated and succeeded in forming a FO by deploying a multidisciplinary catalytic team. It was registered in 1990. government simultaneously set up a Coordination Committee under the Chairmanship of the Director, WALMI to ensure planned improvement of the canals along with participatory management. The Committee includes the Chief Engineer incharge, Chief Executive of AKRSP and representative of the society. It was decided to renovate and upgrade the right bank canal to ensure smooth flow of water and introduction of RWS system. The AKRSP offered at their cost construction of additional structures like crossings on canals beyond ID norms to meet with the local demand. The farmers were involved in the entire process of promotion and formation of FO with canal improvement works. The field channels are constructed and maintained by farmers at their own cost.

Important features of the society are as follows:

- the farmers are involved in planning of seasonal irrigation plans.
- full recoveries are made by the society.
- the meetings of the society are held in turn in different villages.
- the FO provides other services such as credit, input supply, and marketing.
- water rates to be charged to members are decided by the society which are 1.5 times the prevailing government rates on crop area basis.
- different committees are formed to perform functions like distribution of water, collection of water charges, and supervision of works.
- thrasher and other field equipment are purchased for letting out on rent to the members.
- AKRSP has appointed an internal auditor to regularly check the accounts.
- all members of the committee are required to attend the meeting on time. A late comer has to pay even a penalty of Rs.11/-.

The success of FO on right bank motivated farmers on left bank. The CCA on left Bank is 800 ha. Irrigation is being done since long and canals are in good shape. They therefore started organizing without AKRSP's help. Perhaps they did not want the higher water charges as on right bank under the AKRSP umbrella. The ID is providing other necessary guidance and assistance.

The experience though of a short term has indicated that involvement of farmers at every stage is helpful in development of a practicable structure of FO. Sustained interaction with catalyst was extremely important. Also offer of going beyond norms for providing infrastructure attracted farmers to go along with the NGO. Such indulgence could act both ways and hence one has to be circumspect in making such offers in future.

Baldeva Medium Irrigation Project. Encouraged by the co-operation of the farmers and better utilisation of water in Pingot, AKRSP started effort to form FO in Baldeva Project which had been constructed in 1976-77. It is located close to Pingot project and has irrigation command on both the banks. A FO is formed on left bank with CCA of 1155 ha through joint efforts of AKRSP

and ID. It is for the first time that the FO has resolved to bear 5 percent capital cost of modifications required in the distribution system.

Lakhigam Medium Irrigation Project. The scheme is located in Surat district. It has canal systems on both banks having CCA of 400 ha each. The FO was formed for the left bank command comprising 700 farmers. The FO is under process of registration. The society is yet to take up water management. Initially the farmers in head reach owning about 80 ha and getting more than their share of water resisted formation of FO. The Agronomist of AKRSP however patiently convinced them about the disadvantages of over irrigation and removed the obstacle. The AKRSP acted as catalyst and invested on additional infrastructure facilities like road crossings which increased farmers confidence in the NGO.

The modifications in infrastructure were jointly decided by the ID, AKRSP and the FO. The works are being supervised by a quality control committee of three members, one each from the ID, AKRSP and FO. Such joint committee has created a strengthened relationship with FO. Readiness for some token financial investment by the NGO for system improvement in exceptional cases made the process faster and earned the confidence of the farmers. However, such tools have to be used sparingly.

Chopadvav Medium Irrigation Project. The CCA of the scheme located in an adjoining area is 1460 ha. The infrastructure modifications are in progress. Farmers are being trained by the AKRSP and ID. Only one FO for the entire command is planned. Formal registration is already made. The physical rehabilitation of the canal system has not been properly done. However water is being utilised. AKRSP has offered to carry out repair works on distributaries at their cost. The process of formation of FO and modifications in infrastructure are being done simultaneously.

Karjan Major Irrigation Project. It is constructed on river Karjan in Bharuch district. The project has a CCA of 51000 ha spread over 91 villages comprising 11412 ha on right bank and 39588 ha on left bank.

Chitrawadi minor having CCA of 429 ha spread over in three villages on Right Bank command was improved by ID as a pilot project for introduction of RWS system in consultation with WALMI. The department could bring about strict discipline for observing rotations. Enthused by the success, ID and WALMI decided to promote FO in this minor. A team of agronomist, sociologist and an irrigation engineer was deployed by WALMI to motivate farmers and field staff. The formation of FO is decided although there is some delay in registration. Meanwhile the FO has taken over the system for management under government orders.

Similar efforts are initiated in the left bank command by the ID staff where full co-operation is extended by the farmers. One FO is registered in February 1994 on Dhamanchha distributary having CCA of 282 ha and 239 irrigators. The MOU is under finalisation with the government. Since there is no past experience of irrigation, current water rates on crop area basis are adopted. Perhaps volumetric rates of successful FOs in similar area would become acceptable and viable. It is proven that ID officials can successfully motivate the farmers to set up FO without outside catalyst. No doubt farmers training during the process created conducive environment for organisation.

Saurashtra and North Gujarat

This region is drought prone. River flow is highly variable from year to year and within a year. Though many reservoirs are constructed, water availability is low allowing kharif protection and partial rabi irrigation. Perennials are rare. FOs have been attempted in three major projects.

Dharoi Project. It is located in North Gujarat on river Sabarmati about 160 km upstream of Ahmedabad city. It serves a CCA of 56000 ha through right and left bank canal systems for Mehsana and Sabarkantha districts. The project caters to drinking water supply needs of Ahmedabad city also.

The canal network is lined upto 8 ha block. But for want of certain modifications and addition of some structures, RWS is not implemented.

The process of formation for FO was initiated on right bank by ID under CAD activity. Fourteen FOs were registered during 1983-84. None of them is working at present (Annex J). Water was supplied on volumetric basis to all FOs. The prevailing volumetric rate i.e Rs. 0.30/10,000 litres was charged to the FO and it charged the members on crop-area basis at the Government rates. On account of sandy soils, percolation loss was heavy. As a result, the amount received by FO was inadequate to cover what was required to be paid to ID.

As the conversion of the crop area rate in equivalent volumetric rate was not done as in case of Ankalav (Mahi), all FOs made a loss and became non-functional from 1985 onwards. It is necessary to adopt appropriate rates for reviving the FOs. The farmers would like to maintain canals but want ID to pay Rs. 100/- per ha to FOs for this purpose. The rate can be reduced at the rate of 10 percent for the subsequent five years. A uniform rate of Rs. 50/ha may then be paid to FO from sixth year onwards. The process of devising volumetric rates and maintenance grant of Rs. 20/ha adopted in case of Ankalav FO appears workable in reviving these FOs. It is obvious that FOs registered without due preparation and sustained support met with failure. Such instances prove counter-productive in long run.

Machhu - I Project. The project is located in Saurashtra region and has a CCA of 10400 ha. Under CAD activities, 7 FOs covering an area of about 3000 ha were registered with efforts of the ID. As required modifications to canals were not carried out, the FOs have remained dormant. It is necessary to take up and complete the modifications to enable revival of these FOs.

Dantiwada Project. It is a major project having CCA of 44520 ha located on river Banas in Banaskantha district of North Gujarat. The entire system is lined upto 8 ha block. The RWS system of water distribution is introduced in the entire project and is working satisfactorily. The project area has scanty rainfall and the reservoir is rarely full. ID officers, therefore, organized a series of meetings with farmers to share the distress which was readily accepted by farmers.

The ID and WALMI organised further meetings at the level of minor to persuade farmers to form FOs. They are however reluctant to go in for a formal organisation and want to continue managing the distress in informal manner. Basically, shortage in availability of water raises doubts amongst farmers about financial viability of FOs. Secondly and more importantly, the working of ID staff is considered efficient and acceptable by all the farmers. However, a systematic research to evolve an appropriate model for such areas is a necessity.

Kalambandhi System in Kharicut Project. The system is operative in 2800 ha of 10 villages in Matar taluka of Kheda district. The farmers of these villages have been diverting water for irrigation from Khari, a tributary of river Sabarmati for nearly 300 years in past. Kharicut project was planned and constructed on this river in upstream in 1881, diverting water into Chandola tank. This diversion reduced the river flow for use by these 10 villages. When confronted with reduced irrigation supply, the farmers united and approached High Court.

In response, during 1926, the court granted riparian rights to these farmers. Subsequently the farmers negotiated with GOG and acquired through an agreement, benefits of Meshwo project coming up in the adjoining basin for assured water supply. According to the agreement, GOG has to provide 70 cusecs of flow to this area in view of their established rights on waters of Khari river.

In Kalambandhi area, meaning area ruled by this agreement, there are 2450 farmers with an average holding of about one ha. Water distribution amongst farmers below outlet is done by farmers with the help of ID line staff. Maintenance and Operation is done by the ID. Management Committees are formed by the Kalambandhi Khedut Mandal (informal FO) which looks after

irrigation. They desire to remain informal in status as it has more advantages. In future when their water needs are further assured from SSP, they might like to acquire formal status of a FO.

In kharif, only short term rice variety is cultivated. The farmers are conversant about methods of management and scarcity value of water which developed a sense of discipline through competent leadership. After 1970, involvement of farmers in irrigation management has, however, gradually reduced. At present the management is with the ID but during a water scarcity year, they appoint persons at important junctions to keep an eye on the discharge released by ID. Leaders themselves take round of the canals upto head works. They are particular in getting their share of water. The system is properly maintained. Farmers cooperate and guide irrigation management themselves. The experience on the project indicates that farmers came together and fought for riparian water rights but they don't see any advantage in getting formally organised on account of overall shortage of water and only seasonal needs which are being honoured by ID. They don't want to get into day to day financial and other hassles accompanying formalisation.

Sardar Sarovar Project

Irrigation potential of the SSP is 1.8 Mha. The CCA of the first phase of the project between Rivers Narmada and Orsang is 4,48,000 ha. It has been planned to commence irrigation in an area of about 18,000 ha from June 1996. As a policy on this project, irrigation water will be supplied only to groups of farmers and not to individuals. The SSNNL will make water available at the gated regulators of minors. Each minor will serve a VSA of about 200 to 500 ha constituting a FO covering entire land within revenue boundaries of a village or two that can be commanded by the minor. A VSA will have chaks of 30 to 60 ha each commanded by an ungated outlet.

The officers of SSNNL work as motivators for formation of FOs. They may be registered under the Gujarat Societies Registration Act or Companies Act or under an appropriate act. So far, 84 FOs have been formed. Some NGOs have volunteered in the task. The Gandhi Labour Foundation, for instance, actively participates in this process.

The SSP is an instance of formation of FOs even before water has started flowing into the canals. It is an example of advance planning by project authorities in the direction of participatory management of a large irrigation system.

Lalpari Minor Irrigation Project

In the category of minor project this is the only experience. The scheme located near Rajkot city was constructed about 100 years ago.

Although, the dam and the canal system having CCA of 728 ha are 100 years old, their physical condition is satisfactory. The reservoir provides drinking water supply to Rajkot city and only a limited quantum of water for irrigation in rabi season for a few waterings. The farmers have accepted this status but have organised themselves due to the felt need for sharing of water in common interest. At present nearly 360 farmers get the benefit of irrigation for 320 ha of land. They pay irrigation charges as per government rates and as per assessment made by the ID. The water distribution is done by the irrigators themselves strictly as per rotations fixed by them from tail to head. The maintenance of the physical system is done by the ID. For sundry and urgent repairs to field channels, they collect Rs. 5 per irrigator. The balance in a year is not carried forward and they do not maintain accounts. The farmers prefer to remain informally organised.

The informal FO has sustained because of inherent inbuilt tradition of the last 100 years; pragmatic, honest, service minded leadership and farmers with sustained faith in their leaders; homogeneous population in terms of same vocation; single objective with limited functions and a small area; sustained benefits of the scheme; and above all a harmonious relationship and mutual understanding between the ID and farmer leaders.

Groundwater Lift Irrigation Scheme of GWRDC Limited in Kheda District

The GWRDC, a State government corporation, deals with deep tube wells (TW) in the entire state. It has at present about 3000 tubewells under its charge. It took a policy decision to hand over TWs to irrigators who offer the charge on token rent of Rs. 11 per TW in the year 1989. Accordingly, 308 TWs were handed over to irrigators between 1989-94 in the State. Out of this, 66 TWs had to be taken back by the GWRDC, because of several reasons. The policy is still operative.

The conditions laid down by the GWRDC for handing over are as follows:

- The water rate is uniform for all crops which is recently increased from Rs. 16/hour to Rs. 24/hour.
- For forming a FO, 75 percent members of the total holdings are required.

- The FO has to pay Rs. 5000 as an advance to the GEB.
- The FO has to take responsibility of recovering old dues of the individual farmers of the command.
- Total maintenance and operation of TWs is to be carried out by the FO at its cost.

Out of 123 TWs of Kheda District handed over to irrigators between 1989 and 1994, 42 TWs were taken back by GWRDC because:

- Yield of water was insufficient to cater to the needs of the command
- Of failure of the FO to get registered under Co- operative Societies Act within prescribed time in the agreement
- Of disputes amongst farmers
- Of inability of FO to pay electrical bills
- Of improper FO management
- Water was supplied to members even though they were in arrears
- Of lack of coordination between ID, GEB, and FO
- Of one sided agreement by GEB for power supply which was erratic

The reasons of withdrawal of TWs of other Districts might be similar. However more indepth analysis is necessary for the 75 percent FOs be similar. However analysis is necessary for the 75 percent FOs which continue to function.

The conditions laid down by GWRDC regarding 75 percent membership, period for registration and arrears need modification in line with canal systems to promote and sustain FOs. Also continued technical support in a spirit of partnership by GWRDC might prove helpful. Training of farmers in water management, maintenance and FO management would be extremely useful for reviving FOs and for expanding the turnover.

Turnover

The relations between system managers and system users in the government managed systems have suffered from mutual suspicion and lack of confidence

in the systems capacity to perform. The environment can change gradually. Accordingly, TO can be a step by step approach.

The irrigation systems examined here have experienced FO involvement in management for a long period. The concept of TO now under implementation was not available then. However, the ingredients of turnover in so far as understanding with ID, autonomy in internal management of FO and joint action of receiving water and paying for the same has been there. These initial phases have facilitated thinking towards the present approach of a legally binding MOU which should be reviewed and modified periodically to make the ID and FO partnership more equal and sustainable.

Thus, TO is as yet an evolving process to which various models do contribute a lot. A uniform pattern is emerging now. However, the terms of management transfer may differ from the type and size of the transferred system, dependability of water, and costs involved in operating the system. The status of TO in the state in different category of projects and in this background is provided below.

Major and Medium Irrigation Projects

Fatewadi Irrigation Project. The FOs are created under specific conditions laid down by ID. The pumps are owned by the FOs and field channels are constructed and maintained by them. They manage water distribution by themselves and hence defacto TO is considered to have taken place and societies have been functioning for more than two decades.

Ukai Kakrapar Project. Water management has been turned over to FOs under a formal letter by ID. Main functions performed by the FOs are distribution of water, maintenance of FCs, collecting water charges, resolving conflicts and interaction with ID. ID's responsibilities comprise assured water supply, maintenance of minor, overall supervision of the system and technical guidance. TO is complete on the basis of an executive order.

Mahi Right Bank Canal (MRBC) Project. In Mahi project, formal TO is made to two FOs in November 1993, on signing of a formal MOU (Annex II). After TO, joint inspection of the system was done and mutually agreed modifications are made. TO is complete through a legal agreement signed between FO and ID.

Pingot and Baldeva. The MOU is under finalisation with government. However, provisions of the proposed MOU are already in operation.

Groundwater Lift Irrigation Schemes

TO in state tubewells is at best partial. The efficiency of the tubewells transferred to FO has undoubtedly increased. Government liability has decreased. However, the terms of transfer are grossly one-sided and have not been based on reasonable commitment to sustain farmers managed system. More equal terms as is being negotiated for canal system TO needs to be considered to make management transfer workable.

Organisational Procedural Changes

Organisational Needs

The needs can be identified as change in ID organisation and functions, structural change in irrigation administration for assuring adequate and timely supply of water at the turn over points; joint interaction at the turn over point; and unflinching efforts for best upkeep of the entire physical infrastructure of canal system and their head works.

For O&M of canals, the ID has prescribed certain norms for staff of a sub-division for carrying out current procedures. When FO takes over management, say on a minor commanding about 500 ha, ID will have to deal with only one FO instead of hundreds of irrigators. The workload of ID will thus reduce. However, the quality of service and nature of accountability will have to improve substantially. Ultimately, there may be no reduction in manpower. Obviously, the roles and responsibilities of ID will have to be redefined for new scenario comprising a very large number of FOs.

The FOs will also need some staff for water management, maintenance of accounts, and recovering water charges. Considering such factors, phased requirement of organisational changes will have to be worked out while avoiding disruption.

The staff of a FO commanding about 500 ha would be a secretary-cum clerk, one Karkun, and two chowkidars. They may be part time and/or seasonal depending upon the work load. There would be some reduction in staff with ID because of the turn over; and the ID will have to accommodate it elsewhere. The FO does not need such staff nor can it afford the cost thereof. It has to recruit its own staff. Along with reduction in staff of the ID after turn over, the duties and functions also get modified to some extent.

For example, the Karkun does not have to arrange for supplying water to individual farmers nor take measurements of crops; but has to take joint measurements with the representative of the FO for bulk water supplied to the FO; and maintain water account thereof. It has also to prepare water bill. Similarly, the section officer has to ensure that the requisite quantity of water is made available at the entry to the channel turned over to the FO and check water accounts maintained by the Karkun. He has to check the water bill also. The deputy executive engineer and the executive engineer have to oversee that the various provisions of the MOU are adequately implemented.

Training Needs

It aims mainly at utilising the vast human resources of users i.e. farmers, who are most concerned with irrigation system of the country. Their ability, mature experience and talent are to be harnessed. The comprehensive HRD out-look should aim at keeping under constant review four basic factors to support organisational needs for better water management by FOs.

Attitudinal change is called for amongst the line staff for giving impetus to the activity of formation of FOs. It may also be necessary to provide some incentives to the staff. Both these requirements can be met with by providing a specific entry in the format for reporting performance of each staff with respect to his interest in formation of FOs.

The HRD calls for systematic planning and development of man power with requisite know how through appropriate training as also the facilities for training both the trainers and trainees. As per the norms adopted in Mohile and Goel's paper (Ref. 47) on National Training Strategy, the total needs for training professionals and sub-professionals for the major, medium and minor projects of Gujarat would be 1876 persons, and 1333 persons for LLFs. In addition some 15760 farmer leaders would also need to be trained.

To attain these targets detailed training programmes for both farmers and ID will to be organised in their respective areas. The major areas identified for FO and ID are as under.

Pre-turnover Needs. For FO: Cooperative general principles and philosophy, irrigation; and irrigated agriculture. For ID: Communication with farmers; system improvement; distribution and operation of canal system; coordination with other departments concerned; and motivating farmers for organisation.

Post-turnover Areas. For FO: Organisation and leadership; cooperative management; system maintenance; coordination with line-staff, agriculture deptt., coop deptt., and local organisations; irrigated agriculture; to work as

motivator (NGO) for promotion of FOs in the command areas; and resource development. For ID: Guidance and counselling to FO and attitudinal change.

Legal Aspects

Experience of implementing the policy regarding farmers' participation in irrigation management can be broadly covered under two categories of schemes viz flow irrigation and lift irrigation. The flow irrigation can be further divided in two parts viz Major/Medium Schemes managed by government and Minor Irrigation Schemes by District Panchayats under the Gujarat Panchayat Act. However at the government level the rules, procedures and policy for administration of all categories of schemes are identical.

