Chapter 7 Conclusion
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The impact of water user associations and their institution on livelihood: In this section it has been tried to introduce a simple and understandable illustration of the impact of water user associations and their institution on the livelihood of water users, based on objectives of the research this chapter is planned to cover conclusion of the data which collected and analysis done in previous chapter. Generally Conclusion part is the very important part of the any report. How research is important that depend on conclusion and recommendations. So researcher planned to put conclusion as per following area.

As above plan first covered output based on previous analysis and then overall impact and suggestion based on research. So it will give idea in three section first covered respondents’ general information, second part cover Institution part and third part will cover livelihood based Impact on respondents.

1. Respondents General Information:

1. General: There were 97% tribal caste respondents and 3% other caste respondents for the research work, So this project major part more than 90% beneficiary are from tribal community and they are from Chaudhari community. Out of total respondents 84% Male respondents and 16% female respondents. All 100% respondents were married.
2. Out of total respondents 31% from head region, 32% from middle region and 37 respondents from tail region. So Researcher tried to cover all region, caste and male – female representation equally.
3. The maximum respondents from age group of 41 to 50 years 38 %, then second 31 to 40 years was 26 % and 51 to 60 is 24 % so from 31 to 60 years groups respondents was major part total 88 %. Respondents’ minimum age is 21 years and maximum age is 75 year. So respondents covered from all age group. It shows that major parts of farmers are from 31 year to 60 years.

4. Education level: Education decided position of person in society, education plays very important role in development. Under this research out of total respondents 22 % respondents were illiterates, remaining 78 % respondents were literate farmers. So major part 78 % respondents were literate farmers.39 % respondents were studied up to 7th standard,27 % up to 12th standards and 12 % respondents were studied more than 12th standard.

5. Family Size: The total respondents average family size was 5 members per family, the minimum family members in family was 2 and maximum members of family was 10.The 70 % family having member size between 1 to 5 and 30 % family having size of family was more than 5.if we see land resource of family member having 1 to 5 size the major part of 50 % respondents having land up to 2 acre and 14 % having 2 to 3 acre land.

6. Land Detail of Respondents: The major part of respondents having land was 26 % from less than 1 acre and 26 % between 1 to 2 acre,21 % part was 2 to 3 acre and 11 % is from 3 to 4 acre, remaining were more than 4 acre land. The average land size was 2.75 acre, minimum land having 0.2 acre and maximum having 10 acres land. If we take location wise average land, in head region average land of respondents in command 1.76 acres, in middle region 2.23 acre and in tail region 1.74 acre.

7. Allied activities: Result shows that major part (95%) of respondents engaged with animal husbandry so, it shows that, that also one major activity for livelihood of the respondents.Respondets having average 4 to 5 animal for milk. Minimum having one to maximum having 11 animals.

8. Asset of respondents: Result shows that 71 % respondents having other water source for drinking water, canal area and other area which is out of canal.46 % respondents have diesel engine and 24% having electric motor; It shows that in project area there is important of water and irrigation. Out of total respondents 13 % having tractor also. It shows also facility of household level that 97 % respondents having mobile/telephone, 82 % respondents having TV/Dish and 47% having freeze in their houses. It shows that major part of respondents connected with communication and television. 65 % respondents having gas or bio gas facility, 79 % respondents having motor cycle and 13 % having four wheeler.
2. Institution Building and Management:

A. Formation of Institution:

1. Awareness on formation process: Out of total respondents 68% respondents replied for the question of awareness about formation process of water user association and internal discussion among farmers during formation process, out of that 34% respondents from head region, 39% from middle region and 26% from tail region.32% respondents not aware about this process out of that 28% from head region, 33% from middle region and 39% from tail region. The major part which not aware is from tail region out of 32%, 39% was from the tail region. During formation process came to know that main five areas motivated farmers to join and form water user association. 92% respondents said that assured water will provide by institution, 88% said that water will provide easily, 69% said that minimize the conflict, 53% said that control on waste of water and 50% said that management will done by villagers. It shows that the above main five areas motivate farmers to form water user association.

