

Improving Water Use Efficiency by using Participatory Irrigation Management Tools

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ABSTRACT

The idea that farmers should participate in irrigation management has grown in India since mid-1980s. Irrigation management has become a matter of concern for farmers, water users, planners, engineers and public representatives. Experiences show that farmers are potential managers to manage their own affairs effectively if they are properly organized. The need for farmers' participation in irrigation management is recognized by the government all over the country. Participatory irrigation management is increasingly viewed as a means to improve the performance of irrigation investments. Farmer participation in the prevailing system of irrigation management is at four level levels in Major Project, three levels in Medium Project and one or two levels in Minor Project. Basically a joint management system one is upto outlet meaning- water resources department will provide water upto the place from where farmer's management of water begins. The other is below the outlet- meaning distribution among farmers is left to them to manage. Adoption of participatory tools may serve as a source of motivation to many for better water management practices in canal commands. The tools of farmer participation and farmer organization need to be understood and used for improving the water use efficiency. They must be discussed, tested in the field and standardized. In the present paper attempt have been made to discuss our preparedness for receiving canal water for irrigation purpose, what actually happens when canal is opened and how to use PIM tools for improving water use efficiency. Tools of participatory rural appraisal are useful in activities like participatory demarcation of command area, identification of stakeholders, preparation of participatory social maps and command area resource maps, baseline data collection, reconnaissance survey, transect walks, agriculture productivity mapping, crop wise productivity ranking, soil fertility mapping, sowing time line, water requirement time line, net planning, problem ranking, social audits etc. PIM tools provide us useful information on water management aspects of command area. Presently these tools of PIM are under trial and field testing in WALMI training. However, looking to the usefulness of the tools various organizations can attempt its application for achieving improvement in water use efficiency.

1. PARTICIPATORY IRRIGATION MANAGEMENT (PIM)

The idea that farmers should participate in irrigation management has grown in India since the mid-1980s. Experiences show that farmers are potential managers to manage their own affairs effectively if they are properly organized. The need for farmers' participation in irrigation management is recognized by the government all over the country.

Participatory irrigation management is increasingly viewed as a means to improve the performance of irrigation investments. The tools of PIM and farmer organization need to be understood and used in the same way by all. They must be discussed, tested in the field and standardized. Farmer participation in the prevailing system of irrigation management in is at four levels in Major Project, three levels in Medium Project and one or two levels in Minor Project in most of the states. Formation of water Users association under various acts was initiated jointly by water users and water resources department officers. Learning of these efforts was finally acknowledged while PIM act in various states.

2. THE TREND OF FARMER PARTICIPATION IN THE MANAGEMENT

In the beginning, canal command was not fully developed and farmers were provided water through canals which was more than required. Later when canal system was developed they were asked to irrigate with limited water availability or in fixed quota. This strategy resulted in three types of situation in canal command.

- a. Water abundant area
- b. Moderate water availability area and
- c. Water scarce area

This is popularly called as Head , Middle and Tail. Farmers at the head reaches are always at adventitious position in terms of water availability in adequate, quantity and time. Whereas farmers at the middle and tail reaches of canal were provided water as per canal rotations and its flow. To counter this disparity it was realized that tail to head irrigation could be promoted to achieve higher irrigation efficiency. This is possible only with the direct control of water users on water distribution. In order to achieve the higher irrigation efficiency, PIM was considered as best option to gradually increase participation of water users in management and maintenance of canal. The list of activities for WUAs:

- i. Equitable distribution of irrigation water and management for better water use.
- ii. Management and maintenance of the water distribution system.
- iii. Determination of the cropping pattern as per availability of water.
- iv. Recovery and collection of irrigation revenue.
- v. Organization of training in irrigation water management and adoption of appropriate techniques.
- vi. Arrangement of agricultural inputs.
- vii. Resolution of disputes related to irrigation management.
- viii. Demonstrations and training in the latest agricultural technologies.
- ix. Repair of *canals*, adoption of sprinkler irrigation, drip irrigation or border irrigation, etc.
- x. Making available agriculture and plant protection equipment.
- xi. Other production-related programmes such as marketing, processing, storage and others that the grouping considers appropriate to undertake.