The Bombay Irrigation Act 1879 and the Gujarat Canal Rules 1962 are the two legal instruments operating in the state for irrigation administration. All FOs are formed under Gujarat Co-operative Societies Act 1961. For construction of field channels under CAD programme, some provisions of the Bombay Land Improvement Schemes Act are utilized.

The BIACT and Gujarat Canal Rules neither specifically, provide for nor emphasize formation of farmers organisations. For this purpose it is necessary to either amend the present act or to replace it by the New Act on the lines previously proposed in the ordinance and frame rules thereunder. The ID has followed up its attempt to replace the BIACT by issuing several administrative orders. The main thrust in the direction of rational operation of canals for maximum and equitable utilisation of available water has been on following matters:

Rotational Water Supply

Since the turn, time, duration and also the day for taking water by each holder of land will be predetermined, the system hopefully will induce internal harmony amongst irrigators of every chak which is a very congenial aspect for smooth functioning of FOs. For all projects, detailed guidelines have been issued for adopting RWS vide ID order of January 21, 1988. (Annex - L). By now the ID staff has become conversant with these guidelines. Phased programme of infrastructure modification with minimum cost is on way to make the canal system suitable for RWS.

The objectives of RWS is eminently suited for implementation by FO. The FO has, however, to consult with members to finalise a schedule of rotation consistent with him, time and duration of water supply as also the perception of members as to how each one's entitlement is met. The ID has to evolve a

process of interaction whereby its expertise and farmers experience produce an operation plan that meets the interests of the system as well as farmers. The system of making individual applications and granting sanctions under current rules is not compatible with requirement of RWS discipline which the ID has accepted for all schemes including Narmada.

Canal Operation Plan

For every irrigation season, detailed canal operation plans are prepared in advance. WALMI has developed a good software for such programme which is being used on some projects. It is necessary that all projects are encouraged and trained to use this software. Such operational plan is then discussed and finalised in consultation with representatives of farmers in the periodical meetings of various water management or canal advisory committees set up for each project. In the ARP under Mahi project such operational plan was discussed with the FO and then finalised. The programme of running various canals during each season is then prepared on the basis of such finalised operational plan and intimated in advance to each sectional charge and irrigators thereof through VSACs or any other effective means like informal group of farmers of each chak under FO.

Canal Irrigation Only for Critical Stages of Crop-growth

Besides ID has issued very elaborate instructions and guidelines (Annex M) to ensure that canal water is supplied only for critical stages of growth. These instructions, if followed scrupulously, would help optimise overall production and reduce the risk of good agriculture lands becoming saline due to water logging caused by over irrigation. For projects like Mahi and Ukai-Kakrapar, implementation of these instructions is still not easily followed. In water sufficient zones regulation of canal water supply is necessary.

Therefore separate instructions have been issued for such projects to ensure that the surface drains of the project should practically remain dry after Deewali festival i.e. October, implying thereby that only limited doses of irrigation are given through canals by creating artificial scarcity of water during non critical stages or supplying irrigation water only for critical stages of crop growth. During 1990-91, in Ukai-Kakrapar project certain drains were selected for monitoring discharge after October. On the basis of the data so obtained the discharge in the parent irrigation channel was reduced without any adverse effect on the irrigation programme. Such constant care and monitoring would help in improving health of a project.

Water Account

Irrigation water, being a precious and scarce commodity, the necessity of maintaining precise water account is obvious. The policy of supplying water on volumetric basis also implies emphasis on an accounting system of volumes of water delivered to and used by various sectional charges of irrigation management with due regard to reasonable limits of permissible conveyance and seepage losses in various sections of the entire canal system. For such an account to be precise and correct, a system of concurrent monitoring must be enforced. Such a well installed system will be a 'blessing' for the FOs and also for successful performance of Narmada project. The FOs would be better advised to improve the status of water accounting system and thereby increase area under irrigation.

Management Information System

If a FO is formed at minor level, the ID line staff will have to deal with one customer instead of 400 to 500 individual holders of land under the command of the minor. The job role of line staff will assume new dimensions. Moreover, when the water is supplied on volumetric basis, the measurement and billing procedures will also be simplified considerably compared to the present practice of measuring cropwise areas irrigated and assessing the water charges. If computers are used, the output will not only be refined but will be very quick and will require much less man hours. In Mahi project (CCA more than 2 lakh ha), a complete package of MIS has been developed for the current practice of dealing with each land holder individually and adopting "crop area" unit. Such MIS could easily spread in all projects of the state and the same could be further simplified in future when the volumetric supply/rate is adopted for a FO. At grass root level a FO need not be burdened with sophisticated MIS. They would have to be given simple formats on the basis of which requisite data can be fed back to the sophisticated MIS at the project level.

Lift Irrigation

Lift irrigation from canals has been allowed by ID in the initial reaches of canals for areas which remain out of flow command. It is a general policy of ID to discourage such supply. Permission is given only to limited areas (not exceeding 2 percent of the command) on the condition that the farmers form FOs. Such FOs have to make their own arrangement to install, operate and repair the pumping machinery at their own cost and pay half the usual water rates on crop area basis. The successful FOs on Fatewadi canal provide good indicators for the same.

Memorandum of Understanding

In Mahi project, formal TO has been given effect for the two FOs (viz Anklav and Kosindra) in November 1993 upon signing the MOU by both the parties. A copy of the MOU can be seen at Annex 11. Before the TO was effected, joint inspection of the system was made and modifications were carried out as mutually agreed.

The MOU provides mainly for seasonwise water allocation (as per project provision) subject to availability of storage; intimation of seasonal programme in advance; right of the FO to charge non members to the extent of 30 percent higher rates; revision of water rates, if needed; 20 percent rebate to FO for advance payment of water charges to ID; normal M&R of the channel by the FO against the grant payable at Rs. 20/ha; and inspection by ID for implementation of MOU. A uniform MOU for all FOs similar to that of ARP, Mahi project is under consideration of ID.

Chapter 3

LESSONS LEARNED

Introduction

The experiences and observations recounted in the previous chapter have provided valuable insights into the organising process as also the functioning of farmers managed irrigation system. The wide range of experiences necessarily provide a variety in lessons. Some of them are relevant for the category of projects which they relate; some others are related to non-governmental sector and how it can supplement the efforts of government in bringing additional area under irrigation; some relate to large irrigation systems and some other lift from surface irrigation; some experiences from ground water program in the government sector have also been provided. An attempt has been made to concentrate largely on the generic lessons in the main and to supplement it with only a few lessons that relate specifically to some of the important categories. This prioritisation has been made in the background of the work being a continuing process where much more experience will be required to finalise patterns for farmers organisations in the state suited to different agro climatic sub-zones and the types of projects.

Farmer Organisation Promotion

A committed and effective leadership of FO is capable of influencing the organising process and the viability of FO

The WALMI team encountered serious difficulties from powerful farmers in the Anklav ARP who were taking undue advantage of their location and depriving other farmers of their entitlement. It was found that a FO to be organised required a leadership that had conviction in the value of the work and was prepared to guide the FO in the interest of all farmers in the command. The process of locating leader was arduous but once identified the leaders were accepted for the performance they achieved.

Rural leadership is still attached to the ownership of land and the position in the rural power structure on this account. Therefore, great caution was exercised in softening the opposition of powerful people and encouraging others to develop competence to compete for leadership. In the Kosindra minor the influence of long experience in this process in Anklav was a great help. The

identification, performance and competence building of leadership are essential elements for promoting and sustaining FOs.

In irrigation systems with wide coverage of commercial crops such as sugarcane, a marketing approach for economic prices and recovery of water rate through factories brings benefits to FO and ID alike.

In Gujarat first initiatives in water cooperatives appeared with the sugarbelt under the Ukai-Kakrapar project in south Gujarat. Sugarcane cultivation provided the incentive for the cooperative to mobilise other inputs for higher yields of cane. Marketing was simplified since the sugar factory purchased all the production. Sugar factories have also been helping with realisation of water charges for remitting it to government. This approach is beneficial for the smooth working of farmers operated system in commands where commercial crops predominate.

WALMI's demonstration of the effectiveness of a multidisciplinary catalytic team approach alongwith duration of the catalyst intervention should provide valuable guidelines for promoting FO.

WALMI was given the responsibility to implement action research in Anklav sub-minor of the Mahi Right Bank Canal. Some other organisation, specifically IRMA, Anand also took up similar activity. The WALMI work has proved to be a success and has led to a diffusion process through which an additional FO has already come into being. Others are making request for WALMI support. WALMI had organised a multi-disciplinary team comprising Extension Specialist, Irrigation Engineer and Agronomist.

This team was able to interact with the farmers which led to formation of the FO and was able also to convince the FO to bring about systems improved, equitable water supply and extension of area of effective irrigation by economy of water use as also developing sources of conjunctive use. However, it was also found that too long a period of interventions is injurious to self reliance of the FO whereas a very early withdrawal can also result in reduction in farmers interest in organising. Therefore, the catalyst has to be judging the situation on a continuing basis and start a process of withdrawal which makes the FO self-reliant. Both these elements are necessary for the catalyst role in the promotion of FO.

Multidisciplinary institutions such as WALMI and AKRSP functioning as catalyst are in a position to facilitate a motivated FO prepared to share in construction and perform management functions.

On Pingot irrigation project in Bharuch district the ID set up a coordination committee under the Chairmanship of the Director, WALMI to ensure planned improvement of the canals as well as participatory management. The committee included chief engineer incharge, chief executive of AKRSP (NGO) and representative of the society. The farmers are involved in the entire process of promotion of FO and also canal improvement works. The field channels are constructed and maintained by farmers at their own cost.

On Lakhigam Project in Surat district the modifications in infrastructure & canal system have been jointly decided by the ID, AKRSP and the FO and the works are being supervised by a quality control committee of three members, one each from the ID, AKRSP & FO. On Baldeva Irrigation Project, also in Bharuch district, the FO has resolved to bear five percent capital cost of infrastructure modifications. On Karjan project in Bharuch district the ID, enthused by the success of the RWS system, decided to form FO on one minor in consultation with WALMI. A team of agronomist, sociologist and an irrigation engineer was deployed by WALMI to motivate farmers and field staff. The farmers have formed a FO which has recently taken over the system for operation.

Institutions of this nature are in a position to try newer and more viable models which ID can implement.

Farmer Organisation Structure and Jurisdiction

Two-tier structure of informal group at the chak level under a formal FO at minor level can provide a workable balance between individual farm interest with the overall group interest. Subsequently higher levels of federations will be supportive of this basic structure.

In Gujarat experience micro to macro approach has been pursued. In Mahi as also Ukai-Kakrapar project, farmers were first approached in the command of an outlet for organising at the chak level for improved agriculture as also irrigation and drainage management. This was in line with the normal CADA approach. Once the group approach was acceptable, the organisation at the minor level was taken up. The minor was considered workable and convenient since water delivery can be controlled at the regulator and the number of farmers involved were not too large. Apart from the water delivery at the

minor head regulator, the distribution system within the command of the minor followed the same hydraulic criteria. Therefore, the hydraulic boundary has been the preferred choice. The farmers group also decided that only one level of registration was adequate and that level had to be the one that had to enter into agreement with ID. Therefore, the minor level organisation was considered appropriate for this purpose.

It was already felt that a distributary level organisation will have to emerge to make the functioning of the minors satisfactory. Ultimately a project level federation will emerge. The pursuit of equity and technicality have led to the conceptualisation of a three level formal organisation co-terminus with the minor, the distributary and the project where the minor level organisation functions with the support of informal groups at the chak level.

For FO coverage, hydraulic boundary has been the preferred option.

Supply of water and adequate FO control over the regulation of the turnout point(s) that has influence on such supply has led farmers to prefer a hydraulic unit rather than the village as the area of their operation. A single channel like minor having command of about 400 to 500 ha has been found to be a convenient unit. Also the number of points of measuring volume of water supplied to the FO should be minimum, say, one or two. If farmers of one village are served by two minors, perhaps two FOs would be preferable to correspond with commands of two minors.

FO Registration

The irrigators are willing to opt for formal organisation when ID makes a condition that water will be supplied as a rule to a group of farmers.

On Fatewadi Project in Ahmedabad district, the farmers whose lands were situated in the initial reach of canal in deep cutting approached ID for allowing to lift water from the canals. ID considered their request but put up the condition that they should form cooperative societies so as to restrict the number of lifting points. This was readily accepted by the farmers. They formed about 12 lift cooperative societies to avail of the offer.

Again, on Sardar Sarovar Project, canals which have not yet started operating by now 84 VSACs have been formed. The project proposes to supply them water through cooperative societies for the purpose.

These conditions can become incentives when the State Irrigation Act is suitably amended and appropriate rules are promulgated. This has a support in the positive outcome of projects where FOs are working.

Registration to formalise a FO has to follow a process that tests the probability of organisational and financial sustainability and not to precede it.

On Dharoi project in north Gujarat the process of formation of FO was initiated on the right bank by the ID under command area activity; and 14 FOs were formed during 1983-84. The water was supplied on volumetric basis to the FO at the prevalent volumetric rate of Rs. 0.30/10,000 litres and the society charged the members on crop-area basis at the Government rates. The amount so received by the society was less than what it was required to pay to the ID. Since the conversion of the crop area rate in equivalent volumetric rate was not done as in case of Anklav FO of Mahi project, all FOs made loss and became non-functional from 1985 onwards. The Anklav formula can be adopted elsewhere under similar circumstances and further refined.

In yet another case, 7 FOs covering an area of about 3000 ha were registered with efforts of the ID under CAD programme on Machhu-I project in Saurashtra, all of which are dormant at present. The main reason is that the required modifications to canals were not carried out. The commitment to undertake costly modification before turnover can become a disincentive if not carried out in time. Costs so incurred on Anklav can be a poor precedent. Alternatives need to be tried.

A simplification of the registration process for water cooperatives along with delegation of authority to field superintending engineers to take all appropriate measures including, approval of MOU will speed up the progress of farmers managed irrigation system.

At present FOs are required to be registered under the Cooperative Societies Act. It has been the experience that registration of a society takes considerable time and the procedure is cumbersome. These procedures require to be simplified in the recommendation of the workshop conducted by WALMI on January 19, 1994 (Annex N). Informal groups recognized by ID are sometimes preferred by farmers for single purpose FOs. It was desirable that in either case, competence to approve such proposal be vested in SE provided the proposals are framed as per guidelines framed by the government.

FO Viability

Assurance of regular and stable source of income can be the means to facilitate the formation and sustainability of FO. Financial viability is essential for organisational sustainability.

The financial viability is necessary for the sustainability of the FO and extension of the activity to facilitate irrigated agriculture for higher income. This viability will come partly by raising of internal resources by the FO but substantially from the ID on account of the savings that will be generated by the farmers take over of the system. Initially the second source will be the more important one and will also provide the incentive for internal mobilisation of additional resources. The government has therefore to consider this financial aspect. Some of the means by which government can contribute to the finances of FO are:

- a grant equivalent to the savings on account of water recovery charges
- availability of M&R grant on a graduated basis till the FO becomes reasonably sustainable
- providing a share in the Local Fund Cess and similar other measures possible in the conditions of Gujarat. The Workshop in May 1994 held by WALMI has proposed that 50 percent of the local fund cess should be provided to FOs. This matter needs a close examination as fund available will be the basis for improved performance by FO.

FO can derive reasonable benefits by volumetric water rate for supplies made from ID systems.

In ARP of Mahi project, in Mohini society on Kakrapar project and also in case of other FOs it has been found convenient if the ID supplies water to FOs in bulk to be measured at the head of the channel to be turned over, namely head of the minor. This volumetric water rates for ARP- Mahi project are arrived at by converting the crop area charged into equivalent volumetric rate taking into consideration quantities of water supplied for the past five years. After volumetric rates are fixed, a FO can derive further benefits by economizing on water and extending area of irrigation. In Kakrapar command a uniform water rate of Rs 0.30 per 10,000 litres has been found beneficial because of the predominance of sugar cane for which the crop area water rates are quite high. However the same rate has worked adversely for FOs in Dharoi project, where low water rate crops are predominant and soils are sandy requiring higher doses

of water. Therefore volumetric supply rates have to be fixed after taking note of the crops grown so that FO has a margin for financial viability.

RWS suitably utilised to finalise operation plan of canal within the transferred system will ensure equitable distribution of water . Its success can, therefore, be achieved more easily when operation plan is finalised in consultation with FO.

The ID has proceeded to adopt RWS on all projects and has issued guide lines for officers and staff. The system calls for harmony amongst the irrigators drawing water from a common source and also between the line staff and irrigators. It is the experience that the RWS system has been well received. On some projects, canal operation plan is prepared every season and finalised in consultation with water management or canal advisory committees. In the ARP under Mahi project, such canal operation plan is being discussed also with the FO and then finalised. The programme of running various canals during each season is then prepared and intimated in advance to each sectional charge and irrigators thereof through informal groups of farmers of each chak under FO. Since water has to be supplied on volumetric basis in RWS and since application for water from individual farmers has no place both in RWS and FO, scrapping of such system would go very well with operation of RWS and FOs.

Maintaining precise accounts of water supplied to FOs and losses in conveyance and seepage will facilitate economy measures in water use as also financial benefits for FO.

Supply of water on volumetric basis implies emphasis on an accurate accounting system of volumes of water delivered to and used by various sectional charges of irrigation field establishment with due regard to reasonable limits of permissible conveyance and seepage losses. Such a system induces economy in water use and changes in cropping mix that improves incomes of FO and its members. Such a system has economic benefits for the area and the system managers as well since allowance of seepage and evaporation losses will reduce payment liabilities of FO and induce ID to attend to more effective M&R in collaboration with FO.

Organisational and Procedural Changes

Change in the structure and functions of ID will be able to create a conviction about the seriousness of government commitment to farmer managed irrigation system.

The present structure of ID is designed to deliver water upto farm gates within a command. Where the FO has started working, the ID has to ensure the contractual obligation to supply water at a designated control point. From there FO takes over. This has implications for the organisation of ID below this control point and above it. It has to be noted that in spite of water cooperatives working now for period, the pace of management transfer to FO has been very very slow. One reason is the absence of promotion of FO in the functions of the ID functionaries in the field, Government officers are obliged to perform the duty assigned to them which does not happen to be the case here. Issues of this nature have influence on the attitude of the departmental officers in the field. While training will motivate a change in attitude, change in structure and function will bring home the reality that changing was inevitable. Now that a high level committee with the chief secretary as the Chairman will oversee the implementation of policy related to farmers managed irrigation system changes in the field level in respect of structure and function need to be attended to.

Proper maintenance of the system will require the appropriate demarcation of responsibilities of ID and FO as long as ownership remains with government.

It is not possible to anticipate large contribution by irrigators immediately after turnover. The process of sharing the incremental income for generating adequate financial resources with the FO will take time. Besides certain works in the distribution system are such that ID may have to maintain them till FO has developed competence. These matters have not been taken note of by MOU so far. The anticipation is that ID will continue to carry out special repairs, extension and renovation that involves heavy earth work and structures. The FO will carry out normal repairs including desilting, strengthening of canal banks, repair of outlets as also will contribute to emergency repairs during the irrigation period. This question has to be kept under constant review so that the health of the system is assured.

MOU can be the instrument of better understanding of individual and joint roles, rights and responsibilities of ID and FO which together impart stability to FO.