2. Immediate readiness for joining in water user association: Total 30% respondents said that they are immediately ready to join in Institution out of that 21% from head, 32% from middle region and 47% from tail region. Readiness of head region farmers to join was 35% and tail region farmers were 59%. It shows that major part of tail farmers were ready to join in Institution and it also came out that initial very less part of farmers were ready to form water user association.

3. Role of Different Institution in formation of water user association: Respondents replied for the role of Non-government organization, government organization and water user association role. 71% respondents were aware about non-government organization role, 34% respondents aware about government department role and 63% aware about role of water user association. The main role of NGO was Individual contact with farmers, motivate them, plan training and exposure for knowledge, facilitate for Institution formation and take responsibility by farmers and concept development work. The role Irrigation department was to participate in meeting, gave cooperation to Ngo and help for construction planning, registration of water user association and technical guidance. The role of water user association was to join in meeting and as member, form Institution, get information and convince other farmers.

4. Awareness about Contribution for formation of Intuition and structure of institution: Out of total respondents 71% were aware about contribution for joining in water user association and 78% respondents aware about structure of water user association. It shows that major part of respondents aware about that both area.

5. Membership in water user association: Data shows farmers started to join in year 2008 as a member in first year 45% farmers become member, second year reached up to 71%, third year covered 79% and today 3057 farmers member in water user association. As discussed with leaders of water user association now no any farmers remain to join in water user association. If there increase new area than there is a possibility to increase members of water user association.
B. Water Distribution:

1. Water Demand system: Out of total respondents 70% respondents replied for the question of how they put the water demand, it shows that 70% farmers aware about water demand. The demanding water system was 45% informed by filled up form and 45% informing water operator. Rest were directly individually inform not by system. Related to the water demand 30% respondents replied that they faced problem in that out of that 21% from head region, 33% from middle region, 46% from tail region.

2. Awareness on water rates, water distribution and supervision system: Out of total respondents 79% respondents aware about water rates of water user association out of that 84% respondents literate and remaining were illiterate respondents. It shows that major part of that were literate respondents. About water distribution part 55% respondents aware about that and supervision of water distribution 64% respondents aware about that.

3. Assure and enough water and complaint of water distribution: Out of total respondents 58% respondents said that they get assured and enough water for irrigation, out of that 42% from head region, 32% from middle region and 26% from tail region. It shows that for assurance of water tail area has less compare to middle and head region. About complaint in water distribution 46% respondents complained about water distribution and out of that 85% complaint resolved by water user association. It shows that the ratio of problem solution is good. About upper area farmers takes water without turn 25% respondents agreed in that this types of problem happened.

4. Water logging problem: Out of total respondents 30% respondents said that they faced this types of problem, out of that 56% respondents from head area and 38% respondents from middle area. It shows that the water logging problems was in head and middle region more.

5. System for conflict resolution and water distribution monitoring: During water distribution conflict came to water user association during that time 20% conflict resolved by understanding and convincing to farmers, 35% problem resolved by use of rules and regulation, 45% water distribution related conflict resolved by supervision. The water user association supervised properly. The monitoring system for supervision of water distributions 70% done by water operator and 30% supervision done committee member during water distribution.

6. Awareness about water recovery and system for water recovery: Out of total respondents 92% respondents aware about water charge and recovery system. 33% responders said that recovery collected by operator, 44% respondents said that recovery collected by secretary and 23% said that recovery collected by chairman. Data shows that there were three types of system in place in different water user association.

7. Water recovery Comparison: Data shows that till today there is Rs. 57 lakhs due before PIM period recovery. After management taken by water user association from last six years 100% water charges paid to government and got rebate (financial incentive) of Rs.33.0 lakhs and paid to government of RS. 68 Lakhs.