3. EFFECTIVENESS OF TOOLS USED FOR IMPROVING WATER USE EFFICIENCY - PROMOTION OF PIM:

3.1 Water Users Associations - Approach Adopted in Maharashtra

Water Users Associations are the most widely adopted model of farmer's organization in our country. There are two models of functional Water Users Associations in Maharashtra one is under Maharashtra Management of Irrigation System by Farmers (MMISF) act 2005 and Rules 2006 and other is under Cooperative Act 1960. Methodological approach has been followed in the formation of WUAs, which includes people's participation in planning, formation and registration of water user associations, joint inspection, identification of works, handing over of management, training of members in operational and functional aspects, and dissemination of know-how on on-farm water management. Development of WUAs under different acts is depicted in table 1 below.

Table 1: Water Users Associations in Maharashtra under different act

WUAs Formed in MMISF Act 2005		WUAs Formed in Cooperative Act 1960	
WUAs	Area Covered Lakh Ha	WUAs	Area Covered Lakh Ha
1919	8.11	2434	9.12
4353 WUAs are Formed in 17.23 Lakh ha. Area under PIM in Maharashtra State			
Rest of the Area will be Brought Under WUAs in coming Years			

Source: Principal Secretary Speech on 12.08.2014 on occasion of award giving ceremony of WUAs: Hon. Dr. Shankarrao Chauhan memorable Award under Mahatma Phule Paani Vapar Sanstha Abhhiyan, Punyashloka Ahilyabai Holkar Water Users Association Management.

Positive results are seen in the efficient management of irrigation water. There are many success stories on WUAs documented by various institutions in Maharashtra. Most prominent appreciations were in the form of reduce water use and increased area under cultivation, management and maintenance of canal infrastructure, savings on costs and better quality of the work etc.

3.2 Recognitions, Rewards and NGOs involvement for WUAs

Water Resources Department has recognized the fact that functional and self sustainable WUAs are the essential link for success of PIM. A campaign of Mahatma Phule Water User Association is organized in the month of September every year. Under this campaign a Punyashloka Ahilyadevi Holkar Water Users Association Management competition was started in the year 2008. A committee has been constituted under the chairmanship of Secretary WRD for scrutiny of State Level Awards another committee has been constituted under the chairmanship of Chief Engineer WRD to scrutiny the Regional level awards. Detail guidelines for assessment of WUAs performance has been set against which committee carry out the scrutiny of WUAs. Ahilyabai Holkar Awards are conferred only to the best performing WUAs in the form of cash prize and certificate. These awards are normally given to WUAs representative and chairmen's in a well organized state level function under the chairmanship of Ministers concerned. These awards are conferred at two levels ie. at state level and regional level as under:

Table 2: Punyashloka ahilyabai Holkar Awards in Maharashtra State

Position	State Level Award Amount in Lakhs Rs	Regional Level Amount in in Lakhs Rs
Ist	7.00	3.00
IIInd	5.00	2.00
IIrd	3.00	-

Source: Govt. of Maharashtra Order No. CDA/1005/ (417/2005)/(CAD (works, Dated:21.08.2009

Government of Maharashtra, Water Resources Department organizes award giving ceremony every year at different places. A detail of awards given in last five years is as under:

Table 3: Punyashloka ahilyabai Holkar Awards in Maharashtra State

Year	State Level Award						Regional Level Award			
	Ist		IInd		IIrd		Ist		IInd	
	No.	Amt. Lakhs Rs	No.	Amt. Lakhs Rs	No.	Amt. Lakhs Rs	No.	Amt. Lakhs Rs	No.	Amt. Lakhs Rs
2009-2014 (05 Years)	05	35.00	05	25.00	05	15.00	05	15.00	05	10.00
State Level Award Amount						Rs. 75.00 Lakhs				
Regional Level Award Amount						Rs. 25.00 Lakhs				
Total Amount on Awards						Rs. 100.00 Lakhs				

Financial provision of WRD GOM on these awards is indicative of the commitment of government towards having better functioning WUAs in future. Similarly, in order to improve the linkages between farmers and government functionaries Lokabhimukh Pani Sangharsha Dhoran Manch, an informal body represented by prominent NGOs like SOPPECOM, Samaj Pragati Sahayog, Prayas, Shrmik Mukti Dal, Manav Lok, Marathwada Vaidhanik Vikas Mahamandal, Lok Paryay etc, social activists like, retired professors cum water experts, progressive farmers, WUAs, WALMI and WRD representative etc. under the chairmanship of Director General of WALMI is also monitoring the activities of WUAs for its efficient functioning. This body also suggests reforms to be adopted for improving the water management in command area of irrigation projects. As such on recommendations of this manch restructuring of state level committee on PIM (WUAs) has been done by GOM. Considering the importance of joint monitoring of irrigation system actions are being taken to measure the performance of WUAs and WRD on fixed indicators against the stated Goals and Objectives of irrigation water management.