Sufficient funds are required by the FO for its viability initially and thereafter to ensure its sustainability. Such funds are being largely generated by difference in water charges paid by the FO to ID and those paid by farmers to FO. The FO can also charge higher rates to non-members. Funds are also generated by rebate payable for advance payments of water bills and by the grant payable for M & R to the canal system. Specific provision of all such matters in the MOU does instill a sense of assurance to the FO about its financial sustainability.

The MOU also states that the ID continues to be the owner of the channel turned over and would continue to carry out special repairs/extension and renovation involving the earth work and all repairs to structures. The FO is required to operate the channel and the system thereunder and also to carry out normal M & R. This matter will need regular monitoring and appropriate action to avoid conflicts that can harm the relationship between ID and FO.

FO for management of tubewells transferred by the government agency can be sustained with higher operating efficiency provided they are not burdened with unreasonable responsibilities.

GWRDC has handed over tubewells to FOs on token rent basis through an agreement signed by both the parties. The operation cost is to be borne by the FO. The water management, tube well maintenance and recoveries from the farmers are to be handled by the FO. After TO, most of the tube wells are operating well and sustained. However GWRDC has laid down a condition that the FO has to take responsibility of recovering old dues of the individual farmers of the command. In the workshop held in WALMI in May, 1994 the consensus emerged about non recovery of old arrears through FOs, since no such condition is part of MOU in water cooperatives on canals. However, 100 percent recovery of current water charges should be insisted.

The return of tubewells to GWRDC in spite of overall improved performance under management should suggest a review of the terms and conditions of the agreement between the parties.

Replication

Replicability and diffusion will be influenced by comparability of technical and social situation and the quality of motivational support available.

In the Mahi irrigation system ARP in Anklav influenced organisation of a society in the adjoining Kosindra minor. In the surface lift irrigation schemes of SWDF diffusion process is very much in evidence. Similarly in Pingot medium irrigation project impressed by the advantage the farmers on the right bank had started enjoying from such organisation, farmers on the left bank also started organising but without the AKRSP collaboration. It is found, however, that motivational and technical support of a minimal nature will be required if diffusion and replication is intended to be speeded up, ID can undertake this responsibility provided training infrastructure is extended to be commensurate with the programme expansion of farmers managed irrigation system. In the diffusion

process the emphasis has to be on quality of the catalysts' role rather than on its quantum. That is an additional advantage. Since the farmers themselves take initiative in organising the prospects of sustainability are also greater.

Traditional Systems

In water deficit flow irrigation projects formal FOs may not come up easily.

The reservoir of Dantiwada project in North Gujarat suffers from shortage of water. The farmers of the project share the deficit and distribute water under RWS system and they believe they would not gain anything by having a formal water co-operative.

Similarly Kalambandhi system suffers from deficiency of water. The farmers who fought a legal battle for their riparian rights are not interested in forming a FO since reliability of water availability and supply cannot be ensured.

Lalpari minor irrigation scheme in Saurashtra also gets only limited water for irrigation above certain level in the reservoir. The irrigators share water in a disciplined way, acting like a big family with a common interest; and are not interested in forming a water cooperative.

Legislation needs take note of the realities and provide for sustenance of such efforts also.

Management of NGO developed small systems by organised group of farmers in ecologically difficult areas and by socially weak communities should remove doubts regarding farmers capability to organise and to manage their irrigation systems.

Gujarat has a number of NGOs who have undertaken work of organising farmers for irrigation management. The AKRSP is collaborating with the state ID in the medium irrigation segment with good results. SWDF (Satguru Water Development Foundation) has undertaken pioneering work in the tribal dominant areas in developing small irrigation sources and managing it through farmers organisation. The socially weak communities have been contributing to the cost of such management since the income from irrigated agriculture can support it. The experience demonstrates that given the opportunity and the understanding farmers are quick to develop capability to manage their irrigation system.

Chapter 4

RECOMMENDATIONS

Introduction

The recommendations listed in this chapter are based on experiences and lessons learned and in consideration of suggestions made in the workshop held on 25 August 1994 to discuss the entire draft report with the Government of Gujarat (GOG) officials and NGOs. The suggestions are abridged in Annex R. The draft report was again discussed with the Board of Directors of SSNNL on 5 September 1994. There was general consensus about considering recommendations relevant to SSP. No doubt, there are several unanswered questions about the course to be undertaken in future. Research is necessary for seeking answers to these, while continuing with enlarging FO activity.

In this context, three recommendations are included at the end of this chapter to serve as research agenda. GOG has already constituted a working group headed by chief secretary and a standing committee headed by Secretary, N & WRD, for planning and implementing the needed policy changes required to bring about participatory management of water for irrigation.

Factors Facilitating Promotion of FO

If adoption of a comprehensive legislation is likely to take time, the present Bombay Irrigation Act, 1879 may be amended to provide for formation of FOs with a specific stipulation that the irrigation water supply would be made available only to FOs. Volumetric supply and RWS being in overall interest of farmers, should be incorporated in the Act. Wherever necessary, a transition period of one or two years may be prescribed.

In the BIACT there is no specific provision to supply water to individual farmers through FOs. All such individuals should be made eligible to receive water through FOs only. Again such supply has to be on volumetric basis which would need some infrastructure modifications in the system. Some time would also be needed for the activity of organising farmers. During such initial period of say one or two years the present system of supplying water to individual on crop area basis has to be continued.

For promotion of FOs in tribal areas for small lift irrigation schemes, an approach to the community through family units is recommended.

For better and speedier results, the work in tribal area has to cover various aspects of the life style of the tribal people, such as health, hygiene education and social culture for which an approach through family units, and particularly the women folk, is recommended. The SWDF model for lift irrigation is an indicator in this direction

Role of Catalyst

NGOs' catalytic role would remain limited to promotion of FOs as models. The primary responsibility for forming FOs in irrigated areas would be with ID for which the line staff may be trained, motivated and assigned the tasks of catalyst.

Being limited in numbers, the NGOs cannot cover all projects for formation of FOs and therefore, they can at best be expected to install some viable models. The ID will have to deploy its staff to work as catalysts for formation of FOs on a large scale. Obviously the staff would need training and motivation for the purpose.

The catalytic process has to start with efforts of a multi- disciplinary team of catalysts comprising irrigation, agriculture and extension specialists.

In practice the process of actual formation* of FO in the field may conveniently start bottom upwards through a multidisciplinary team of specialists in irrigation, agriculture and extension drawn from ID and AD.

The catalyst should not withdraw before FO's viability is established; nor should it stay too long to cause over dependence.

The withdrawal of the catalyst has to be properly timed. After a certain initial period, the FO would take time to establish its viability, during which period the presence of catalyst would be very much needed for guidance. Once the FO gains sufficient experience the catalyst has to withdraw as otherwise the FO may form a habit of over-dependence upon the catalyst, rather than being self reliant.

Incentives or Motivational Factors

A committed, strong and sustained follow-up action by ID is recommended through a special monitoring and evaluation cell.

Once the ID decides to supply water to groups of farmers only and not to individual farmers it would be necessary to take committed steps to implement the decision and such follow-up action would need a special monitoring cell. The follow up action would continue well beyond TO.

The ID should launch multi-media mass awareness programme amongst target water users.

It will be necessary to create mass awareness amongst farmers who have to be informed and explained the concept of participatory irrigation management and its benefits to them so that the activity of formation of FO can pick up momentum. This would need a campaign with a programme comprising all media viz., AIR, Doordarshan, News Papers, Magazines, Leaflets, Fairs, Religious and Social functions, Special Seminars.

Special water allowance should not be authorised to promote FOs, even initially.

Each project report provides a specified water allowance which is uniform throughout the particular zone of the project command. A soft option should not be adopted to increase such water allowance, even initially, as an incentive or attraction for formation of an FO. Such temptation has proven to be counter productive.

Level and Structure of FO.

A three-tiered FO comprising informal set up at outlet level, a formal FO at minor level catering up to 500 ha, and a federation at distributary level is recommended.

The process of forming FO may start at outlet level by motivating farmers of a chak to form an informal group. Leaders of such chak groups of a minor can form a formal FO at the minor level. Subsequently, when formal FOs of all the minors of a distributary are formed, they may federate at the distributary level. For a large/major project, such federation can form a union at the branch/ main canal level. For a minor/micro irrigation project, a single tier FO would suffice.

Initially, informal FOs are recommended in water deficit regions. Appropriate enabling provision may be considered while amending the BIACT.

Projects in water deficit regions are able to provide limited quantity of water, sufficient for just one or two waterings. Farmers of such projects are not inclined to go in for formation of a formal FO as the hassles and obligations of following rules and procedures detract them.

Formal Registration of FO

A simplified procedure for registration may be formalised early by the Registrar of Cooperative Societies.

The present procedure is cumbersome, lengthy and interpreted differently by local officers. Simplified and unambiguous guidelines from the Registrar of Cooperative Societies will go a long way in reducing the hardships and avoidable procedural delays.

Water Rates

Water rates should reflect its scarcity value from time to time. They should be based on volumetric bulk supplies to FOs.

Initially weighted average of current structure of crop/area water rate may be converted into equivalent volumetric water rate for each season. FOs can be convinced about such conversion. This helps achieve full recovery and switch over to volumetric supply. Once FOs adopt such volumetric rate, necessary upward revision can be implemented in a phased manner to match O&M costs.

FOs should be authorised to fix water rates both for members and non members within the minor command. Rate differential may be about 30 percent.

Depending on the volumetric water rate to be paid by FO to ID, the FO may fix either crop-area or hourly water rate for its members so that FO earns a reasonable surplus. In so doing non- members can be charged upto 30 percent higher rates than the members.

Turnover and Memorandum of Understanding

A generalised model MOU based on experience generated so far may be issued early to serve as a guide for intending FOS. Alternative models may be considered

Alternative could include:

- **water cooperatives under the State Cooperative Act**
- **societies under the Society Registration Act**
- **companies under the Central Company Law**
- **long-term agreement**
- **recognised groups/associations under Irrigation Act after its amendment**

Viability

FOs may be encouraged to limit their activities initially to water management for diversification at a later date.

Primary objective is better water management so that water use efficiency increases resulting into improved productivity. If many activities are clubbed together in the beginning, the primary objective is likely to get a back seat. At a later date it becomes easy to take up new activities which sustain FOs for a longer time.

For financial viability, model MOU could comprise following incentives:

An appropriate rebate in water bills for prompt payment along with suitable discount for those making advance payment. Since no other income is available for FO, provision for suitable discount on prompt payment should be made in MOU to generate assured income.

Earmarking for use by FOs, a part of local fund (LF) b) cess payable on water charges for improvement of roads in their commands. At least a part of LF cess payable on water charges should be earmarked for use by FOs for improvement of roads in the command so that need based optimum use of such fund can be made by users themselves.

Passing on a part of M&R grant to FOs for normal maintenance of minor and the system. Part of M & R grant may be given directly to FOs for maintenance of minor canal system so that need based optimum use of such fund can be made by users themselves.

Extension of incentives eligible under the Gujarat Cooperative Societies Act to FOs. The FOs should be apprised of various incentives being given to other co-operative societies and they should be properly guided to apply for and avail them.

Human Resources Development

Appropriate HRD programme should be devised for ID line staff and farmers for cooperative participation.

The line staff working in present conditions has to be trained for adopting to changing situation. There is a gap between present pattern and the working pattern expected in the new situation. The gap has to be critically studied and identified, and appropriate training programme carefully devised to bridge the gap. Volume of HRD needs should be assessed and required institutions should be identified and/or created.

WALMI should be assigned consultant's role for participatory management, networking with agriculture training centres, training line staff and trainers for imparting training to both farmer leaders and ID officers, and coordination of HRD programme implementation.

WALMI is an apex autonomous institution for training in water and land management programmes in the State. Agencies engaged in the programme of FOs may meet with problem in areas such as irrigation management, agriculture, and human resources development. WALMI with the aid of its faculty in the respective fields can help in finding a solution to field problems faced by the catalytic agents.

WALMI is mainly engaged at present in providing training to different level field staff. AD looks after training in Agriculture for their field staff and farmers by arranging programmes at its training centres. WALMI can take advantage of such programmes by synchronising the agricultural training needs emerging from the field, or can jointly plan integrated training programmes for IA. WALMI can cater to the special training needs for line staff, farmer leaders, in cooperative water management in collaboration with District Cooperative Unions and CD. Lastly WALMI should devise HRD programme and coordinate its implementation.

Replicability

For speedy diffusion, avail services of articulate members of viable FOs and deploy them with trained staff of WALMI and ID.

The efforts to spread FO programmes are made at present through ID and some NGOs. For speedy and successful diffusion, the service of potential members of successful FOs may be availed as catalyst with necessary support from ID and WALMI. Since, the farmers have realised the benefits of FOs and are conversant with the neighbouring systems, the farmers, and the agriculture practices, their communication becomes more credible and effective. Such local resource persons may be included in the teams of catalysts.

Identify potential NGOs to act as catalysts in each district for formation of FOs.

There are different organisations working for rural development, social welfare, education, and health in the State. In view of the vast command area to be brought under operation by FOs, potential NGOs with ability and aptitude should be identified and entrusted work of catalysts.

Organisational and Procedural Changes (OPC)

Superintending engineers may be empowered to grant approval to formation of FOs as per government guidelines.

At present, ID's approval is required for forming each irrigation FO. Such approval precedes registration under Cooperative Societies Act. This power should be vested by government in SE who should follow specified government guide lines.

Government policy may be revised to ensure construction and maintenance of field channels by FOs while assuring continued technical guidance.

Real participatory management will be accomplished by inducing at least some financial involvement of farmers like bearing the cost of field channels. Field channel is essentially a private facility necessary for equitable distribution of water as per RWS. The difficulties regarding land acquisition and right of way will disappear if the construction and maintenance are done by users themselves, which incidentally will promote harmony amongst the members of FOs. ID's role should be limited to providing only technical guidance. In this context, the present government policy may be revised.

Chairman of FOs may be considered for empowerment as canal officers.

The chairman of a cooperative society has the powers of head of the Institution under the co-operative act and rules to manage the functioning of a society. Empowering him as canal officer under BIACT will broaden the horizon of his powers for better water management.

Incentives may be provided for motivating line staff through performance appraisal.

The ID line staff has a major role in bringing about the transformation in irrigation water management culture. Positive encouragement to such staff can be built in their performance appraisal. One way of doing this is to add a new item specifically for such aspect of transformation in the format for reporting annual performance of such staff. It could be followed up by issuing letters of commendation. On the basis of such appraisal selective posting may be offered to meritorious persons. Such incentives should be considered as a package and widely notified to all the staff.

Research Agenda

A study of non functioning FOs should be launched to identify the causes and provide guidance for pilot projects.

During the past few years quite a few FOs have become non- functional after formal registration whereas in the same or surrounding area and in almost identical or comparable environment, some FOs are working satisfactorily. In some cases, early completion of structural modifications caused waning of interest whereas in others lack of completion caused it. FOs in head reach get adequate water whereas in tail they don't get. But both situations have surprisingly caused dormancy. Financial non-viability is accompanying water deficit regions and is a major cause. It is therefore advisable to carry out in depth study to find out real reasons and identify remedies to revive the FOs. Such a study will also provide guidance or feedback for launching some more pilot projects. There could be slight shift in focus from ARP approach for the adaptive trials so that successful models can be recommended for large scale replication.

The role to be performed by ID, CADA and WALMI in future may be assessed and studied in depth to enable their effective transformation.

In the next ten years or so, Gujarat will have developed its full potential of irrigation. Therefore the construction phase of such schemes would practically end. In this context it is necessary to conduct a study regarding changed roles of ID, CADA and WALMI and regarding the manner in which a smooth transition should be initiated right from now for such transformation. The CADA has gone through a difficult phase so far. Its role has to be more clearly recast to realise the objectives of wholesale development of irrigated commands. The fabric of organisational and training requirement of the entire N & WRD ten years hence should be preconceived in such a study so that in the ultimate phase comprising only single activity of commissioning the completed projects and utilisation of potential, the entire community of the staff and FOs are well equipped to optimise their performance efficiency yielding maximum output at minimum cost.

An action research project may be taken up in the entire command of a completed medium irrigation scheme north of river Narmada for trying out all recommendations as Research and Development (R&D) effort.

In such R&D effort normal rules and procedure will naturally not apply. Therefore specific orders of exemption may be issued and full authority to carry out R&D be vested in the SE with a view to facilitate his working and avoid audit objections.

Chapter 5

NEXT STEPS

The National Water Policy and State policies have identified people's participation as a central theme for improving irrigated agriculture. Setting up of FOs, implementation of requisite OPC and TO to sustainable FOs have been considered as the three instruments for achieving this goal. Recommendations have been listed in this report assessing the experiences in Gujarat. Research agenda has also been identified.

Steps that can be taken during the next three years can have salutary effect on realisation of short term as well as long term goals. This is especially true because a midterm review of eighth Five Year Plan has been undertaken. Thinking about the ninth plan will also start a little. The following paragraphs bring out a practicable action plan that emerges from the recommendations.

Farmer Organisations

The government of Gujarat is identifying pilot projects (PP) and corresponding catalytic agents. The minor irrigation projects which are not yet covered by the effort have to be brought into the fold of pilot projects in a big way. Some of the models and/or approaches available in the country as a whole should be attempted on these schemes. The coverage of pilot projects can comprise study of unresolved issues like - informal Vs. formal FOs, micro to macro approach and/or vice versa, single purpose or multi purpose FOs, incentives for farmers and line staff. The real challenge lies in development of an appropriate model for the large water deficit regions of the State, as Mahi and Ukai-Kakrapar models will admirably serve the south and central Gujarat regions.

Organisational and Procedural Changes

The State has to take immediate steps to introduce the modified bill for irrigation and drainage. It can be discussed in the political parties or in Consultative Committee of NWRD to have a smooth sailing in legislature. Simultaneously, efforts should be made to amend the BIACT, 1879 to empower FOs and ID staff to enable them to move fast. Procedure for registration should be smoothened so that it does not become counter productive. Mechanism to ensure cooperation of AD and CD should be set up. At ID level, government policy should be announced. a generalised MOU - MOA formalised. patterns of water rates on volumetric basis announced. reorientation of line staff of project commands

undertaken and policy for construction and maintenance of field channels modified.

Above all immediate steps are required to start work on identified Research Agenda.

Turnover

Wherever TO has taken place, a special team should be assigned to hold discussions with the concerned FO and find out difficulties experienced and to recommend remedies. Successful TO would mean quicker diffusion, in future. The up and coming FOs should be selectively supported to realise TO during next three years.

In case of FOs where financial viability is not yet established, a special task force be asked to meet the concerned office bearers and evolve a time bound action plan for the purpose.

The action plan for the next three years could comprise the following:

1995 Launching additional pilot projects ; moving the new bill or proposals to amend BIACT; issue of policy - model MOU/MOA - volumetric water rates; modification of policy about field channels; simplification of registration process; training of catalysts, line staff and farmer leaders of pilot project commands; setting up of task forces.

Starting work on Research Agenda. Setting up of Coordination mechanism between ID-AD-CD.

1996 Review of role of ID - CADA - WALMI and reorientation. Training of farmer leaders and line staff, feedback on causes of failures and proposals for future, identification of catalysts, restructuring of ID to suit new role setting up of diffusion targets in 4 different categories of projects. Setting up federations on Mahi and Tapi commands, public awareness campaign.

1997 Finalise targets for ninth FYP, set up confederations on at least Mahi and Tapi systems, trials for privatisation, start with Narmada FOs in a concentrated manner, set up a conflict management mechanism outside government fold, attempt diffusion on a large scale and provide mid course corrections.