7. Problems Solving Systems of Water Use Association: The problem solved by water user association by organized regular meeting, discussion meeting in presence of external person from government and Ngo also, plan training for farmers, make rules and regulation and follow that, supervision during water distribution with farmers involvement. As shred by respondents in 16% cases of conflict they took help from NGO for solving that, in 10% cases they took help from
irrigation government. Remaining solved by themselves out of that in 7 % cases they involved villages leaders like Sarpanch, other village leader for solving the conflict. So the water user association had a system to resolve their problem.

During discussion with NGO representatives and government officer it came out that the main area was from problem was turn in water distribution, recovery, area measurement, filed channel issue and problems between farmers to farmers. The main technique or strategy they used for minimize this tension were maximize individual contact and canal site visit, plan meeting and training ,with it tried to increase common understanding and motivate farmers. Plan “Shramdan” and activity done by farmer’s participation like area measurement so minimize the confusion and leaders discuss the work of water user association in social function regularly.

C. Canal Repair and Maintenance:

1. Awareness about canal protection: The view of respondents about canal protection was 91 % respondents replied and out of that 92 % said that the responsibility of canal protection is Water user associations, 8 % said that is responsibility of irrigation department. It shows that farmers accepted that canal is for the farmers.

2. Awareness about canal repair and Maintenance: The view of respondents about canal repair and maintenance was 89 % respondents replied and out of that 44 % said that government responsibility, 41 % said that WUA responsibility and 15 % said that it is a responsibility of both. It shows that the maximum respondents aware about that and as per respondents view ratio of responsibility were same.

3. Awareness about canal repair planning and tail area repairing planning: Total 63 % respondents replied about that and out of that 35 % from head region, 34 % from middle region and 31 % from tail region. About tail area planning 54 % replied, out of that 36 % from head region, 31 % from middle region and 33 % from tail region. It shows that awareness among canal planning was in all regions but overall awareness about canal planning and planning for tail area was less.

4. Participation & Awareness in “Shramdan”and canal repair work done by whom? : Total 98 % respondents replied and 96 % respondents participated in “Shramdan”.it shows that maximum participation in this by members.

Respondents replied about repairing of canal, out let and field channel. Irrigation Department done 24 % work in all three types of work. Water user association done 36 % work in canal and out let and in field channel 55 % work done. NGO also supported in repairing work of canal, field channel and out let and it was 33 % part. During discussion it came out that impression on respondents for repairing like new approved work take as a government,30 % of rebate given by government work done by wua was count wua work and also “Shramdan” count as a wua working support for repairing count as a Ngo supported work. It shows that wua took good responsibility to repair the canal. Data shows that wua work from incentive by government, contribution as 10% and “Shramdan” total amount is Rs.13 lakhs and NGO supported work also implemented by WUA was around Rs. 10 lakhs.

D. Management of Water User association:

1. Awareness and participation in Annual Meeting: As per respondent’s views total 77 % respondent aware about regularity of annual meeting, about last meeting organized 77 % aware, 68 % respondents aware about what discussed in last meeting and out of that 47 % respondents participated in that discussion. It shows that major part was aware about annual meeting. Participation in discussion is less.
The area discussed in Annual meeting was timely water to farmers, timely recovery, rotation plan, control on waste of water, canal cleaning, leader’s selection, irrigation area plan.

2. Awareness about committee and other meetings: respondent’s views total 77 % respondent aware about regularity of committee meeting, 88 % committee meeting organized monthly and 12 % organized quarterly. Apart from this 49 % respondents about other types of meeting. It shows that for committee meeting major part of respondents aware but for other meetings only 49 % respondents aware about that.

3. Meeting: During discussion with leaders, NGO representatives and with Irrigation department officers, it came out that there were seven types of meeting organized for management of whole work of water user association with clear agenda and discussion, during discussion it came to know that leaders were very aware about that.