3.3 Training and Capacity Building of WUAs:

Training programmes for WUAs and farmers are the regular activities of WALMI Aurangabad which are widely appreciated all over the state for increasing awareness on MMISF act, its provisions and effective functioning of WUAs besides other aspects of irrigation water application in the field and management and maintenance of physical system under the control of WUAs. There is growing participation of the people in the command area of Major, Medium and minor irrigation projects and that a sense of belonging is developing among the water user associations over the management of their minors. In Maharashtra Water Sector Improvement Project funding to improve the capacity of Water and Land Management Institute (WALMI) which is the nodal training institute of WRD, was provided to carry out the training and capacity building activities of water users and other stakeholders to create awareness and skills in water management. This project was implemented in Maharashtra for the period 2005-06 to 2012-13. At the project close following activities and out put were achieved:

- 315 Training programmes (92 % of Target)
- 23789 trainees against the target of 21201 (111%).

The participants included technical staff and officers of WRD, Management committee members of WUAs, farmers, WUAs Secretaries, NGOs. Training included PIM, Irrigation Water Management, MMISFAct, Water Entitlement, Monitoring and Evaluation of WUAs, communication, Technical Training and TOTs etc. Refer Table 4. WALMI conducted a total of 315 training courses involving 23,789 trainees including WRD managers and technical staff, WUA management committee members, and NGOs supporting project activities.

Table 4: Training and Capacity Building programmes conducted under MWSIP phase I in WALMI Aurangabad (Year 2005 to 2012)

Sl. No	Participants	Total No. of courses	Total No. of Participants
1	WRD Officers	165	6897
2	Farmers	114	12549
3	NGO	6	177
4	WRD Officers & Farmers Combined training	14	2045
5	WRD Officers, Farmers & NGO Combined training	16	2121
	Total	315	23789

Source: WALMI Aurangabd, 2014

There were however a number of current and anticipated limitations including Institutional capacity to provide training to a growing number of WUAs in future.

- Lack of arrangements for monitoring the performance and impact of trained trainers under the ToT program
- To upscale and ensure future sustainability of training and capacity, in March 2014 the GoM issued a GO for establishment of a permanent unit for monitoring and evaluation of WUAs. 19 new permanent staff posts have been approved under the GO for the unit.

It is evident from above that PIM calls for more effective application of participatory tools and techniques for achieving rapid and sustained impact to improve water use efficiency. In this regard following tools have been identified to improve the impact of PIM.

4. TOOLS OF PIM:

Adoption of participatory tools may serve as a source of motivation to many for better water management practices in canal commands. Following tools are proposed for wider application in the command area to increase water user's participation in management of water and to improve water use efficiency. PIM tools are developed from the experiences of Participatory Rural Appraisal tools which are widely used in Rural Development sector. These tools are under trial and are subjected to testing in the field during various training programmes of WALMI. Suggestive list of activities that can be done in participatory mode are proposed in following table:

Table 5: List of Activities under PIM as tools of ensuring water users participation

Sl. No.	Tool	Output
1	Baseline data	•Data collected •Resources Identified •Felt need assessment done •Baseline Survey Report documented
2	Demarcation of Command Area (DCA)	•Community upgrades command area maps prepared by Govt •Community map shows different structures in canal, present status of community infrastructural facilities available in command area, on farm structures like field channels water courses etc.
3	Identification of Stakeholders in DCA	•List of Identified stakeholders in command area (irrigators) notified by Govt and identified by Community
4	Preparation of DCA maps	•Notified area Maps of Govt and Community maps.