ANNEXES

Annex A

EXTRACTS FROM NATIONAL WATER POLICY (1987)

"Irrigation: 10.1: Irrigation planning either in an individual project or in a basis as a whole should take into account the irrigability of land, cost effective irrigation options possible from all available sources of water and appropriate irrigation techniques. The irrigation intensity should be such as to extend the benefits of irrigation to as large a number of farm families as possible, keeping in view the need to maximise production.

:10.2: There should be a close integration of water use and land-use policies.

:10.3: Water allocation in an irrigation system should be done with due regard to equity and social justice. Disparities in the availability of water between head-reach and tail end farms and between large and small farms should be obviated by adoption of a rotational water distribution system and supply of water on a volumetric basis subject to certain ceilings.

:10.4: Concerned efforts should be made to ensure that the irrigation potential is fully utilised and the gap between the potential created and its utilisation is removed. For this purpose, the command area development approach should be adopted in all irrigation projects.

"Water rates : 11 : Water rates should be such as to convey the scarcity value of the resource to the users and to foster the motivation for economy in water-use. They should be adequate to cover the annual maintenance and operation charges and a part of the fixed costs. Efforts should be made to reach this ideal over a period, while ensuring the assured and timely supplies of irrigation water. The water rates for surface water and ground water should be rationalised with due regard to the interest of small and marginal farmers."
"

"Participation of farmers and voluntary agencies : 12 : Efforts should be made to involve farmers progressively in various aspects of management of irrigation system, particularly in water distribution and collection of water charges. Assistance of voluntary agencies should be enlisted in educating the farmers in efficient water use management."

Annex B

LIST OF THE WORLD BANK AIDED PROJECTS
WHERE RWS SYSTEM HAS BEEN INTRODUCED IN PHASES

Sr. No.	Name of project	CCA (ha)	Area suitable for RWS (ha)
1.	Machhanala	2463	1916
2.	Hadaf	5238	4368
3.	Bhadar (P)	8000	7433
4.	Sukhi	19790	10731
5.	Deo	6457	5550
6.	Watrak	18341	13531
7.	Guhai	7111	6327
8.	Mazam	4717	3900
9.	Sipu	16000	10490
10.	Kalubhar	4702	3802
11.	Sukhbhadar	5410	5286
12.	Machhundri	8095	5543
13.	Uben	2497	2497
14.	Venu-II	5253	4471
15.	Und-I	9900	9050
16.	Demi-II	3108	3108
17.	Aji-III	6635	5967
18.	Aji-II	2384	2384
19.	Panam	34800	2661
20.	Dantivada	44517	44517
21.	Bhadar (S)	26587	9196
22.	Shetrunji	35750	4742
23.	Machhu-I	10409	2001
24.	Machhu-II	9990	7500
25.	Karjan	56200	5035
Total:		354354	182006

Annex C

COMPARATIVE EFFICIENCY OF WATER MANAGEMENT

- 1.0 The action research studies carried out over the last five years in the command area of 1000 ha under Anklav sub minor (community managed) of Mahi right bank canal (MRBC) systems clearly indicates that water use efficiency, measured usually in terms of 'area irrigated per day cusec' (AI/DC in acres) is enhanced by 66 percent compared to such efficiency in the just adjoining area of 5660 ha under Adas distributory (Government managed) which is the parent channel of the Anklav sub minor. The performance details of irrigation under these two channels for the last five years is shown in the following table.
- 2.0 There are ten FOs in the command of the Ukai-Kakrapar which is a major irrigation project of Gujarat with command area of 3.31 lakh ha. These water cooperatives commanding an area of 4460 ha were registered in various years from 1978 to 1989. They are supplied water on volumetric basis at the rate of Rs. 0.30 per 10,000 litres.

Table 5

Performance Details of Irrigation under
Anklav and Adas Distributory

Sr. No.	Year	Season	AI/DC Anklav sub-minor (1000 ha)	AI/DC Adas Dist. (5660 ha)	Remarks
1.	1986-87	Kharif	2.05	1.23	a. Anklav SM is self managed by farmers.
		Rabi	2.85	1.19	
		(H. W.)	2.38	1.32	
2.	1987-88	Kharif	2.40	1.44	b. Adas Dist. (excluding Anklav SM) is managed by ID.
		Rabi	2.40	1.62	
		H. W.	2.38	1.23	
3.	1988-89	Kharif	1.99	1.34	
		Rabi	2.93	1.28	
		H. W.	2.95	1.36	
4.	1989-90	Kharif	2.80	1.39	
		Rabi	3.05	1.63	
		H. W.	2.51	2.20	
5.	1990-91	Kharif	2.25	1.45	
		Rabi	2.89	1.80	
			----- 35.83 -----	----- 20.48 -----	
			14	14	= 2.42 = 1.47

Result : AI/DC Anklav sub minor (SM) (community managed) is 66 percent more than that of Adas Distributory. (ID managed.)

Their performance is found to be much better than of their parent channels managed by ID. Please see below abstract of five years' performance of five such FOs.

Table 6
Comparative Performance of Areas of FOs and Non FOs.

Sr. No.	Name of water cooperative.	Weighted ----- for FOs	AI/DC (acres) of last five years. ----- for parent channel.
1.	Mohini	4.21	1.94
2.	Hathuka	3.88	2.63
3.	Vaskui	3.48	2.03
4.	Rayma	4.24	3.53
5.	Pardi-Indris	4.21	2.16
		----- 18.02	----- 12.29
		----- 5	----- 5

Absolute Average = 3.60 2.46

Result: AI/DC of FOs is 43 percent better than that of parent channel.

- 3.0 The GWRDC Ltd. has started handing over such tubewells on token rent to willing farmer beneficiaries for operation and maintenance as FOs. Besides, there are quite a few private companies operating very deep tubewells in Mehsana district. It is found that such private companies perform better than even the FOs. The comparison of irrigation performance of 26 water cooperatives of Kheda District and 13 private companies of Mehsana district is reported by Tushar Shah and Saumindra Bhattacharya of Institute of Rural Management, Anand (IRMA) in their paper on "Farmer Organisation for Lift Irrigation - Irrigation companies and Tubewells Cooperatives of Gujarat" which appeared as Net Work paper 26 in June 1993 issue of Overseas Development Institute (UK)'s journal ODI Irrigation Management Net Work. (Reference) They have concluded that "a company managed tubewell operated for 50 percent more hours per year than a cooperative managed tubewell." The reasons for better performance of a private company are obvious. Here, the sense of ownership is much stronger compared to that obtaining in cooperatives. Likewise, the cooperative perform better than government/ Public managed systems.

Annex D

STATUS OF FOs IN MAHI IRRIGATION PROJECT

Sr. No.	Name	Village	Minor or distri- butory	CCA in ha	No. of holdings	Year of Regis- tration	Catalyst	Present Status	Programme
1.	Sardar Krishi Vikas Piyat Sahakari Mandali. Bhetasi	Ankalav Ambali	Anklav subminor	1000	1738	1992	WALMI	Working	WRM&T project sponsored
2.	Kosindra Sub-minor Krishi Vikas Sahakari Mandali.	Kosindra	Kosindra subminor	125		1993	Self (WALMI advisory)	Working	WRM&T project
3.	Kavitha Piyat Sahakari Mandali	Asi	Kavitha subminor	275	395	1990	IRMA	Not working	WRM&T project
4.	Valli Kharyukta Jamin Sudharna Sahakari Mandali.	Valli		50	38	1991	WALMI	Not working	ICAR (Drainage Scheme)
5.	Dabhau Kharyukta Jamin Sudharna Sahakari Mandali.	Dabhau		50	103	1991	WALMI	Not working	ICAR (Drainage Scheme)

Annex E

NON FUNCTIONING FOs IN MAHI IRRIGATION PROJECT
ORGANISED UNDER CAD PROGRAMME

Sr. No.	Co-operative Society	Name of Village	CCA in ha.	Number of Members	Date of Registration
1.	Bhalej Piyat Sahakari Mandh	Bhalej	446	50	31.05.83
2.	Finav Piyat Sahakari Mandli	Finav	725	42	31.01.85
3.	Sahaj Piyat Sahakari Mandli	Sahaj	549	37	09.02.87
4.	Navli Piyat Sahakari Mandli	Navli	200	34	29.04.85
5.	Ajarpur Piyat Sahakari Mandli	Ajarpur	641	38	29.04.85
6.	Anklav Piyat Sahakari Mandli	Anklav	400	28	31.01.85
7.	Mogari Piyat Sahakari Mandli	Mogari	125	51	25.02.85

Annex F

FUNCTIONING WATER COOP SOCIETIES IN THE UKAI KAKRAPAR PROJECT ORGANISED UNDER CAD PROGRAMME

Sr. No.	Cooperative Society	Name of Village	Canal	CCA in ha.	No. of Farmers	Date of Registration
1.	Mohini Water Cooperative Society	1. Kharhhasi 2. Mohini 3. Goja 4. Gangava 5. Khamhasala 6. Delvada	4L,5L,6L Sub Minor Ex. Bhestan Minor	487	225	15.7.78
2.	Saras Water Cooperative Society	1. Saras	Orma Sub Minor 2R Sub Minor	458	261	12.12.86
3.	Gadat Water Cooperative Society	1. Gadat 2. Pathvi 3. Manekpur 4. Dhakvada	Gadat Minor and Ambika River	353	610	11.2.85
4.	Wanskui Water Cooperative Society	1. Champavadi 2. Vanskui 3. Dungeregang	Champavadi and Wanskui Minor	411	290	13.6.83
5.	Hathuka Water Cooperative Society	1. Hathuka 2. Bhimour 3. Dumkhal 4. Golan 5. Kanjod 6. Kumbhria	Hathuka Sub Minor Hathuka Minor Nalan Sub Minor	1073	400	27.1.83
6.	Rayma Water Cooperative Society	1. Rayma 2. Kanta Sayou	Rayma Distributary	453	140	01.01.82
7.	Padri-Idrish Water Cooperative Society	1. Pardi-Idris 2. Kathodra	Piludra Minor	672	141	20.08.82
8.	Gangpur Water Cooperative Society	1. Kareli 2. Gangpur 3. Jetpur 4. Umrakh	4L Sub Minor Ex. Kareli Minor	89	106	22.08.86
9.	Umrakh Water Cooperative Society	1. Bahen 2. Umrakh	1L and IR Ex. Kareli Minor	199	213	08.11.89
10.	Shera Water Cooperative Society	1. Shera 2. Mangrol	Asta Minor, Utaraj Sub Minor and D.O. of Hansot Branch	266	198	11.08.88
Total:				4461	2584	

Key: Br - Branch Canal
 Ex - Off-taking from
 Dy - Distributary
 DO - Direct Outlet
 Coop- Cooperative
 Mr - Minor

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Annex G
NON FUNCTIONING WATER COOP SOCIETIES IN THE
UKAI KAKRAPAR PROJECT ORGANISED UNDER CAD PROGRAMME

Sr. No.	Cooperative Society	Name of Village	Canal	CCA in ha.	No. of Farmers	Date of Registration
1.	Syadla Water Cooperative Society	1. Syadla 2. Kareli	Syadla Sub 1L Y Sub Minor	294	90	27.01.83
2.	Mudad Water Cooperative Society	1. Mudad 2. Kareli	DO Kathodra, 3L Kathodra, 2R Vadoli	628	339	12.12.88
3.	Dhanori Water Cooperative Society	1. Dhanori 2. Changa	Gadut Minor (1L,2L,3L & 1R)	572	316	29.10.80
4.	Salej Water Cooperative Society	1. Salej 2. Kolva 3. Chanda 4. Vasan	3L,4L,4R Ex. Amalsad Br.	214	214	29.01.85
5.	Sardar Kalvach Water Cooperative Society	1. Kalvach 2. Desad	Desad Minor	321	227	18.10.82
6.	Devadh Water Cooperative Society	1. Chalthan 2. Kharad 3. Kharbhans 4. Antroli 5. Niyol 6. Gangdhara	Devadh Minor 2L and TWC	880	515	09.09.83
7.	Sania Hemad Water Cooperative Society	1. Kosmadi 2. Sania 3. Hemad 4. Saroli	Saroli Sub Minor and 15L, DO	465	218	07.07.83
8.	Sania Kande Water Cooperative Society	1. Sania 2. Kande 3. Eklora 4. Dindoli	6L,7L and 8L Bhestan Minor etc.	927	322	09.09.83
9.	Ladvi Ovian Water Cooperative Society	1. Ladvi 2. Ovian 3. Valthan 4. Chhadacha	Sania Minor 1R W/C. 1L/WC, TWC	495	208	15.12.88
10.	Vanz Water Cooperative Society	1. Vanz 2. Talangpor 3. Lajpur 4. Vaktana 5. Bonand	Vanz Minor Ch. 17 to 25.4 etc.	849	127	30.03.83

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11. Mangrol Water Cooperative Society	1. Mangrol 2. Kalam	Mangrol Distributary Ch.10.5 to 12.1	383	106	11.08.81
12. Digas Water Cooperative Society	Digas	Kanva Distributary Ch. 2.9 to 5.9	760	332	19.07.88
13. Dihen Water Cooperative Society	Dihen	Barbodhan Minor Bhandut Minor	1164	588	21.05.90
14. Pal Water Cooperative Society	Pal	7L, 8L and 9, DOL Ex. of Hajira Branch	280	302	21.01.91
15. Vesu Bharathan Water Cooperative Society	1. Panas 2. Althan 3. Bharthana 4. Bhimrad 5. Khajod 6. Vesu 7. Sarsana 8. Abhava	Dumas Distributary Ch. 0 to 15	1132	242	

Total:			9364	4146	
--------	--	--	------	------	--

Key: Br -	Branch Canal	DO -	Direct Outlet
Ex -	Off-taking from	Coop-	Cooperative
Dy -	Distributary	Mr -	Minor

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Annex H

LIFT COOPERATIVE SOCIETIES IN
FATEWADI IRRIGATION PROJECT (MAJOR)

Sr. No.	Cooperative Society	Total Members of Cooperative Society	Area in Acres	Canal
1.	Ganesh Piyat Cooperative Society, Visalpur	53	130	Moti Fatewadi
2.	Amul Piyat Sahakari Mandli, Visalpur	50	130	Moti Fatewadi main canal
3.*	Khodiyar Piyat Sahakari Mandli Ltd. Bakrol	22	129	Moti Fatewadi main canal
4.	Adarsh Khedut Piyat Sahakari Mandli, Visalpur	68	118	Moti Fatewadi main canal
5.	Bakrol-Badarabad Piyat Sahakari Mandli Ltd., Bakrol	25	136	Moti Fatewadi main canal
6.	Survoday, Visalpur	8	91	Moti Fatewadi main canal
7.	Moti Fatewadi Uttarvibhag Piyat Sahakari Mandli, Ltd., Visalpur	24	100	Moti Fatewadi main canal
8.	Sabar Lift Irrigation Sahakari Mandli, Visalpur	54	165	Moti Fatewadi main canal
9.	Visalpur Piyat Sahakari Mandali, Visalpur	22	100	Moti Fatewadi main canal
10.*	Sarvoday Piyat Sahakari Mandali, Visalpur	34	130	Moti Fatewadi main canal
11.	Janta Lift Irrigation Sahakari Society, Narimanpura	14	120	Moti Fatewadi main canal
12.	Narimanpura Piyat Sahakari Mandli Ltd., Narimanpura	14	121	Moti Fatewadi main canal
Total:		388	1470	

Note: *Out of these twelve FOs, FOs at serial number 3 and 10 are not working.

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Annex I

FUNCTIONING FOs IN FOUR MEDIUM IRRIGATION PROJECTS BETWEEN
RIVERSTAPI AND NARMADA, AKRSP AS CATALYST

Sl.No	FO	Year of Registration	Village	Project	CCA ha	No. of Holdings	No. of members	Programme
1.	The Jivandeep Piyat Vistarman Panini Vahechani Karnari Sahkari Mandli Limited Zarnavadi	1990	Kamlia Zarnavadi Hathakundi Punpujiya	Pigut (Right Bank)	600	323	216	W.B.Project
2.	The Baldeva Piyat Vistarman Panini Vahechani Karnari Sahkari Mandli Limited Baldeva	1993	Baldeva Kambalia Alkhol Chasvad Zarna Panchsim	Baldeva (Left Bank)	1155	340	227	WB Project
3.	Lakhigam Society	Under 4 Villages Process of Registration		Lakhigam (Left Bank)	400	700	NA	GOG
4.	Chopadvav Society	Under 19 villages Process of Registration.		Chopadvav	1460	NA	NA	GOG

Annex J

**NON FUNCTIONING WATER COOPERATIVES IN THE
DHAROI IRRIGATION PROJECT COMMAND ORGANISED
UNDER CAD PROGRAMME BY ID**

Sr. No.	Cooperative Society	Name of Village	CCA in ha.	No. of Members	Date of Registration
1.	Dharoi Piyat Sahakari Mandli	Dharoi	358	57	24.6.83
2.	Umta Piyat Sahakari Mandli	Umta	2732	97	19.8.83
3.	Rangpur Piyat Sahakari Mandli	Rangpur	852	61	19.8.83
4.	Denap Piyat Sahakari Mandli	Denap	300	82	13.10.83
5.	Valam Piyat Sahakari Mandli	Valam	800	317	14.10.83
6.	Jetvasana Piyat Sahakari Mandli	Jetvasana	400	25	21.7.84
7.	Paladi Piyat Sahakari Mandli	Paladi	415	66	25.11.83
8.	Chhatral Piyat Sahakari Mandli	Chhatral	200	29	15.5.84
9.	Karani Piyat Sahakari Mandli	Karani	1365	21	1.9.83
10.	Hajipur Piyat Sahakari Mandli	Hajipur	252	86	13.6.84
11.	Khatasan Piyat Sahakari Mandli	Khatasan	300	91	13.6.84
12.	Moti tarvani Piyat Sahakari Mandli	Moti Hirvani	320	50	13.10.83
13.	Chachriya Piyat Sahakari Mandli	Chachriya	246	55	13.10.83
14.	Jaska Piyat Sahakari Mandli	Jaska	1536	23	29.9.83

Annex K

MEMORANDUM OF UNDERSTANDING FOR FOs MAHI PROJECT - A TYPICAL FORMAT

A Memorandum of Understanding between Sardar Patel Krishi Vikas Sahkari Mandli and Water Resources Department, Government of Gujarat for irrigation management.

This memorandum of understanding between the Executive Engineer, Anand, Irrigation Division, Anand on behalf of the Governor, Gujarat State on one side and the Chairman of the Sardar Patel Krishi Vikas Sahkari Mandli on the other side is executed at Anand on _____.

As per this Memorandum of Understanding, the command area falling under Anklav sub minor Ex. Adas distributary of Mahi Right Bank Canal project in the villages of Anklav, Ambali and Bhetasi of Borsad Taluka of Kheda district is assigned to the said co-operative for irrigation management for the period under this mou. (Plan of the command area is attached). However the ownership of the sub minor including the land, the structures thereon and the land acquired for such structures, all other works executed at Government cost vests with the Government. Both the parties with whom this MOU is executed have given the consent to the following conditions. Any change in the condition could be done with mutual consultation and agreement between both the parties.

1.0 OBJECTIVES:

The main objective is to ensure farmers participation in irrigation management so as to optimise the use of available water and raise agricultural productivity and production in the command. The following shall be the part of the byelaws and general objective.