4. Decision making system and communication system of decision: The views of respondents were 7 % respondents said that decision taken by chairman, 61 % respondents said that meeting, 32 % not replied about that. The respondents shared about how they came to know about decision.55 % replied and 48 % respondents get information in meeting, 26 % get by water operator, 20 % get individually and 6 % knew by Vethiya means local system to inform by some local person. It shows that major part of decision taken in meeting. Communication system with farmers 48 % connect by meeting and major 26 % by operator.

5. Communication system for farmers to water user association (how farmers raise their voice?) out of total respondents 66 % replied for that and the major system for approaching WUA was 38 % raise in meeting,28 % informed to water operator,13 % informed to secretary and 13 % Chairman, rest do individually. Data shows that major part approached in meeting, second way was with water operator and third chairman and Secratory.

6. Regular Contact with farmers: Out of total respondents 40 % said that water operator meet them regularly, 26 % said that secretary meet them regularly, 22 % said that Ngo and Go representatives meet them and 12 % respondents said that chairman and leaders meet them regularly. It shows that water operator and Secratory were the major part for regular contact with farmers.

7. Awareness about selection of leaders and responsibilities of them: Out of total respondents 60 % respondents are aware about selection of leaders and 57 % respondents are aware about selection of chairman.42% respondents aware about role of selection of leaders and 49 % respondents participated in discussion of selection. About awareness of responsibilities 49% aware about chairman responsibilities,48% aware about leaders responsibilities and 52 % aware about rules and regulation of water user associations.

8. Change in leadership: Among 11 water user association in last six year there were change in leadership in 3 water user association. During discussion farmers said that the existing leaders were ok for them, where they found to change they changed in 3 water user associations.

9. Success to giving water in tail area: Out of total respondents 86 % replied. Out of that 28 % said that success up to 25 %, 34 % said that success up to 25 to 50 %, 28 % said that success up to 50 to 75 % and 10 % said that success respondents more than 75 %.It shows that the major part is ratio 50 to 75 %.

10. Satisfaction to farmers due to WUA works: Out of total respondents 96 % replied. Out of that 20 % said that success up to 25 %, 29 % said that success up to 25 to 50 %, 10 % said that
success up to 50 to 75 % and 41 % said that success more than 75 %. It shows that 96 % replied and out of that 41 % said that the ratio was more than 75 %.

11. Satisfaction to respondents due to WUA works: Out of total respondents 96 % replied. Out of that 20 % said that success up to 25 %, 25 % said that success up to 25 to 50 %, 16 % said that success up to 50 to 75 % and 39 % said that success more than 75 %. It shows that 96 % replied and out of that 55 % said that the ratio was more than 50 %.

12. Satisfaction to other respondents due to work: About other respondents view of work NGO representatives said that that was more than 75 %, Irrigation department officer 50 % said that ration is 50 to 75 % and 50 % said that more than 75 %, sarpanches view was more than 75 % and Milk co cooperative representative 25 % said that 50 to 75 % and 75 % said that more 75 %. It shows that major part of respondents ratio is more than 75 %.

13. Key area which involved more farmers: Out of total respondents 72 % replied. Increase rotation is very important activity for farmer’s involvement, than second ‘Shramdan’ involved more farmers than enough water for all farmers. Those were main activity which supported for farmers involvement. There were others activity also timely repairing, good management and water up to tail area also supported.

14. Women Participation: Out of total women respondents women farmers are more aware about water distribution systems, water rates, getting water or not, opinion about water management and about canal protection they were gave answer for that, about 35 % to 40 % respondents from women gave answer. So these five areas they were more aware compare to others areas, 24% respondents aware about decision. Remaining area about formation, structure, water demand, meeting awareness less than 20 %.

15. Financial Sustainability: If we see the financial status of water user association they were in profit after deduction regular expenditure, the income source of water user association was water charge income, 20 % rebate of water charge from government for administrative purpose and 30 % rebate of water charges from government for regular repair & maintenance, they charge farmers water charge higher than government. Every year they finalized water charge in annual meeting based on government water rate.