Sl. No.	Tool	Output
5	Reconnaissance / walk through	•List of Canal bottlenecks
5	Transect Walk	•List of Command area bottlenecks
7	Productivity mapping (Crop wise)	•Crop wise Map showing high, medium and low productive zones in DCA •Plan to improve production per ha
7	Soil Fertility Mapping	•Map showing high, medium and low productive zones on the basis of soil fertility in DCA •Plan to improve production per ha
8	Wealth Ranking	List villagers according to their economic bearing in DCA
9	Social Maps	Map of village settlement in DCA
10	Resource Maps	Map of village resources in DCA
11	Village Profile	Village inventory documented
12	Sowing Timeline	Documentation of Defined Duration of sowing
13	Water Requirement Timeline	Documentation of Defined Duration of irrigation
14	Crop wise Productivity Ranking	•List of cultivators according to their crop wise productivity •Productivity Groups •Transfer of indigenous techniques among cultivators with no cost •Techniques of higher production per unit of land will be explored. •Income per unit of area will improve on sustainable basis.
15	Identification of Stakeholders Problems	Problems identified
16	Problem Analysis	ranking/ priority assigned to problems of stakeholders
17	Net planning	Individual farm planning document
18	Preparation of planning matrix	Plan of DCA
19	Implementation of plan	WUAs Role
20	Monitoring	WUAs Role
21	Feedback and Social Audit or Nirakh Parakh	WUAs Role and Community Role

Detailed process of implementing above tools is discussed in **Annexure 1**.

5. CONCLUSIONS:

Implementation of PIM has been done for last one and half decade. Results obtained in the initial years were encouraging. However, due to lack of adequate tools to work with water users communities the programme failed to upscale in desired manner. This can be achieved by using various participatory rural appraisal tools with little modifications as per the requirement of command area. There is a growing need of community mobilization techniques in command area for improving water use efficiency. This can be achieved by integrating the PRA and PIM in effective manner. Tools suggested above are suggestive and can be applied in command area of water resources project where community is involved in operation and maintenance of canal. PIM tools provide us useful information on water management aspects of command area. Presently these tools of PIM are under trial and field testing in WALMI training. However, looking to the usefulness of the tools various organizations can attempt its application for achieving improvement in water use efficiency.

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Annexure 1

Tools and Techniques of Participatory Irrigation Management

Sl. No.	Task	Method	Participant	How to do?	Output
1	Baseline data	Questionnaire/ Schedule/ key informant Guide/ Interview Guide	Irrigators and community	•Baseline survey is important in irrigation application/ projects. This is conducted well before the start of irrigation/ project so as to document the status of different success indicators. These indicators provide useful information on whether the irrigation/ project objectives are achieved or not. Information is collected from villagers with the help of: •HH survey in the command area villages •Identification of command area resources and felt need assessment	•Data collected •Resources Identified •Felt need assessment done •Baseline Survey Report documented
2	Demarcation of Command Area (DCA)	Participatory	Community +	•Carry Command Area Maps prepared by Water Resources Department. •Spread the map on a clean platform in village •Ask community members to identify their farms and write their names on map. •Also ask them to put a Circle mark for Dug well, water course, field channels and canal structures etc. if it is available on their farm •Some other mark for minor canal, distributory canal or main canal, Village Road Bridges and other hydraulic structures as per availability. •Demarcation of other infrastructural facilities like roads, its type, community drinking water sources, village ponds, electricity, village institution buildings, community halls, community water and sanitation facilities etc.	•Community upgrades command area maps prepared by Govt •Community map shows different structures in canal, present status of community infrastructural facilities available in command area, on farm structures like field channels water courses etc.
3	Identification of Stakeholders in DCA	Participatory	Community +	•Key question is raised among the villagers for listing different categories of communities in their village including irrigators from canal water •List is prepared as per community responses and this list is displayed on sheet of paper pasted on wall	•List of community Identified stakeholders in command area notified by Govt
4	Preparation of DCA maps	Participatory	Community +	•Community is provided with locally available material to draw realistic command area map as per actual condition or by perception •This map is then overlapped on existing command area map. •Overlapping of map will result in identification of Blue area- where both Govt. and community think that irrigation can be done; Black area where both Govt. and community think that irrigation cannot be done; , Green Area where community think that irrigation can be done; and Yellow Area where Govt. think that irrigation can be done;	•Notified area Maps of Govt and Community maps.
5	Reconnaissance / walk through	Participatory	Community +	•Community members walk with facilitators along the canal in notified command area. •Direct observations are noted in field observation sheet •Photographs of relevant places are documented	•List of Canal bottlenecks