- a) Atleast 51 percent of the command of sub minor shall come in the cooperative society jurisdiction. The government expects that this percentage would increase in future, so that the full command area comes under jurisdiction of the cooperative society.
- b) Cooperative society shall take water from government on volumetric basis at Anklav sub minor head and distribute amongst the members and non members on crop area basis. It will ensure optimal water utilisation, water economy and thus generate profit.

- c) Society shall maintain and repair outlets, field channels, drains and other structures of physical system in its jurisdiction below the outlets.
- d) Society shall maintain and repair sub minor and the structures on it.
- e) Society shall make available to members, modern scientific method of irrigation and agronomy practices for ensuring optimal utilisation of water and increased production and productivity.

If the Cooperative Society proposes to incorporate additional objectives in their byelaws, the government will not have any objection provided the additional objectives to be incorporated by the cooperative society do not violate the main objective mentioned above. The cooperative society should get additional objectives approved from the government and the cooperative society should have provision in the byelaws to validate those additional objectives consistent with the main objectives.

2.0 WATER RIGHTS:

- a) The society is entitled to receive water allocation on volumetric basis at the head of Anklav sub minor, subject to provisions made in subsequent clause 2(d).

Kharif season	2500	T.Cu.m.
Rabi season	2500	T.Cu.m.
Hot Weather Season	2700	T.Cu.m.
Total	7700	T.Cu.m.

The duration of irrigation seasons shall be as under:

- i. Kharif - from 16th June to 15th November
- ii. Rabi - from 16th November to 15th March
- iii. Hot Weather - from 16th March to 15th June.

Clear boundaries of seasons are drawn without overlapping of seasons in view of seasonal allocation of water mentioned above. This water allocation would be reviewed after a period of two years in mutual consultation and agreement of both the parties.

In case the cooperative society needs more water than the sanctioned allocation in any season and if the cooperative society demands such additional allocation, the government does not take

any responsibility for sanctioning the additional demand. However, if the additional water is allocated in the adjoining command areas, the cooperative society would also be entitled to receive it on ground of equity.

- b) After utilising the sanctioned allocation as spelled out at 2 (as above, if the cooperative society demand additional allocation and if it is sanctioned by government, the society would be required to pay water charges for the additional water at a rate of 20 percent more than the normal rates of that season.
- c) Government reserves all rights to sanction or reject the additional water demand over and above the sanctioned allocation. The additional demand shall be considered as per availability of water and on the basis of equity to the adjoining areas. If due to some reasons, the additional water allocation could not be sanctioned, the government shall not be responsible for any loss caused to the cooperative society.
- d) Due to less availability of water in the storage in any year, the allocation sanctioned as per clause 2 (a) shall be proportionately reduced as per government policy, with due advance intimation to the cooperative society before beginning of the season.
- e) If the cooperative society uses less quantity of water than the sanctioned allocation in Kharif season, the cooperative society shall have no right to carry over the balance quantity in the next Rabi season or hot weather season. The balance quantity of Rabi season shall be permitted for carry over to Hot weather season, provided the society demands the balance quantity one month before the close of Rabi season as per clause 2 (g). However, the cooperative society shall be entitled to only 30 percent of the balance quantity of Rabi season in Hot weather season. For the balance quantity of Rabi season allowed to be used in Hot weather season, the cooperative society shall pay the water charges at the rate fixed for Hot weather season.
- f) If any of the land owner, who is a member of the cooperative society sells his land in the command area, he shall cease to be member and the new land owner shall be eligible for membership of the cooperative society.
- g) In each season, the rotational schedule shall be worked out by the WRD in a negotiable process with cooperative society, so as to

satisfy the crop water requirement of the major area. The rotational schedule shall be prepared on the basis of past experience and practice in action since 1986-87, and it shall conform to overall rotational schedule of Mahi Project.

- h) In every season, the rotation programme shall be prepared by the Water Resources Department and a copy of the same shall be supplied to the cooperative society 15 days before the commencement of the season. The cooperative society should intimate to the concerned sub divisional officer before starting of the season the water demand. A gauge register would be jointly maintained by the sectional officer of Water Resources Department and authorised representative of the cooperative society. The cooperative society shall not get water outside the rotational schedule.
- i) All the beneficiaries in the command area of sub minor shall be eligible for membership of the cooperative society. Every member has a right to receive water in every season. If any member does not require water or use less quantity than allocation, the cooperative society has a right to divert that quantity to other members. There is no restriction on the cropping pattern in the command area of sub-minor from government.
- j) The cooperative society shall get water for irrigation purposes only. However, if the cooperative society requires water for purpose of processing agricultural produce, the society shall demand separate allocation and should obtain separate sanction for this demand.
- k) The cooperative society shall purchase water on volumetric basis at Ankjav subminor, from WRD and sell water amongst members on crop area basis. The rates chargeable to members on crop area basis shall not be more than those being charged on individual on crop area basis.
- l) The society shall have a right to charge separate water charges from the non members and shall also recover the water charges from the non members. But the water rates for the non-members shall not be more than 30 percent of the rates chargeable to the members of the society.
- m) The society has a right to give water to the land falling within the command area of Ankjav subminor, but which are declared as an uncommand.

- n) No claim for compensation towards loss of crops etc. on account of breach in main canal/branch canal/distributary and natural calamities and other unforeseen reasons resulting in disruption of water delivery shall be entertained by the WRD.

3.0 WATER RATES ASSESSMENT:

Government shall from time to time fix the water rates chargeable to the cooperative society for the volumetric supply of water. The following rates would remain the operation until further notice:

Kharif	Rs. 14.00	per 1000	cu.m.
Rabi	Rs. 21.00	per 1000	cu.m.
Hot weather	Rs. 30.00	per 1000	cu.m.

If the water charges, calculated on the basis of actual water utilised on volumetric supply rates, are less than those calculated on area basis, the farmer shall be charged to the cooperative society otherwise the later will prevail. After this MOU is executed the water rates shall be reviewed every two years and shall be modified if needed with mutual consent of both the parties.

4.0 RIGHTS OF THE MEMBERS OF THE COOPERATIVE SOCIETY

The land owner or the tenant of the land in the command area of sub minor is eligible to become a member of the cooperative society, provided he is registered as a owner or tenant of that land in revenue records.

The members would register their demand for water supply in the prescribed form to the cooperative society. The cooperative society with due consideration will inform about water supply to the members, in each season government has sanctioned certain allocation of water to the cooperative society and according to the policy of co-operative society each member has a right to get water in each rotation.

5.0 RECOVERY OF WATER CHARGES

Government shall supply later on volumetric basis at the sub minor head at the end of each season demand statements would prepared on the basis of total quantity of water supplied and at the rates indicated as per clause

3. The demand statements shall be sent to the cooperative society as per following schedule:

	<u>Kharif</u>	<u>Rabi</u>	<u>Hot Weather</u>
i) Date by which government shall send the demand statement to the society.	30th November	15th April	30th June
ii) Date by which payment shall be made to the government by the society.	31st December	15th May	31st July

If the society deposits the full amount of bill before the dates indicated at (ii) above, a rebate of 20 percent of the amount of the bill will be given to the cooperative society, in the bill itself. If the amount is not deposited before the dates indicated at (ii) above, the cooperative society shall not be entitled for rebate. The government reserves the right to stop water supply if the water charges are not paid within the stipulated period.

6.0 MAINTENANCE AND REPAIRS TO THE FIELD CHANNELS:

- a) After signing the MOU, a joint inspection of physical system would be carried out. The required repairs as found necessary shall be carried out at government cost. The department shall ensure that the actual discharge at various points are as per designed capacity.
- b) The cooperative society shall be responsible for maintenance and repairs of the physical system to the subminor in its jurisdiction. For this purpose the cooperative society shall receive a grant of Rs. 20,000.00 per annum and grant will be reviewed after every two years with mutual consent of both parties.

Maintenance of the minor include the following items:

- 1) Desilting of sub-minor
- 2) Service road and inspection path shall be maintained in proper condition.
- 3) Removing trees, shrubs and weeds from canal and canal banks
- 4) Structures shall be kept in good condition.
- 5) The outlet gates and measuring devices shall be kept in good condition.

The repair works shall include following items of work which shall be carried out by the Water Resources Department:

- i. Repairs to all structures on subminor like outlet syphon, VRB etc.
 - ii. Any major breach in the embankment of subminor. A breach having length more than 1.5 m shall be treated as major breach. A breach having length less than 1.5 m will be repaired by the cooperative society.
 - iii. Replacement of outlet gates.
- c) If proper maintenance and repairs are not done, than the department shall carry out such M&R on behalf of cooperative society, and shall have a right to recover the expenditure incurred thereon from the cooperative society. If the negligence towards M&R is observed persistently, then on preintimation, department shall have a right to stop the water supply. The decision of the department will be final, and no claim towards damages/compensation on this account will be entertained.
- d) The maintenance grant amounting Rs. 20,000.00 or the actual expenses incurred by the cooperative society towards the maintenance of Anklav subminor, whatever is less shall be given per annum by the government to the cooperative society, subject to the following conditions:
- i) The maintenance grant shall be Rs. 20,000/- or equal maintenance expenses incurred per annum, whatever is less; if the annual irrigation intensity of Anklav subminor is more than 100 percent
 - ii) If the annual irrigation intensity of Anklav subminor reduces to less than 50 percent, the total maintenance grants shall be Rs.10,000/- or actual expenses incurred per annum whatever is less
 - iii) For the annual irrigation intensity between 50 percent and 100 percent the maintenance grant shall be worked out in proportion of annual irrigation intensity, and actual expenses incurred whatever is less

- iv) The maintenance grant shall be provided by the Executive Engineer, Anand Irrigation Division, Anand to the cooperative society by a crossed cheque drawn in favour of the cooperative society.
- v) To begin with, a 40 percent of the annual maintenance grant worked out on the basis of last three years performance shall be given to cooperative society by the end of May and it shall be treated as maintenance advance. Further grants shall be released afterwards based on the performance, and certificate of actual expenses incurred in accordance with (i) to (ii) above.
- vi) At the end of each irrigation year i.e. at the end of Hot weather season, the cooperative society shall produce duly audited account of expenses incurred for maintenance of subminor, against which the account of advances given for that particular year shall be adjusted.

7.0 MAINTENANCE AND REPAIRS TO THE FIELD CHANNELS

- a) The cooperative society shall be responsible for the proper maintenance and repairs of the field channels and the structures thereon. No grant shall be given to the cooperative society for this purpose. The government reserve the right to stop the water supply if the physical system below outlet is not maintained properly by the cooperative society. The maintenance and repairs of the field channels include the following items:
 - 1. Removing silt from field channels and water courses
 - 2. Removing grass, plant, shrubs etc.
 - 3. Maintaining structures in good condition
 - 4. Maintaining outlet gates and measuring devices in good condition

8.0 RIGHT OF THE GOVERNMENT OFFICIALS:

The officials of the Water Resources Department are entitled to inspect the operational area of the cooperative society, water supply made and the implementation of the provision incorporate in the MOU.

9.0 The period of this MOU would be for 5 years and its further continuance would be decided thereafter with the consent of both the parties.

EXECUTIVE ENGINEER CHAIRMAN

Annex L

GOVERNMENT RESOLUTION DATED JANUARY 21, 1988 REGARDING
GUIDELINES FOR INTRODUCTION OF RWS

No.RWS/1187 (1) Part-II.P.2

Government of Gujarat
Irrigation Department
New Sachivalaya,
Block No. 9
Gandhinagar
Date : 21st Jan. 1988.

To,

- (1) All Area Development Commissioners.
- (2) The Chief Engineer & Director, WALMI, Gandhinagar
- (3) All Superintending Engineers, Executive Engineers
(IP and CADA) Wings.

Sub: Introduction of the RWS in the World Bank aided projects.

- Ref: (1) Government Letter No. RWS. 1187 (1) Part-II P.2
dated 18th July, 1987.
- (2) Government letter No. RWS-1187 (1) Part II P.2
dated 2nd September, 1987.

The guidelines for introduction of RWS and providing gated control at the outlet structure were issued vide Government letter dated 18th July, 1987 and 2nd September, 1987 quoted above. On further discussion of these guidelines with the World Bank Consultants, it was found necessary to revise the same. In pursuance thereof, the revised guidelines for introduction of RWS in the World Bank aided projects are enclosed. The guidelines issued earlier vide the above said two Government letters should be treated as cancelled.

The farmers and the field staff should be adequately trained regarding this policy of equitable water allocation well in advance of each irrigation programme.

During the last Supervisory Mission of the World Bank Consultants which visited Gujarat during October, 1987 the following 10 projects were found fit for introduction of RWS on the basis of these revised guidelines:

- | | | | |
|------------|-------------|----------------|---------------|
| (1) Deo | (2) Sipu | (3) Sukhbhadar | |
| (4) Aji-II | (5) Aji-III | (6) Uben | |
| (7) Und | (8) Venu-II | (9) Demi-II | (10) Kalubhar |

The project officers' in-charge of these projects should, therefore take particular care to follow all details for introduction of RWS and also to ensure that irrigation does not commence without the discipline of RWS. In other projects where RWS is not straightaway feasible on account of rigid infrastructure already built in. efforts should be made to bring in discipline of RWS spreading gradually in the entire command area in a phased manner.

In the Irrigation Management Action Programme Area of Mahi project, the discipline of RWS should be introduced immediately as per these guidelines and such discipline should be spread in the remaining area of the entire command of Mahi project gradually.

Sd/-
(K.M. Dave)
Officer on Special Duty (WM)
Irrigation Department.

Copy to :

All Chief Engineers and Joint Secretaries, Sachivalaya, Gandhinagar. Officer on Special Duty (PPM Cell). Irrigation Department, Sachivalaya, Gandhinagar

Officer on Special Duty (CAD), Irrigation Department, Sachivalaya, Gandhinagar. for information.

Sd/-
(I.M. Patel)
Deputy Secretary (WM)
Irrigation Department.

Revised guidelines for introduction of RWS in World Bank projects.

(Accompaniment to G.I.I.D No. RWS-1187 (1) Part-II/P 2 dt. 21st January, 1988).

The main principles for introduction of RWS would be as follows :

- (a) Supplies of available water shall be allocated to farmers within each subproject, in proportion to the C.C.A. owned, provided, however, that to the extent possible, small and marginal farmers shall be given special preference in the allocation of water.
- (b) Each farmer shall be free to irrigate crops of his choice, subject to pre-defined restrictions, if any.
- (c) Farmers shall not be required to submit seasonal applications for supply of water.
- (d) Seasonal water allocation shall be delivered according to pre-determined weekly schedules designed to meet water requirements of the predominant crops in the areas served and determined in consultation with farmers representatives.

The above principles would be required to be followed at all stages like (a) Designs, (b) Execution and (c) Operation. Instructions relating to these three different stages have therefore to be followed by all disciplines. However, for the sake of convenience, they are broadly grouped as under :

(Only main issues are highlighted in these instructions and the remaining ones to be considered by local officers will have to be consistent with these guidelines.)

I. Design :

1. The physical capacity of all canals including the water courses will be determined on the basis of peak demand of the principal crops envisaged in the cropping pattern of the project. If the peak occurs in Kharif, rainfall contribution should not be taken into account.
2. The physical chak and outlet size will be determined on the basis of water allocation for agriculture and seasonal crop intensities of irrigation envisaged in the project. However, from practical considerations, the stream size or the rate of flow of water in the

water course should not be less than 0.5 cusecs and more than 1.5 cusecs which can be easily handled by the farmers. Therefore, the chak size should also be adjusted between 30 to 60 hectares.

3. There should be no direct outlets chaks from the main canal or branch canal which are supposed to run continuously. Similarly, if the distributary is also to run continuously in any case, no direct outlets chaks even from such distributary should be permitted.

The adjustable gated control for release of water should be provided only upto the distributaries and/or minors which are to be operated on the principle of 'ON' or 'OFF'. No gates to be provided on the outlet structure of the chak.

4. The chak should be subdivided in sub-chaks each of 5 to 8 hectares and only sliding gates should be provided for operation by group of farmers within each sub-chak so that the stream flow from an outlet can be rotated in each sub-chak one after another according to RWS time schedules.
5. In designing the lay-out of minor network planning of canal system, it should be ensured that at the tail end of every minor channel, there are at least two off-taking channels.
6. The tail reach of every minor or sub-minor from which the outlets take-off and deliver water in chak should be designed for a fixed full supply depth of 25 or 30 cms.

II. Execution

1. Wherever chaks/outlets are already provided directly from the main canal or branch canals, the possibility of irrigating areas there under through nearby distributary or minor should be examined and if the cost is not prohibitive, such modifications should be carried out only after getting approval from the Superintending Engineer.
2. Wherever adjustable control gates are already provided on chak-outlets and/or where pipes of larger diameter which may permit more flow than the one for which such chak outlet is designed are already provided, the same should be throttled either by fixing the gate rigidly or by inserting another smaller diameter pipes or by any other means with a view to ensure that the restricted area of such outlet does not permit any rate of flow of water to pass through it which is more than the one for which it is

designed, i.e. the authorized discharge as has been worked out at the stage of design for each chak/outlet.

3. The chak size should be normally about 30 ha. to 60 ha. Wherever smaller chaks are already provided, the feasibility of combining them should be examined and, if the cost is not prohibitive, necessary modifications should be carried out only after getting approval from the Superintending Engineer.
4. It should be ensured that infrastructure like field channels, land preparation and where necessary, even field drains, etc. is provided before commencement of each irrigation programme.
5. Suitable measuring devices should be installed downstream of a distributary or minor which have adjustable controlled gated regulation of flow. No measuring devices are necessary downstream of chaks/outlets wherever they are designed to permit not more than authorized discharge when parent channel runs fully.

III. Operation

1. The water management operational plan for the entire project should be decided for each season every year in consultation with water management committees for earmarking water allocation for agriculture and non-agriculture purposes as per the laid down policy of government. It should be ensured that Water Management Committees are formed in each project before commencement of irrigation in accordance with the guidelines issued vide G.R.No. ADA-1086 1341-53-C,I-P 2 dated 29th July, 1987.
2. Water, which is earmarked for agriculture should be fully utilized by allocating to all the farmers in the command area of each outlet. Due care should be taken to ensure that even the tailenders also get their share of water.
3. The Water Management Committee and or village service area committees should be consulted in advance for preparation of RWD schedule below each chak.
4. Rigid RWD schedule for each chak should be prepared once for all by allocating time of the entire period of a week. This time should be allocated to each farmer in the command area of each chak in the ratio of the CCA owned by him to the CCA of the entire chak. Small and marginal farmers may be given some more weightage in allocating time depending on specific government directives, if any.

5. In preparing the RWD schedule due allowance for transit losses should be given for working out notional areas on the basis of which time should be allocated.
6. Conveyance system of the canals i.e. the main canal and the branch canal should run continuously and the carrier system viz distributary, minor etc. may be rotated to run intermittently but it should be ensured that whenever the canals of carrier system are in operation, they should run to their full capacity for the entire period.
7. Irrigation programmes for all the seasons should be communicated to the farmers well in advance in each season. The date of commencement of the first irrigation and total number of irrigations to be given in each season should also be communicated to them with details regarding period of each irrigation and of closure of parent channel.
8. Each chak area should be further sub divided into sub-chak of 5 to 8 ha in which water from the water course should be rotated one after another by the farmers themselves as per the RWD schedule.
9. A close watch should be exercised on the gauge of water level at the tail end of each minor or distributary.

The sectional officer should be made accountable for variation if it exceeds more than (+) or (-) 5 percent of the designed full supply depth.

Sd/-
(K.M. Dave)
Officer on Special Duty (W.M.U.)