3. Livelihood Impact:

1. Change in Cropping pattern:
   a. Sugarcane increased from 12 % area to 84 % in canal command
   b. Vegetable crops increased from 2 % area to 5 % area in command
   c. Fodder increased from 1 % area to 3 % area
   d. Juwar crops decreased from 48 % area to 1 % area command
   e. Paddy crops decreased from 24 % area to 4 % area in command
   f. Groundnut crops decreased from 7 % area to 3 % area in command
   g. Farmers not grown Tuvar (pigeon pea) and wheat now before the area was 2 % and 4 % in command

2. Change in crop productivity:
   a. Productivity increased in paddy from 6.2 quintal per acre to 11 quintal per acre, so increase productivity 56 %.
   b. Productivity increased in Sugarcane from 32 tons per acre to 42 tones in acre, So productivity increase 76 %

3. Change in Crop intensity in Project:
   a. It shows that sugarcane crop area increased by 60 % against planning
b. Wheat crop area decrease by 25%, when project design the area plan was 28% of total area and now 3% area is covered under wheat area
   c. Groundnut area decrease by 4%, when dam design the area plan for groundnut was 5%, now area covered from groundnut is 1%
   d. Fodder increased up to 18% area. When the dam design there was no planning of fodder. Currently total 18% area under crops.

4. Change in Asset Position: The Asset position of farmers indicates the prosperity of farmers. Following is the change in asset position of farmers:
   a. Tractor in command area increased from 7% to 13%
   b. Electric motors increased from 10% to 24%
   c. Diesel engines increased from 25% to 46%
   d. Well increase from 12% to 29%
   e. Bore well increased from 16% to 47%
   f. TV/Dish increased from 24% to 82%
   g. Mobile/telephone increase from 36% to 97%
   h. Freeze increased from 9% to 47%
   i. Gas/Bio gas increased 28% to 65%
   j. Two wheeler increased from 27% to 79%
   k. Four wheeler increased from 3% to 13%

5. Non-Agriculture activities:
   a. Household increases in Animal husbandry activity from 84% to 95%
      i. Household increased in head region 4% in Animal husbandry activity. Household increased in medium region 6% and Household increased in tail region in Animal husbandry 28%.
   b. Household decrease in labour work from 41% to 37%
      i. Household decrease in labour work in head region up to 18%.
      ii. Household decrease in labour work in Middle region up to 9%.
      iii. Household decrease in tail region was 7%.

6. Change in Non-Agriculture Income per year per family:
   a. Per family non-agriculture average income per year increase from Rs.16852 to Rs.33128, it is increase 96%.
   b. Per family average income per year in Animal husbandry increase from Rs.10885 to 21397 Rs.
   c. Household in head region income in Animal husbandry per family per year increase from Rs.11000 to Rs.23722
   d. Household in middle region income in Animal husbandry per family per year increase from Rs.10462 to Rs.20037
   e. Household in tail region income in Animal husbandry per family per year increase from Rs.11389 to Rs.21174
   f. Per family average income per year in Labour work increase from Rs.5967 to Rs.11731.
   g. Household in head region income in Labour work per family per year increase from Rs.5417 to Rs.10000
   h. Household in middle region income in Labour work per family per year increase from Rs.6625 to Rs.14571.
   i. Household in tail region income in Labour work per family per year increase from Rs.6100 to Rs.11300.

7. Change in Agriculture Income:
   a. Per acre agriculture average income per year increase from Rs.10163 to Rs.58887. It is increase up to five times.
i. Per acre in head region average agriculture income increase from Rs.12400 to Rs.65140.
ii. Per acre in middle region average agriculture income increase from Rs.10650 to Rs.58240.
iii. Per acre in tail region average agriculture income increase from Rs.7440 to Rs.53280.
b. Per Household average income per year increase from Rs. Rs.27885 to Rs.160455. It is increase up to five times.
   i. Per household in head region average agriculture income increase from Rs.36503 to Rs.176452.
   ii. Per household in middle region average agriculture income increase from Rs.28752 to Rs.159432.
   iii. Per acre in tail region average agriculture income increase from Rs.18400 to Rs.145480.