Sl. No.	Task	Method	Participant	How to do?	Output
				•Community views about the status of canal and its structures documented	
5	Transect Walk	Participatory	Community +	•This method is used for developing understanding about village settlement, agriculture farms in command area, topography, pasture land, rivers, canals, community land etc. It also provides opportunity to physically visit the different resources of command area, understand their status and map the problems by self analysis. •Community members walk with facilitators across or away or perpendicular to canal in notified command area. •This area is either farms, or village or pasture land or habitations •Direct observations on status of village are noted in field observation sheet •Photographs of relevant places are documented •Community views about the status of village infrastructure including canals and its structures documented	•List of Command area bottlenecks
7	Productivity mapping (Crop wise)	Participatory	Community	•A questionnaire is used on crop wise agricultural production status. •Personal interview method to collect the data from all household or cultivators •Analysis of data •Cultivators placed in different slabs of productivity •Plan to improve productivity by cultivators	•Crop wise Map showing high, medium and low productive zones in DCA •Plan to improve production per ha
7	Soil Fertility Mapping	Participatory	Community	•Focus Group Discussion (FGD in every ward of village •Community will be provided with key questions related to Soil fertility status •A demonstration on knowing soil type will be given by facilitator	•Map showing high, medium and low productive zones on the basis of soil fertility in DCA •Plan to improve production per ha
8	Wealth Ranking	Participatory	Community	•Wealth Ranking is a process of listing the villagers on the basis of their wealth. Eg. Very poor, Resource Poor, optimum resource rich and resource rich etc. by conducting a meeting with villagers and asking them to define these categories as per their perception. •Explain these categories by giving examples •Prepare cards for all households mentioning name of head of family, caste etc. for all households in a village •Prepare list of families as per their categories. Present this list before villagers and update. Disputed household names may be sorted out in consultation of community •Record final list in WUAs record register and froze the list for two years	List villagers according to their economic bearing in DCA
9	Social Maps	Participatory	Community	•Workout preparations, plan visit to command. • Explain Villagers about social map. Draw sample on ground. •Ask villagers to draw their own village map. Keep patience. Allow villagers to work out details and draw the map •Use appropriate symbols and locally available material •Information to be depicted on map •Village Settlement area, Internal Roads – Boulders,	Map of village settlement in DCA

Sl. No.	Task	Method	Participant	How to do?	Output
				CC and connecting roads, Houses – Kachha, Pacca, Mixed, Drinking water sources, Electric line, Temple, Choupal, Shops, health center, school etc, Settlement according to cast and religion if any, Community center, Canal – Earthen, Concrete etc. Minor distributaries, Canal Structures, Village Road Bridges, Cross regulators, Command area - symbolic •Use of Map •Demography of village •Population distribution in different categories •Health and education data •Animal husbandry data •Human resources data •Facilities and services •Dos •Initiate the map preparation process and allow community to draw map at their own •Step back and observe •Ask small questions on changes in preparation of map •Motivate community •Do not feel nervous if map preparation do not take off •Ask male and females to draw village social map separately •Always keep in mind behavioral and attitudinal issues •Assist large communities in drawing map •Talk about various problems and facilities •Find out potential development area	
10	Resource Maps	Participatory	Community	•Process of formation of Resource map is same as that of social map •In resource map prominent features are – Agricultural land, Irrigated land, river, nala, dam, stop dam, wells, tube wells and hand pumps, canals, hydraulic structures, etc. •Location of structures and their numbers can be assessed through resource map •Resource map is a important tool for preparing seasonal irrigation plan in canal command •Net planning can be done with the help of resource map •Area and land use •Type of agricultural land •Type of canal, length and its distance from village •Availability of microdistribution network, water courses, field channels etc. •Position and location of outlets, VRBs, CRs etc •Soil type and drainage •Plantation etc •Resource map not only provides present scenario of village and command area resource but it also provides useful information on planning of different developmental activities like – need of canal construction, location, status and numbers; land development- location, status and numbers; •Use different colors for present available resources and proposed development •How to prepare resource map- call villagers and discussed matters of their concern, built confidence among them •Tell them objective of preparation of resource map •Select appropriate place where community can draw resource map •Take a transect walk of village with community before start of activity of resource map preparation	Map of village resources in DCA