Annex M

C.E.(C)'S LETTER OF 16.6.88

M.R. GOSWAMY
Chief Engineer (C) &
Joint Secretary

D.O. No. WMU-1087-12-P2
Irrigation Department
Sachivalaya, Gandhinagar,
Dated : 16/6/88

Sub: Giving Canal Irrigation for only critical stage of growth of crops.

Dear Shri

The necessity of effecting maximum economy in use of water stored in various irrigation schemes need not be over emphasized. At the same time, the objective of optimizing the yield of different crops irrigated through canals can not be sacrificed. Research data and our own field experience in past have indicated that the maximum water use efficiency is achieved only during scarcity conditions of water available for crop production. It has been found however, that there are certain stages of growth of any crop which are critical from the point of view of yield. There are some other stages of growth of any crops, which even if not irrigated, do not cause any appreciable reduction in yield level. Over irrigation has caused problems of drainage, water logging, and salinity in many part of the states. Over irrigation has also resulted in depriving the tail end area of the benefits of irrigation schemes.

2.0 In the above context, it has now been decided to adopt a new policy for canal irrigation which inter-alia envisages following points.

- a) Water in the reservoir earmarked for agriculture should be delivered in the entire command area equitably under the discipline of rotational water supply.
- b) Canal irrigation should be given only for critical stage of growth of principal crops under the command of each project.
- c) The farmers should be taken into confidence about the new approach and the dates of commencement of canal irrigation, the number of waterings to be given in each season and the duration of running and closing of each canal should be intimated to the farmers well in advance.

3.0 In order to enable you to implement the abovesaid revised policy of canal irrigation, some model charts are prepared and enclosed herewith. On the basis of these charts you will have to prepare project specific programmes of running, the canal systems in your charge. Such programmes should be prepared for each seasons well in advance and got approved from government, so that immediately there after the farmers could be apprised atleast one or two months in advance of each cropping season. I once again reiterate that the model charts enclosed herewith are not required to be followed blindly in any case. They are meant only to serve as broad guidelines to enable preparing programmes of canal rotation without sacrificing the need to irrigate all the critical stage of growth of crops in each region of the state.

4.0 I request you to kindly ensure that projects specific programmes of irrigation for the ensuring kharif season are submitted to government by the end of June 1988, assuming normal pattern of rainfall.

With regards,

Yours Sincerely,

Sd/-

D.A. : As above

(M.R. Goswamy)

To,
All Area Development Commissioners.
All Chief Engineers (including Panchayats)
Chief Engineer and Director, WALMI.
All Superintending Engineers.
All Executive Engineers.
All Technical Officers in Sachivalaya.

Table 7
Critical Stages of different Crops (Gujarat)

Sr. No.	Name of crops	Critical stage of the crops.	Days after sowing	Remark Duration for Maturing (Days)
1	2	3	4	5
1.	Wheat (Rabi)	1. Crown root initiation	18-25	120 Days From From 2nd to 3rd week of Now.
		2. Tillering Stage	40-45	
		3. Booting	60-65	
		4. Heading	75-85	
		5. Milking	100-105	
2.	Paddy	1. Seeding establish-ment.	2-15	120-140 days from 4th week of June to 1st week of July.
		2. Tillering	20-30	
		3. Heading	30-50	
		4. Flowering	60-70	
		5. Milking	80-85	
3.	Bajari (H.W.)	1. Tillering	20-25	95 days from 1st to 2nd week of Feb.
		2. Flowring	20-60	
		3. Milking	65-70	
		4. Dough	75-80	
4.	Maize	1. Vegetative growth	20-40	110-115 days from 4th week of June to 1st week of July.
		2. Tasselling	45-60	
		3. Grain setting	70-80	
5.	Groundnut (H.W.)	1. Flowering	40-45	110 days from 2nd to 3rd week of Jan.
		2. Peg formation	50-60	
		3. Pod development	70-80	
6.	Gram (Rabi)	1. Branching	30-35	105 days from 2nd to 3rd week of October.
		2. Peg Formation	55-60	
		3. Pod development	70-80	

Sr. No.	Name of the crops	Critical stage of the crops.	Days after sowing	Remark Duration for Maturing (Days)
1	2	3	4	5
7.	Mustard (Rabi)	1. Branching 2. Flowering 3. Pod setting	30-35 55-60 75-80	120 days from 2nd to 3rd week of Oct.
8.	Castor	1. Before flowering 2. After capsule formation.	75-80 80-100	180 days from 1st to 2nd week of August.
9.	Cotton	1. Commencement of sympodial 2. Flowering 3. Ball formation 4. Ball Brusting	60-70 98-105 126-135 145-160	210 days from 4th week of June to 1st week of July
10.	Jowar (Kharif)	1. Boot stage 2. Milking	55-60 85-90	100 days from 4th week of June to 1st week of July.
11.	Tobacco	1. Period of rapid growth period.	40-76	180 days 2 stage of irrigation from 3rd to 4th week of August.
12.	Sugarcane	1. Tillering to grand growth period.	75-210	365 Days 7-8 stages of Irrigation from 3rd to 4th week of Jan.
13.	Potato	1. Stolenization to Tubler initiation 2. Yield formation	30-35 40-45	95-100 days from 2nd to 3rd week of October.

Annex N

BRIEF SUMMARY OF RECOMMENDATIONS OF FOUR WORKSHOPS CONDUCTED BY WALMI ANAND

I. Workshop on "Registration of Water Cooperatives" : (January 19, 1994)

1. In order to simplify the procedure and avoid delay in processing the case for registration of a water cooperative society following suggestions emerged:
 - (a) Copies of village level record of form 7/12 and 8/A in respect of all promoters of the society duly certified by Dy. Ex. Engineer and countersigned by Executive Engineer should be accepted.
 - (b) Instead of promoter's serial numbers as voters data regarding their house number and ration card number should be considered adequate.
 - (c) Certificate regarding non-existence of any other water cooperative in the village issued by the Dy. Ex. Engineer and countersigned by the Ex. Engineer should be accepted.
 - (d) The agreement signed by the Executive Engineer and the Chairman of the water cooperative should be accepted as authentic document.
 - (e) A token share capital of Rs. 500 only may be accepted.
 - (f) Signature of the extension officer of taluka panchayat on every page of the proposal (in four copies) is not necessary.
 - (g) Water and soil suitability certificate and benefit-cost ratio of lift irrigation scheme is not necessary.
 - (h) The bye-laws of the society need not be registered before the registrar of stamps and duties.
 - (i) The certificates required from a common authority should be clubbed together.
 - (j) The state and district level institutes for cooperatives should train irrigators and ID staff also for promoting sustainable water cooperatives on large scale.

II. Workshop on "Memorandum of Understanding" (February 16th, 1994)

The provision to be made in MOU should make following major provisions :

1. General aims and objectives

- a) Command area of the minor system to be handed over to the water co-operative should be for the same period for which MOU is authorised.
- b) The property rights of the canal system constructed by the government shall vest in government.
- c) Atleast 51 percent of the land holders of the area under command should have become members and the land held by them should also be atleast 51 percent of the total CCA of the water co-operative at the time of turn over.

2. The quantum of water to be allotted to the water cooperative.

- a) The allocation for irrigation water should be done in advance on the basis of past experience and in consideration with water co-operative, the decision of the Executive Engineer would be final and binding to the water co-operative, because he has to take a balanced view considering requirement of entire project.

Normally following dates for allocating water should be adhered.

Kharif - 15th August
Rabi - 30th September
Hot-weather- 16th January

- b) The water co-operative should have freedom of utilising some water for the purpose other than agriculture and also the freedom for deciding the water rate for such use. The government should, however, charge the water co-operative only one common water rate for the entire volume of water supplied to water co-operative.
- c) Water co-operative should be entitled to claim compensation only in such cases, where the production has been reduced by more than 25 percent of the normal production and such claim of compensation should be entitled only in the situation beyond the control of department and natural calamity resulting in failure of the

department to supply adequate and timely water to the co-operative. In case of dispute regarding such claim, the matter should be referred to the arbitrator.

- d) The data regarding use and distribution of water should be maintained jointly in prescribed format by the authorized member of government and water co-operative.

3. Mode of water distribution

- a) The water co-operative will have distribute water to its members on the principles of RWS after ascertaining the demand of each member and getting approval from the department with due regard to the total CCA.
- b) The office bearers and members of the water co-operative should be given necessary training for their functions.
- c) The seepage water or the ground water available as recharge on account of surface water flowing in the canals can be utilised into command area of the water co-operative even by lifting , provided the water co- operative has granted necessary permission thereof. The water rates for such use will be decided and recovered by the water co-operative.
- d) The water co-operative shall also permit irrigation to the area falling within its gross command but not declared as CCA as such.
- e) The co-operative will be supplied water in accordance with the over all plan of operation of canal. No exception will be made in this regard.
- f) The government shall not insist on enforcing any cropping pattern in the CCA of the water co-operative.

Water Rates

- a) The water rates shall be revised in phases. In the initial stage, the water rates will be recovered from the water cooperative on the basis of crop area. After about 3 years experience and necessary study the water rates should be decided and levied on the basis of over all volume of water supplied to the water cooperative.
- b) The water cooperative should have the right to decide the water rates to be recovered from its members and non-members.

- c) The water co-operative may decide different water rates for non-members but such water rates shall not be more than 30 percent higher than the normal water rates to be recovered from the members.
- d) The authorised canal office shall carry out 10 percent to 15 percent sample checking of the area irrigated and the result of such sample checking shall be applied to the entire command area of the water cooperative for assessing the water rates on crop area basis.

Recovery of water rates.

- a) The government shall recover the water rates from water cooperative on the basis of assessment to be made as under:

Description	Season		
	-----	-----	-----
	Kharif	Rabi	Hot-weather
1. Last date of furnishing bill to the water co-operative.	30th Nov.	15th Apr.	15th July
2. Last date for making prompt payment of the bill by water co-operative.	1st Feb.	1st June	15th Sept.
3. Absolute last date of final payment.	30th Apr.	31st July	30th Nov.

- b) If the water cooperative makes the payment of 100 percent assessment before the prescribed date for prompt payment, it should be entitled to retain 20 percent thereof.
- c) If the payment of the bill is made after prescribed date of prompt payment, 10 percent surcharge shall be recovered in addition to the normal water rates.
- d) The water cooperative shall be entitled to further 10 percent compensation for the payment of water rates made in advance of the prescribed date for prompt payment.

- e) If the water co-operative fails to make payment till absolute final last date as prescribed, the government shall be entitled to stop supply of water.

Maintenance and repairs

- a) The responsibility of maintenance and repairs of the canal system shall be continued by the government as long as the necessary repairs are not carried out as decided by the joint inspection of representatives of the department and water cooperative and also as long as turn over has not been made and MOU is not signed. There after the water cooperative shall be responsible for normal maintenance and repairs of the canal system within its area and the department shall pay to the extent of 30 percent of the water rates assessed for the relevant years.
- b) The special repairs required to be carried out on account of reasons beyond control of water cooperative and on account of natural calamities shall be carried out by government in consultation with water cooperative and if such works are carried out by water cooperative, necessary budgetary support shall be provided by the government.
- c) Normal maintenance and repairs items to be carried out by the water cooperative shall comprises of :
 - i) Maintenance & repairs of minor and sub minor including desilting.
 - ii) Maintenance of service road and inspection path.
 - iii) Removal of grass, shrubs etc. maintaining structures in good condition.
 - iv) Maintaining outlet gate, seals etc. in good condition.
 - v) Maintaining field channels and drains.
 - vi) If the water cooperative fails to carry out its normal functions of maintenance and repairs, the department may stop its water supply after advance notice.

III. **Workshop on "Turnover process and HRD**
(March 5, 1994)

1.0 The turnover programme is conceived to have nine stages for which following consensus emerged :

(i) **Diagnosis of the present irrigation system :**
This activity can be sub-divided into -

(a) major constraint of physical system and on-farm system.

(b) major constraints of operation of main system and on-farm system.

(c) social behaviour and agronomical practices.

(ii) **Motivation of farmers to form groups or associations or water cooperatives:**

The major chunk of responsibility for motivating farmers to form FOs should be shouldered by the ID line staff as they are best suited, being conversant with both the system as well as farmers in their respective jurisdiction. The help of NGOs WALMI and the extension wing of the agriculture deptt should also be taken in conducting the meetings with farmers at village level for the purpose of motivating them to form groups and also, in process to identify their leaders. Some good farmers and their leaders should be imparted training to make them aware about the new irrigation management approach, to create interests in them for group working and understand the participatory management programme and its benefits etc.

(iii) **Organising of farmers groups associations or water cooperatives:**

The groups of farmer should be preferably formed at the chak level i.e. for each outlet drawing water from a minor. The farmers should be motivated to select their own group leader and then the professional, competence and skills for such group leaders should be developed by imparting them training in water management (RWS), soil water crop requirements, responsibilities and duties of group leaders, modality of resolving conflict, methods of irrigation etc.

(iv) Turnover practice:

Prior to actual TO, both ID and FOs should work collectively/jointly and acquire experience and confidence of working together particularly for the following activities.

- (a) Preparation of seasonal plans and RWD schedules and implement the same for one or two seasons.
- (b) Resolve conflicts and decide modalities.
- (c) Ensure timely and assured water supply in the canal and manage RWS below outlets. Minimum system innovation as pre-requisite for the Turn Over should be carried in consultation with FOs and work experience of maintaining field channels should be acquired by farmers.
- (d) Training of ID line staff regarding their new role in changed situation and training of office bearers of FOs regarding their role and responsibilities structure for FOs registration process, provisions to be made in MOU etc.

(v) Registration of FOs as water cooperative societies or associations

The process of seeking registration of FOs and water cooperative societies can be initiated simultaneously and work experience of joint working in this aspect can also be acquired. A separate workshop only on the process of registration was exclusively conducted under this programme on January 1, '94. It would be desirable if WALMI pursues the follow-up action for issuing revised simplified guidelines for registration by the Registrar of Cooperatives.

- (vi) Joint inspection of physical system Joint inspection of the canal system should be carried out by the Deputy Executive Engineer of ID and the Chairman and Secretary of the FO by walking together along the canal and the lists of items needing immediate attention should be prepared for further plan of action, cost estimate etc. The intention should be very clear viz. the process of TO should not be delayed under excuse of completing heavy repair works.

(vii) Actual TO

This involves mainly two activities -

(a) Signing of MOU and the training of ID line staff and FO officials regarding the rules and regulations of the water cooperative societies. For MOU also there was an exclusive workshop conducted recently on Feb. 16, 1994. Accordingly at the stage of signing MOU at least 51 percent of farmer should be willing and the total holding of such farmer should also be at least 51 percent of the command area to be assigned to the water co-operatives. The EE should sign on behalf of the govt and the Chairman water cooperatives. Immediately thereafter the training of ID line staff and FOs officials should be conducted preferably by the training institutes run by the cooperation department covering particularly the following items :

1. management of water cooperative societies.
2. daily routine work of irrigation management and record keeping.
3. maintaining accounts of water cooperatives.
4. M & R works to be done by water cooperatives and ;
5. irrigation methods and techniques of irrigated agriculture in general.

The actual TO may be completed within one year or at the most one and half years.

(viii) Performance evaluation of the objective of TO on the basis of MOU

Parameters should be predetermined for such evaluation of performance vis-a-vis the defined objectives of the TO programme. Such performance evaluation should be carried out at the end of every season.

(ix) Withdrawal of NGO/WALMI/Motivators

On the basis of the aforesaid performance evaluation the issue regarding withdrawal of the ID line staff/NGO/WALMI as motivators should be considered. Efforts should be made to ensure that such withdrawal takes place after one years work experience or at the most before the end of the second year.

IV. Workshop on "Farmers Organisation of Irrigation Water Management " Experiences and Lessons Learnt" (May 24-25, '94)

General consensus

1. The prerequisites of water co-operatives including the infrastructure ;
 - a. The Bombay Irrigation act currently in force in the state should be immediately modified.
 - b. For assuring timely water to all the canal system should be modified as mutually agreed after joint inspection by the farmers representatives and officers of the ID However it was cautioned that such modification works be carried out concurrently along with the process of registration so as to ensure that after completion of such modifications the members of the proposed FO do not back out .
 - c. The training of the deptt. staff and the farmers is necessary.
 - d. Advantage of extension services and the media such as television, radio etc to be taken to spread the message.
2. The role of community organiser (CO)/Irrigation Department line staff/NGO
 - a. The role of NGO as motivator cannot be denied. However it has its own limitations and therefore the department viz. ID staff in general and SO in particular will have to be trained for working as motivators or community organisers so as to cover all projects.
 - b. WALMI should train ID staff and farmer leaders on large scale.
 - c. The catalysts or the motivators should not over stay nor withdraw much before establishing sustainability of FO. Both farmers and I.D. staff need to be motivated for working together.
3. Incentives and water rates:
 - a. The water rates to be levied from farmers should be decided by the FO and these have to be higher than those payable to the deptt. so that economic viability is sustained for all the time.

- b. The rates of the deptt must be volumetric while the rates chargeable by the FO to farmers may be on crop area basis or on cusec-hour basis.
 - c. The FO should be given some incentive say 20 percent for 100 percent payment of current water dues in prescribed time limit.
 - d. The volumetric water rate to be decided by govt. may be different for different seasons.
4. Level of FO/Area of Operation etc.
- a. The FO's should be minor wise and the CCA should preferably be 400 to 500 ha.
 - b. The suggestion of having village wise FO's did not find favour.
 - c. There was a novel suggestion of first having a federation at distributory level followed by FO's at minor level and finally a union at the branch canal level for major projects. Such federation can work as motivator or a catalyst.

5. Registration

The participants were not against registration under the co-operative act. However some were in favour of only formal recognition by the I.D. for mono purpose FOs.

6. Viability - Economical and Organisational

Initially the FOs would be financially viable if the water rates to be charged to farmers are higher than the water rates payable to government. The institutional viability would depend upon the quality of leaders of FOs.

7. Other Recommendations

- a. It was the general consensus that there must be a firm government commitment for farmers participation by formation of FOs and the new irrigation act should be enacted or at least the current act should be modified for that purpose.

- b. The long experience of pilots though limited in extent of area is rich enough from the point of view of variety of representative samples. Therefore it may be advisable not to wait for more than 2-3 years more for embarking on large scale.
- c. There should be close co-ordination between I.D. and the agriculture department.
- d. FOs would certainly succeed where there is assurance of timely water.
- e. Even for encouraging formation of FOs or for replication the principle of equity of water allowance should be maintained.
- f. Recovery of old arrears through FOs would not be possible. For the same reason 100 percent recovery, of current water rates should be insisted and enforced.
- g. The GWRDC should hand over tube wells to FOs if at least 51 percent of irrigators agree to form a society and operate the tubewells themselves at their own cost. The liability of recovery of old arrears should not be passed on to such societies.
- h. Assured supply of power from GEB should be tied up with responsibility of compensation for failure of crops under tube wells.
- i. At least 50 percent of the local fund cess collected from the area under FO should be directly passed on to FO for improving the command area roads etc.
- j. At least 10 percent of M & R. grant for canals should be passed on to FO for normal maintenance of the minor and its system.
- k. All incentives available under the co-operative act should be availed by the water co-operative also.
- l. The field channels should be constructed and maintained by the farmers themselves at their own cost. The current government policy should be revised immediately. The I.D. may provide only technical guidance.