8. Change in Village level Milk Cooperative:
   a. Data analysis from two village milk co-operative one from head region and one from tail region shows that milk production increase.
      i. Head region village milk production increase 33% and tail region milk production increase 77%.
   b. Data analysis from two village milk co-operative one from head region and one from tail region shows that Milch animal increase.
      i. Head region village milk animal increase 14% and tail region milch animal increase 20%.

9. Change in Animal Husbandry activity on respondents:
   a. Household increased in Animal husbandry, 3% household increased in buffalo and 4% household increased in cow.
   b. Milch Animals increased 18% cow and 19% buffalo.

10. Change in Irrigation area:
    a. Ver Project Irrigation area increased up to 2024 hectare, Before PIM maximum area covered under irrigation up to 1786 hectare in last five years. After PIM area covered under irrigation up to 2024 hectare.
Integrated Impact

Participatory Irrigation Management

Social
1. Harmony
2. Social Relationship
3. Stress Management
4. Capacity in Decision making
5. Participation in Development process
6. Unity among clusters and Management of irrigation issues
7. Skill Development
8. Change in the attitude & habit
9. Asset

Economical
1. Improvement in agriculture and allied activities
2. Change in crop pattern
3. Increase in Production
4. Increase household income
5. Increase area of Cash crop

Ecological
1. Increase Ground water table
2. Increase irrigated area
3. Increase crop area
4. Crop change
5. Control on wastage of water

Overall Impact
1. Secure livelihood “Be time Shnatithi Khavanu male Chhe”
2. Locally managed decentralized sustainable Institution
3. Change in life style –Improved quality of life
4. Increase Social and Economic status
5. Sit to gather and good environment in village and cluster
6. Reduce migration in area
1. Sugarcane crop increased in more than 80% area in command, during discussion of group of farmers and respondents views it came out that the reasons behind that was:
   a. Sugarcane give a good income
   b. Market easily available for sugarcane in nearby area
   c. After sowing this crop less labour work required for that.
   d. Day by day due to irrigation labour shortage also in area
   e. Schedule of irrigation project is on rotation base it is also supporting factor for this crops those who have not private source of irrigation.
   f. Vegetable also giving good income but vegetable needs more day to day monitoring, work compare to sugar cane and regular watering also.

2. Food crops decreased and cash crops increased in command area so farmers have to purchase food from market, may be in future food security problem can be rise one day. Food crops Juwar decreased, as per respondent’s views the reason behind that was Juwar gives less financial income and need more days to monitoring and work.

3. Animal husbandry increased in command area and due to that fodder crops also increased.

4. Household level Income increased

5. Asset Increased : household level facility increased like mobile, gas, motor cycle, tv, freeze and agriculture asset like diesel engines, electric motor, tractor, well, bore well increased.

6. Bullock decreased in the area the reason behind that is good machinery available, young generation doing agriculture so they prefer machinery, required, skill problem also for using bullock, land decreases division of land among family members, buffalo increase in area means buffalo gives milk and also compost, bullock pair costly and also food expenditure of bullock also costly. Young generation also like to use machincary compare to bullock.

7. Farmers have lack of knowledge about sustainable farming they are more think on money and labour work instead of sustainable farming. Became much more dependent on fertilizers.

8. Role of Institution training in better management of project : Increased skill and knowledge among farmers:
   a. Skill to manage construction work, accounts writing and knowing, Liasoning with government department.
   b. Decision making skill about decision of water distribution, construction, repair and maintenance, management of water user association. (For examples, if any type of conflict occurred then WUA take decision quickly on the same day).
   c. Conflict management of water management issue.