Sl. No.	Task	Method	Participant	How to do?	Output
				- Initially assist villagers then allow them to draw rest of the map - Slowly walk out of the main scene and observe the community - Promote use of locally available material for developing map - Copy community drawn map on piece of paper and get the confirmation of community	
11	Village Profile	Village Schedule	Village Panchayat officials and community	- Village Survey is planned to collect General information of village - Local representatives, Sarpanch, Sachiv of Gram Panchayats may be contacted for providing information - Following information is collected during PARA - Demographic details of village- Total Population, Male, Female - No. of Family members – Caste, religion etc - Availability of Roads and its status, distance from district road, total length of road, year of construction etc - Electricity availability – in villages, in households and on farms - Communication availability - Public facilities availability and its distance from village - Area of Village, and land use classification - Availability of irrigation facilities - Availability of village institutions and groups with their members	
12	Sowing Timeline	Participatory	Community	Normally there are two Sowing Seasons in a year. Cultivators are provided with following options: Kharif Sowing: - Dry Sowing: In Last week of June - Wet Sowing: On onset of Monsoon and after getting proper pre sowing condition of soil. This is on time sowing generally done during Second week of July - Late Sowing: Delay in previous crop cutting or delay in land preparation or delay in input or resources mobilization leads to Late Sowing. - Late Sowing is effected in Second week of August and onward. Rabi Sowing: - Dry Sowing: In first week of October - Wet Sowing: On application of pre soaking water (Palewa) and after getting proper pre sowing condition of soil. This is on time sowing generally done during Third and Fourth week of October - Late Sowing: Delay in previous crop cutting or delay in land preparation or delay in input or resources mobilization leads to Late Sowing. - Late Sowing is effected in Second week of November and onward. Mapping of cultivators on village map/ command area map is done according to their sowing options. - Yellow area demarcate early sowing condition on map - Green area demarcate timely sowing condition on map - Blue area demarcate late sowing condition on map	Documentation of Defined Duration of sowing
13	Water Requirement Timeline	Participatory	Community	Normally there are two irrigation Seasons in a year either from canal or tube/dugwell. Cultivators are provided with following options: Kharif irrigation: Dry spells during rainfall: In Last week of July and	Documentation of Defined Duration of irrigation

Sl. No.	Task	Method	Participant	How to do?	Output
				first week of August 2. Critical Root Initiation Stage: 21 days after sowing-First Irrigation 3. Flowering stage: 21 days after first irrigation. (Second Irrigation) 4. Pod Formation: 21 days after Second Irrigation. (Third Irrigation) 5. Dough Stage: Grain Formation 21 days after third Irrigation. (Fourth Irrigation) Rabi Irrigation: 1. Palewa or Pre soaking Irrigation: In Third week of October 2. Critical Root Initiation Stage: 21 days after sowing-First Irrigation 3. Flowering stage: 21 days after first irrigation. (Second Irrigation) 4. Pod Formation: 21 days after Second Irrigation. (Third Irrigation) 5. Dough Stage or Milk Stage: Grain Formation 21 days after third Irrigation. (Fourth Irrigation) 6. Grain Formation Stage: 21 days after fourth irrigation. (Fifth Irrigation) Mapping of cultivators is done according to their irrigation options. •Yellow area demarcate pre soaking irrigation area on map •Green area demarcate single irrigation requirement area on map •Blue area demarcate two irrigation requirement area on map •Orange area demarcate three irrigation requirement area on map •Violet area demarcate Four irrigation requirement area on map •Red area demarcate Four irrigation requirement area on map	
14	Crop wise Productivity Ranking	Participatory	Community	1. List of the cultivators is procured along with their operational holding size. 2. List is updated by local enquiry. 3. Columns are added to the list for major Kharif and Rabi crops 4. Cultivators are asked to mention their production against each crop as per their size of land 5. Per hectare production is worked out by dividing the production by area 6. Analysis of result will be done to find out Maximum and Minimum values of production per hectare. 7. Further analysis is done by arranging the production levels and cultivators in descending order. 8. Grouping of cultivators will be done for same production level. 9. A list of Number of groups and their production per hectare will be prepared. 10. This exercise will be repeated for all Kharif and Rabi Crops grown in the area. 11. Crop wise productivity slabs will be documented. 12. Low production level Cultivators will be given exposure to interact with groups having higher production 13. This will lead to transfer of indigenous technology among cultivators. 14. Cultivators reaping higher production will be selected for inter state exposure visit where modern agricultural practices are applied to get	List of cultivators according to their crop wise productivity Productivity Groups Transfer of indigenous techniques among cultivators with no cost Techniques of higher production per unit of land will be explored. Income per unit of area will improve on sustainable basis.