Annex O

COMPETENCE OF IRRIGATION DEPARTMENT

In June 1989, "The Gujarat Irrigation and Drainage Ordinance 1989" was promulgated and then brought into force from 1st August, 1989. Some rules called "The Gujarat Irrigation and Drainage (Supply of Water to groups and associations) Rules, 1989" which were immediately required for implementation of the said ordinance were published in August 1989 for bringing into force from 1st October, 1989. The State Irrigation department was thus compelled to prepare itself and the irrigators of all the schemes of the state to understand, adopt and implement the new policy of irrigation in a very very short time of three-four months only. Attempts were made to meet this challenge by extra ordinary planned efforts from the highest levels of the department the effect of which percolated and spread right down upto all irrigation sections and also to the irrigators of all schemes of the state. Briefly the scheme of spreading the message operated for creating very promptly a strong and sustainable wave of awareness was as under:

- a) Detailed instructions containing main provision of the ordinance were drafted and circulated by the department (vide CE and JS's d.o. letter of July 26, 1989) down to Superintending Engineer, Executive Engineers, Deputy Executive Engineers and even to Sectional Officer and they were advised to hold meetings in quick succession to discuss and understand the various provisions and be prepared for immediate implementation.
- b) Such meetings were advised to be convened in following order
 - i) The Chief Engineer to discuss with all Area Development Commissioners, Superintending Engineers.
 - ii) Each Superintending Engineer to discuss with all his Executive Engineers and Deputy Executive Engineers (The CE and ADCs each to attend one such meeting.)
 - iii) Each Ex.Engineer to discuss with all his Dy.Ex. Engineers and Sectional Officers (The Supt. Engineer to attend one such meeting of his circle).
 - iv) Each Deputy Executive Engineer to discuss with all his Sectional officers and bit Karkoons (The Ex.Engr. to attend one such meeting of his division.)

- v) Each sectional officer to discuss with all his bit karkoons, chowkidars and a few representatives of his irrigators (The Deputy Executive Engineer to attend one such meeting of sub-division).
- c) The ADCs, SEs, and EEs, were also advised to obtain feed back regarding response in the meetings convened at their lower levels and pass on the same to the Chief Engineer and Joint Secretary so that prompt remedial actions can be taken.

The above mentioned scheme worked very well and almost every one was geared in action for implementing the new policy. Unfortunately the said ordinance lapsed as it could not be converted into Act although "The Gujarat Irrigation and Drainage Bill 1989 was introduced in the State Legislative Assembly in September, 1989". The main purpose of recording such working experience is to establish that the irrigation department is confident and competent to rise to the occasion and carry out the changes in policy even at very short notice. In future when the said new (proposed) Irrigation and Drainage Act is passed by the State Assembly and brought into force, a similar or perhaps still stronger and comprehensive scheme for its implementation will have to be designed and acted upon.

Annex P

SUMMARY OF RECOMMENDATIONS OF THE GUJARAT STATE FINANCE COMMISSION (1994)

- a. There is a consensus that water rates should cover O&M expenditure and at least part of the long - term capital cost of irrigation projects.
- b. Low water rates are regressive in nature with the indirect subsidisation flowing mostly to large farmers forming a small percentage of the total farming community. There is no justification for the continuance of low water rates as this would be unfair and iniquitous considering that the entire population of the state had contributed to the creation of irrigation facilities.
- c. Low water rates lead to wasteful use of water and low capacity utilisation of irrigation facilities.
- d. Water rates must be charged on volumetric basis in place of the present system of charges on the basis of area under irrigation .
- e. Government should forthwith adopt the Vaidynathan Committee recommendation on water rates for agricultural purposes and over the next five years, gradually increase water rates that cover O&M cost and 5 percent return on capital invested. Water rates for commercial and industrial use should cover 12 percent return on capital invested. In calculating water rates for multi-purpose projects as per this recommendation, the project cost will first have to be apportioned between the beneficiary sectors in direct proportion to the benefits flowing to each sector.
- f. Adoption of economic rates on volumetric basis would lead to optimal use of water resources and lowering of rates through improved capacity utilisation and higher system efficiency.
- g. Distribution of water from branch canal onwards should be privatised through users co-operative/association. NGOs, Joint Sector Company or private sector firms. Government's responsibility should be limited to reach the water upto to village level with the distribution within the village area being managed by farmers' bodies.

- h. Private participation in the creation of new water resource systems should be encouraged. Existing facilities could be privatised with the proceeds being used for upgrading existing systems and in the Narmada Project.
- i. Minor irrigation works should be managed by user cooperatives. If these do not come forward, they should be transferred to the highest bidder.
- j. A statutory, autonomous Board should be set up to fix and revise water rates at specified intervals on the basis of specific norms.
- k. GWRDC should be wound up and the bore wells run by it should be transferred to user cooperatives. If such cooperatives do not come forward, they should be transferred to the highest bidder.
- i. Investments should be made in the area of conservation of water and its optimum utilisation. In particular the traditional practice of conservation of rain water and adoption of dry land farming should be actively promoted.
- j. A statutory, autonomous Board should be set up to fix and revise water rates at specified intervals on the basis of specific norms.
- k. GWRDC should be wound up and the bore wells run by it should be transferred to user cooperatives. If such cooperatives do not come forward, they should be transferred to the highest bidder.
- j. Investments should be made in the area of conservation of water and its optimum utilisation. In particular the traditional practice of conservation of rain water and adoption of dry land farming should be actively promoted.

Annex Q

KEY NOTE ADDRESS OF THE CHIEF MINISTER OF GUJARAT (1988)

The, then the Chief Minister of Gujarat delivered a key note address on "13th Bhai kaka Memorial Lecture" on the subject of "Farmers participation in irrigation water management" at the second Indian Engineering Congress held at Hyderabad in January, 1988 under the auspicious of Institution of Engineers (India). In this address he made some categorical statements of policy of which a few important ones are as follows :

- a) The first and foremost requirement for bringing about farmers' participation is to increase the level of irrigation water rates and to levy the same on volumetric basis.
- b) Water for irrigation is one single input which can serve to provide a common interest for group formations.
- c) Conviction about the necessity to bring about a change is a must at all levels.
- d) No where in the World, except India, government has undertaken responsibility of making irrigation service available individually to lakhs of small holders of land.
- e) In the initial years, massive and well coordinated effort will have to be planned and put in for inducing farmers to manage the systems.
- f) From the point of view of efficient land and water management, hydraulic boundary determined by the canal net work should be considered in preference to a village boundary.
- g) The necessity of administrative reforms and legal "Backing for enforcing group behaviours and discipline in irrigation water management should also be given due recognition.
- h) In new projects, Farmers' involvement is desirable from the stage of preliminary investigations, survey, design and planning and also subsequent phases like construction, operation, maintenance, etc. throughout the life of the project.

- i) The farmers have a crucial role to play in improving the efficiency of the water and land. The technologies like lift, sprinkler, drip and drop irrigation which consume less water for same or even more production will have to be adopted even in command areas of canals.
- j) The degree of success in achieving farmer's participation in irrigation management will largely depend also on assured and timely supply of water at all outlets.
- k) Farmer's participation in large and small flow irrigation schemes run by government is a compelling need and necessity of the day. To bring about such total involvement of farmers is a joint responsibility of many sectors like irrigation, agriculture, public administration, cooperation, rural sociology and such a joint responsibility will have to be shouldered not only by government departments but also by non-government agencies and voluntary organisations through a well knit and coordinated preconceived action plan or strategy".

Annex R

SUGGESTIONS MADE IN WORKSHOP ON
GUJARAT STATE SYNTHESIS REPORT

(Draft) held at WALMI, Anand on August 25, 1994.

- A. Remarks by Shri. Sanat Mehta, Chairman, SSNNL, Gandhingagr.
- (a) Irrigation is multidisciplinary
 - (b) Water delivery system can succeed only if managed by farmers.
 - (c) Treat farmers as equal partners and friends.
 - (d) Memorandum of Understanding (MOU) gives status to farmers.
 - (e) Farmers are ready to pay for water
 - (f) Sardar Sarovar Project (SSP) has two major challenges; (1) Rehabilitation and (2) Water Management.
 - (g) Strong political backing is necessary
 - (h) 30 Water co-operatives in Viramgam area are already framed eventhough SSP-water will reach this area five years hence.
 - (i) A special officer of Co-operation department will be appointed exclusively for SSP for registration of water Co-operatives under the Gujarat Co-operative Act.
 - (j) SSP has adopted a policy of supplying water in bulk only to group of farmers of each minor canal.
 - (k) All NGOs working in Rehabilitation can be also deployed for water management for which social committment is very necessary.
 - (l) In SSP, if water management by farmers fails, the entire project may fail. Therefore farmers should be trained by WALMI and various NGOs.

(m) The success of the project will also depend on the collective performance of TAD-mix i.e. technocrats, administrators and democrat i.e. politicians. At the end he requested that this report be presented once again exclusively before a selected group of SSNNL officers and be finalised only thereafter.

B. Suggestions by officials of N & WRD/SSNNL and dignitaries of various NGOs.

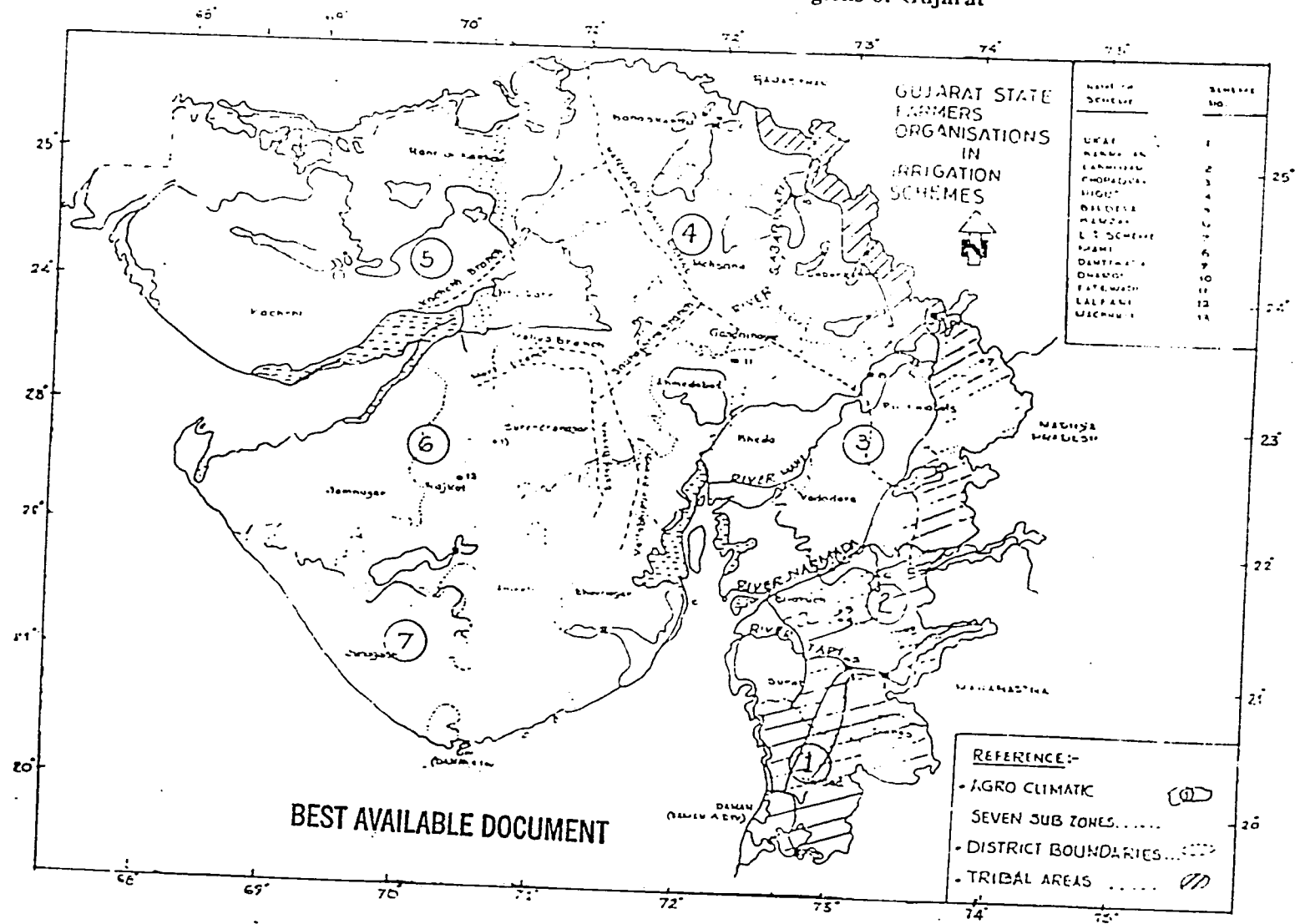
- (a) A High Power Working Group is formed at the level of High Power Working Group High Power Working Group Chief Secretary. A policy resolution on Participatory Water Management (PWM) is in the offing. A model MOW is also under active consideration of government. Few pilot projects for PWM are selected by the standing committee formed with Secretary (WRD) as chairman to assist the working group.
- (b) In the ultimate phase, privatisation of irrigation projects will have to be accepted for maximising the direct and indirect benefits.
- (c) The department should give mandate to its staff and also some incentives for good work. Government staff may even be sent to NGOs on deputation. Government should assist NGOs for engaging motivators for FOs.
- (d) The extension services of Agriculture Department may be utilised in command areas for formation of water co-operatives.
- (e) The irrigation water rates should be on volumetric basis only and they should be high enough to recover at least the O&M cost. Water should be supplied in bulk only to groups of farmers and jointly measured as precisely as practicable. Volumetric water rate will reduce wastage and ensure equity.
- (f) Conjunctive use of ground and surface waters should also be promoted along with farmers' organisations (F.Os).
- (g) Superintending Engineers should be given full powers to implement government policy.
- (h) Even for water deficit projects, formal FOs will be found useful in the long run.

- (i) ISPAN may suggest HRD programme details.
- (j) Some legal powers should be given to irrigation officers to sort out disputes and settle claims of compensation.
- (k) Some staff willing to work for the new approach should be selected and encouraged to create good model for others to follow.
- (l) The system of Rotational Water Supply (RWS) should be specifically stipulated in the new Irrigation Act. The MOU should provide for closure of canals in case of perennial irrigation schemes.
- (m) Field channels should be constructed and maintained by farmers at their own cost. This will reduce hardships regarding land acquisition and right of way over and above inculcating the sense of ownership of the system.
- (n) Measuring devices should be installed in order to convince farmers about supply of water in bulk at various levels of canal system.
- (o) The FOs will in future promote drip and sprinkler systems which an individual farmer can not afford. In the long run, this will help in reducing the gap between the total cultivable land of the state and the current estimate of providing irrigation through all sources.
- (p) The report should sharply focus how an individual farmer will benefit by joining FO, and how does FO benefit by volumetric water rate. Volumetric supply gives freedom regarding choice of crop.
- (q) Even for tribal areas, family welfare approach is not 'a must' for promoting FOs.
- (r) Irrigation staff performance should be evaluated in terms of work done for forming FOs.
- (s) Management Information System (MIS) should cover institution building also. A major change in values will have to be brought about by reorienting the attitudes.
- (t) Different Water rates (on volumetric basis) may be provided for new projects- very recently completed or new projects (like SSP).

- (u) Small units of willing staff members should be formed and deployed for producing good models of FOs. Such units can be used in many project areas, one by one. The effect of such work will spread and motivate others also to join or form such groups.
- (v) Some priority or preference in water allowance should be given to members of FO as an incentive.
- (w) M & R grant for minors to be given to FOs should be adequate. Rs. 20 per hectare as suggested is not enough.
- (x) Adequate funds should be earmarked for modification of infrastructure of canals under CAD programme. Canals should be made capable of delivering the required discharge.
- (y) All the suggestions regarding FO/OPC/TO may be tried out on a full project of medium size as an R & D effort. Instead of only FOs try to develop Water Users' Associations (WUA).
- (z) In order to facilitate passing of the new Irrigation Bill or some important amendments of the existing act by the State Legislative Assembly, the same may be initially discussed jointly in the consultative Committees of MLAs for N and WRD.

FIGURES

Figure 1: Agro-Climatic Regions of Gujarat



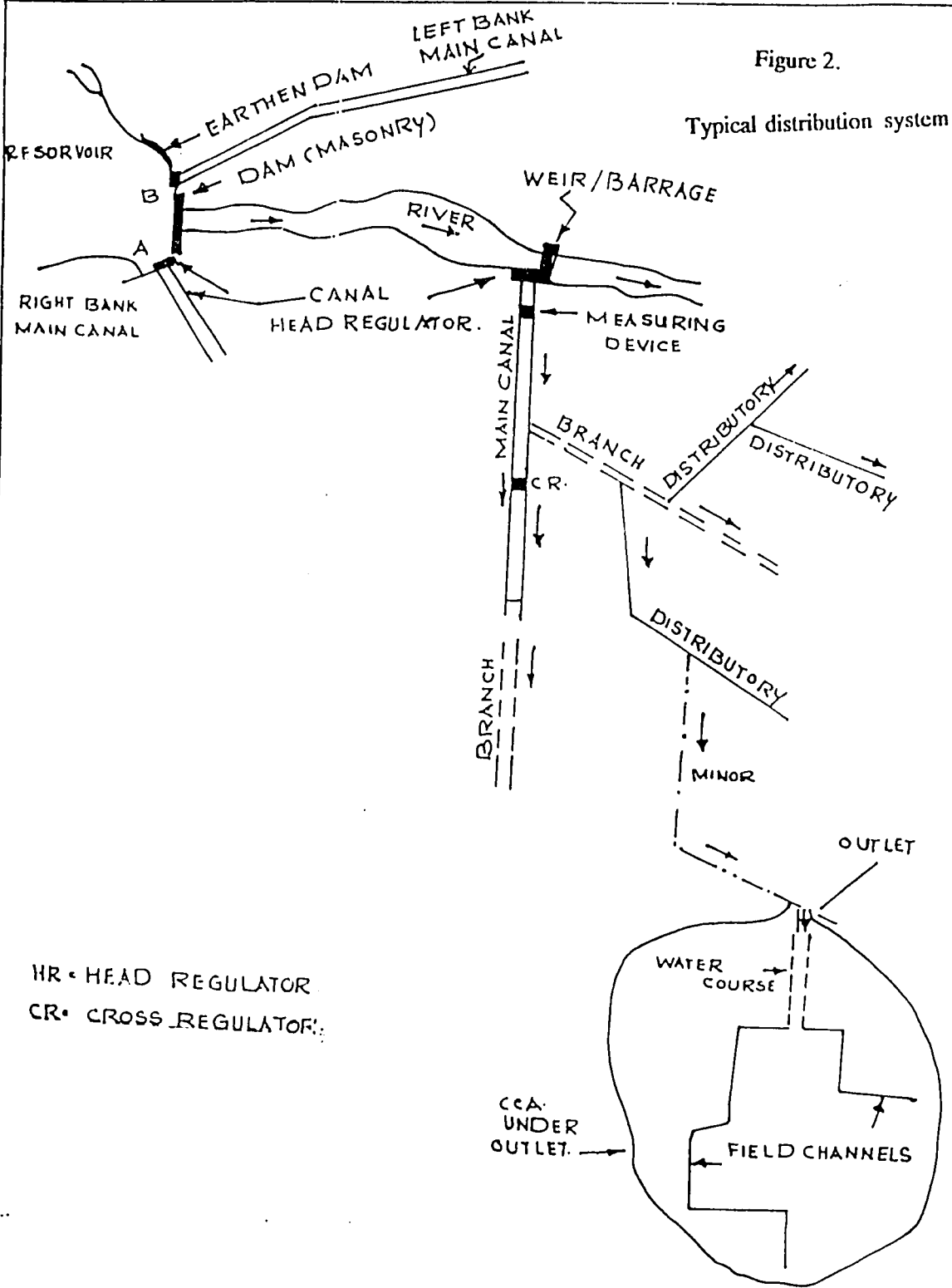


Figure 2.

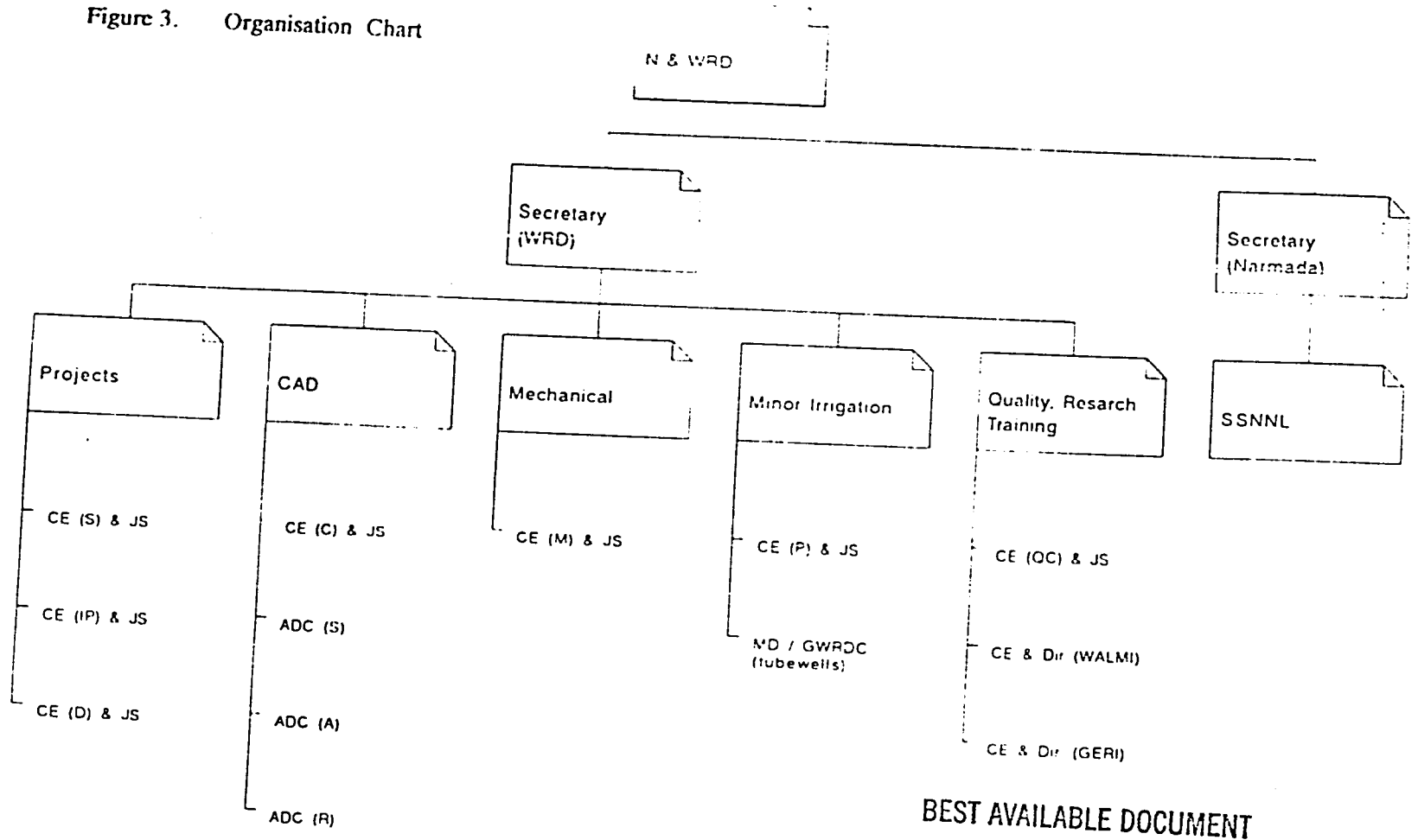
Typical distribution system

HR = HEAD REGULATOR
 CR = CROSS REGULATOR

CCA UNDER
 OUTLET

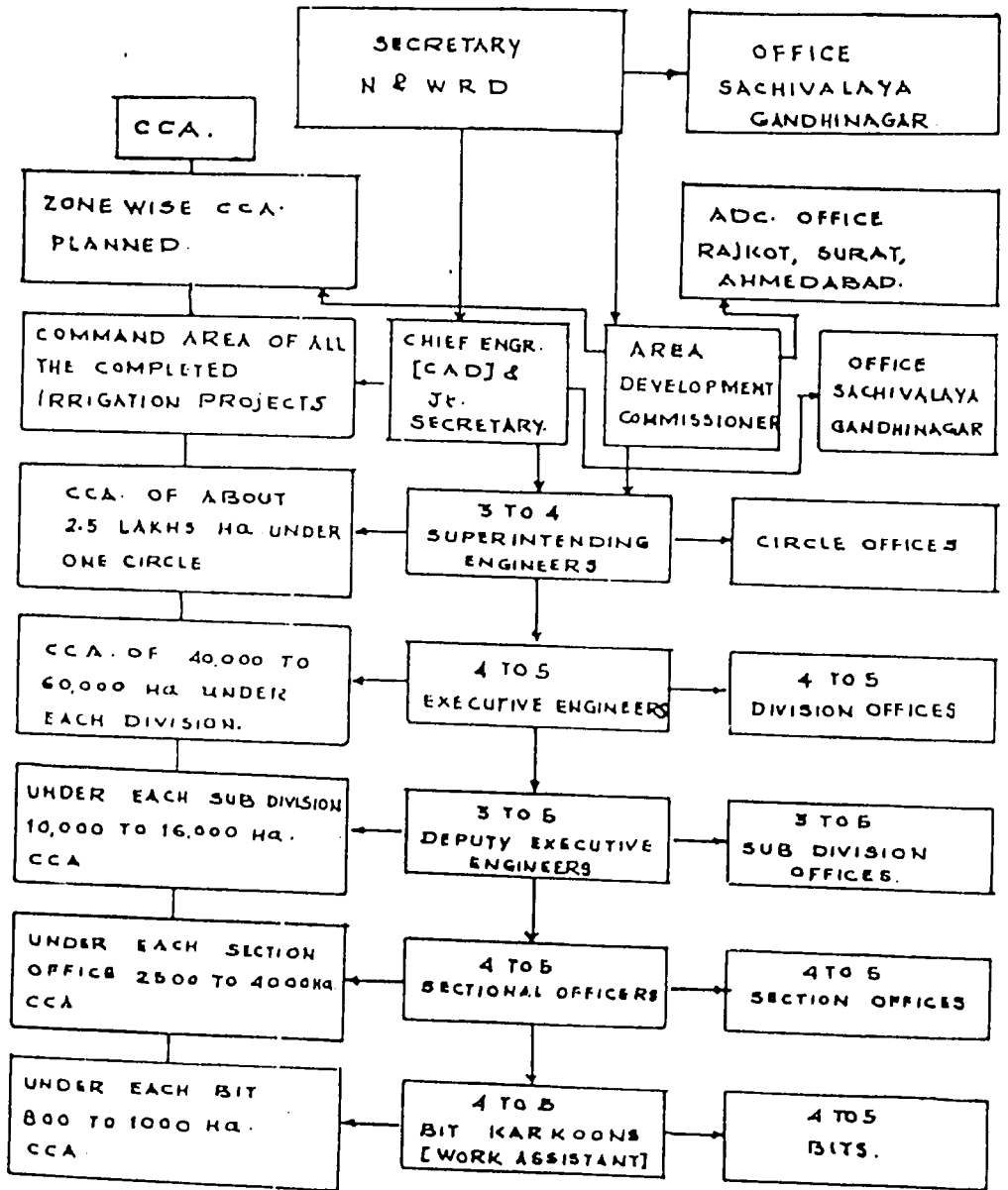
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Figure 3. Organisation Chart



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Figure 4. Organogram for management of Irrigation Command



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Figure 5. Index Map of Mahi Irrigation Project

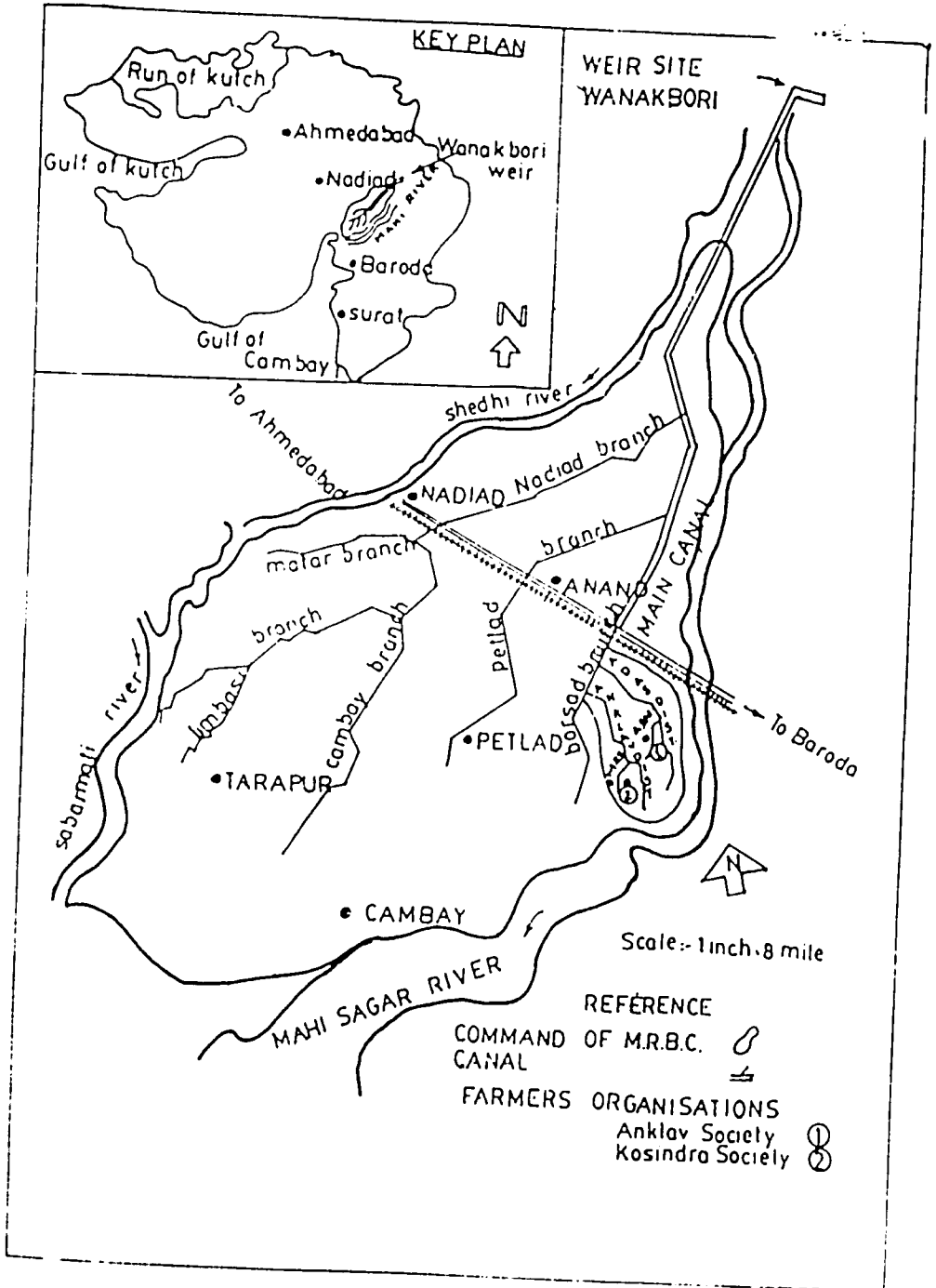


Figure 6. Index Map of Ukai-Kakrapar Irrigation Project

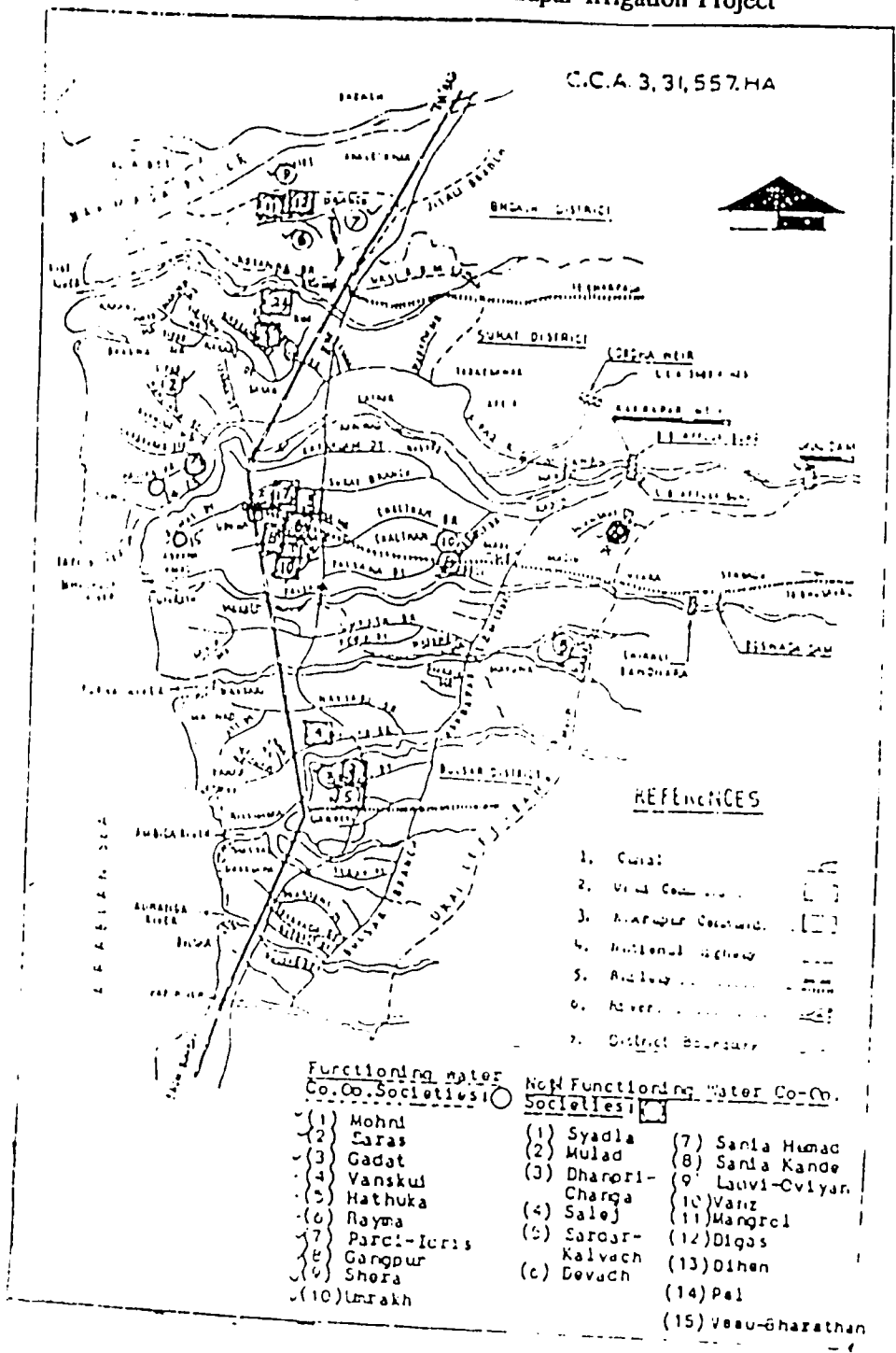
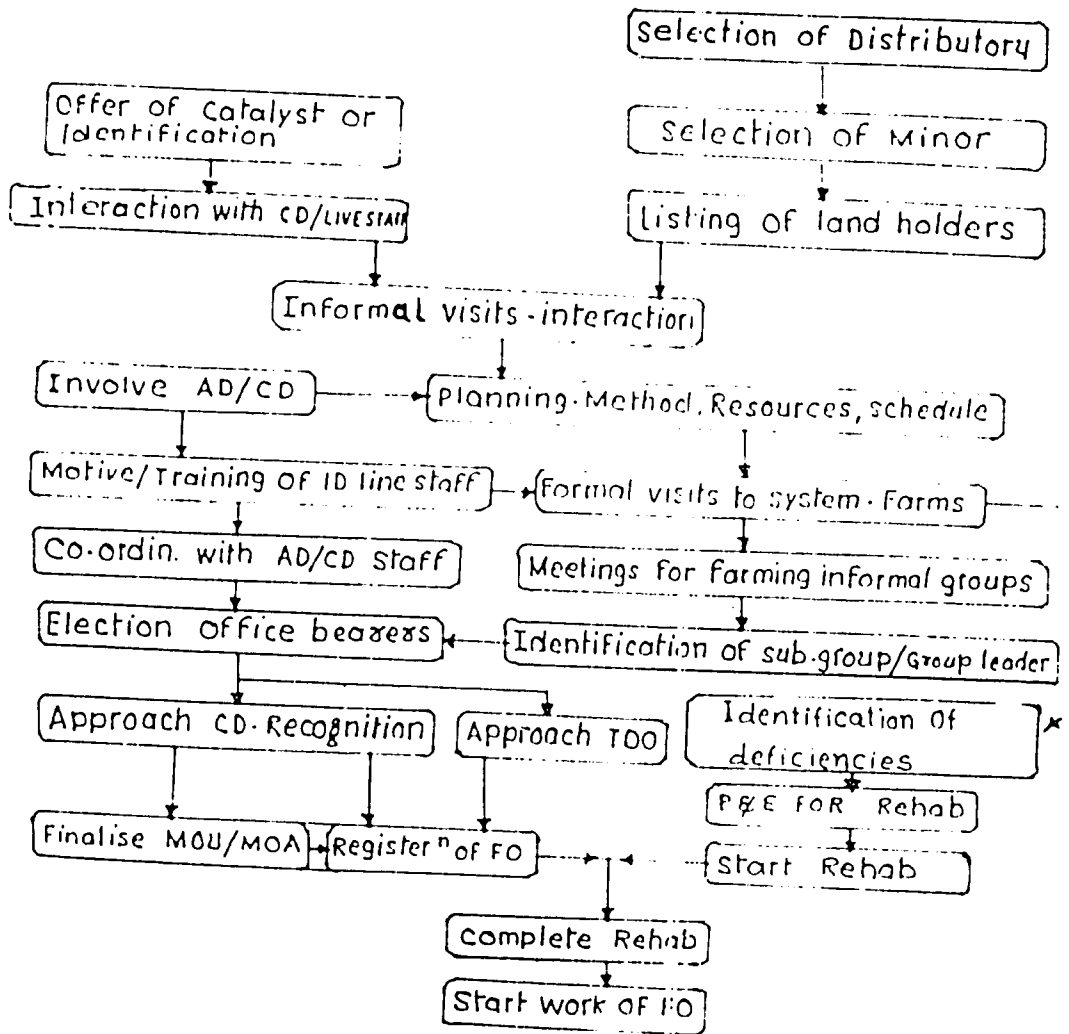


Figure 7. Flow Chart of Process of Formation of FO



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