Sl. No.	Task	Method	Participant	How to do?	Output
				optimum production. 15. Cultivators having optimum production will undergo training for calculated reduction in cost of cultivation and controlling the application of agriculture inputs so that their savings will improve.	
15	Identification of Stakeholders Problems	Participatory	Community +	List the different stakeholders in the selected project area. These are the inhabitants of the village who may fall under some general category and who will have some definite stake (benefit and gain or contribution or losses). The stakeholder analysis in LFA is an analysis of the problems, fears, interests, expectations, restrictions and potentials of all individuals and organizations •Meet Primary Stakeholders in their environment according to their category viz. women's, farmers, artisans, etc. •Float key question related to their problems •Give them enough time to express their problems •Encourage all to express •Write the problems on separate sheet of paper •Once they done it, read out the problems expressed by them •Take the consensus and make the correction according to their suggestions •Float another Key question on prioritizing the problems from their point of view •Ask them to give top priority to the problems they felt most essential to address •Complete the Ranking of the problem •Prepare the Ranked Sheet •Read out the Ranked Problems loudly •Select the top few problems for further analysis (But in Practice all the problems of Stakeholders need to be addressed) •Repeat the exercise for all the relevant stakeholders groups. •Covert the problems into the problem Scoring Matrix	Problems identified
16	Problem Analysis	Participatory	Community +	From the problems identified above, a list is prepared. Against each problem, the rating given is noted. If two or more groups have identified the same problem, the rate given by each group is noted. Select a tentative "starter" problem Prioritization of problems: This is based on the final score obtained by each problem. The problems that score the highest are those that are common to most of the stakeholder group. These form the "starter" problems.	ranking/ priority assigned to problems of stakeholders
17	Net planning	Participatory	Community +	Objectives: Develop Ownership feeling among irrigators or members of WUAs, Ensure farmers participation in decision making process of WUAs, Use available financial resources judiciously in WUAs, Implement water distribution schedule Benefits: Method is participatory in nature Beneficial in social perspective Quality of work is ensured Local wisdom is efficiently used Planning is on area basis Participation of all members ensure Develops credibility and ownership feeling among members	Individual farm planning document

Sl. No.	Task	Method	Participant	How to do?	Output
				Ease in implementation Gat No. wise plans are prepared Method: Visit every Gat No. of command area along with owner and his family members Start discussions on farm Take information of rainfall and irrigation availability Survey land area of Gat Find out contours and slope of land, land class, soil depth, erosion if any, Take crop grown information, Draw map of Gat and show present land use of that Gat No. Group for Visit Technical Expert, Social expert, WUAs representative What to Do? Identify problems of Gat, discuss with owner of land about problems and its probable solution	
18	Preparation of planning matrix	Participatory	Community +	All the information collected above is used for preparation of planning matrix. Use predesigned format for planning. Planning matrix should contain – Goal, Objectives, Outcomes and Activities. Define the indicators and means of verification for achieving the activities, out come and objectives. If required declare the assumptions.	Plan of DCA
19	Implementation of plan	Participatory	Community +	Give plan to WUAs. Train them for implementation of plan and maintaining relevant records of implementation. Maintain evidences of all activities performed as per plan	WUAs Role
20	Monitoring	Participatory	Community +	Active monitoring by communities while activities are in progress	WUAs Role
21	Social Audit or Nirakh Parakh	Participatory	Community +	Conducted by communities themselves Outcome is discussed and measured Discussions on shortfalls Common consensus achieved for mitigating the shortfalls	Community Role
22	Feedback	Participatory	Community +	Qualitative improvement is done through the process of feedback Design appropriate questionnaire for getting community feedback on irrigation services offered by Department and WUAs.	WUAs Role