9. Strengthen from unity through federal system: Increase the cooperation among villagers. It helped to build healthy environment in command area and within and Inter village also, it also helped to build social relationship.
   a. For example earlier due to water rotation there was problem between farmers to farmers in village. Now due to management by water user association everybody have turn for watering, also understanding and assurance, also operator for support and guidance so there were no tension about that so due to that there is a smooth relationship between two farmers and it effect village level, village level cooperation also increased and now due to that village level unity also increased.
      As per Sarpanch view it helped in panchayat development work also.
   b. Earlier due to water distribution tensions were there problem between village to village also, now there are 11 water user association and they planned water distribution and management jointly for that they together regularly and decide jointly. So conflicts also minimized between villages so it helped to increase social relationship among command area villages and now due to that people also
do the engagement and marriage of their children. They meet each other in social function also discussed about common development things
c. Change in mind set – ownership about project,”Shramdan”.Regular pay to water charges, Irrigation with understanding, minimize conflict.
10. Decrease the conflict between them and strategically they motivate farmers ,Increase awareness among them
11. Satisfaction due to getting water „Secure livelihood - “Be time Shanti thi Khavanu Male che”
12. Visitors from outside for visit their project.
13. Well managed society system: Habits of Institution with system like regular meeting, Decision taken meeting with discussion. Sitting together regularly, Good impression of CBOs at taluka level in government.
15. Increased ownership towards project and realized that the project is for them, they Work together for ‘shramdan” i.e. in rainy season the soil deposited and also grown unwanted plants in minor and sub minor canal. At the end of kharif season, from each household one member come and participates in Cleaning, Repair and Maintenance of canal.
16. They also learnt about water use efficiency i.e after PIM they irrigate their crops according to growth stages of the crop or crop calendar.
17. They follow the ‘Wara Bandhi’ rule, it means when the Minor canal gate is open one by one they irrigate the farm sometimes if needed firstly the tail farmers take water then middle and end. Improve environment
18. Recovery also occurred on time. Before PIM farmers did not pay the irrigation charges at the time some did not pay the money even after requesting. But after PIM they paid money at the right time so, government give rebate 50% of the total amount of charges and in last six years water user association paid 100% charges to irrigation department.
19. Increased irrigated area and Increased ground water level also.
20. Change in Standard of Living :
   1) Increased the standard of living of the villagers. After PIM, due to increase in income their living styles also improved. For examples, they reconstructed their house in better condition, starts using mobile, motorcycle, T.V, children go to school regularly and also started sending to nearby town school by spending yearly 25000 to 30000 Rs.
   2) Earlier they compromise with cloth one pair for two year, three year now purchase new cloth every year
   3) Food habit also changed purchased as basmati and Tuvar dal from market for their consumption.
   4) Improved the health status of the villagers. They starts growing vegetables in the small patch of the field or intercropping with main crop. So, daily get green or fresh vegetable. Eat vegetable from farm and also purchase from market (95 % family eat vegetable), earlier difficult to eat vegetable.
   5) Drink tea with milk (90 % family) earlier compulsory Black tea (90 % drink black tea) ,60 to 70 % house hold takes milk with food
   6) In marriage earlier spent 35000 Rs. and in food they prepared rice and dal.Now there is a change in expenditure they spent minimum 100000 Rs. and in marriage DJ sound system now hired, in food they even serves Sweet and Basmati rice, mineral water.
   7) Earlier they take money from money lander now take from credit society & Bank also
21. Based on discussion with respondents and during group discussion following area came out as an impact:
Respondents view on Key achievements due to Participatory Irrigation management

- Assured & Easily Water
- Water up to tail area
- Increase Rotation - earlier 3-4 to 6
- Time Saving
- “Varabandhi”
- Change in Cropping Pattern
- Increase Productivity
- Increase Irrigated area
- Perennial Crop in area
- Increase Vegetable and Fodder
- Control on wastage of water
- Heding Problem Minimize

Benefit due to Participatory Irrigation Management

- Irrigation Management by villagers
- Conflict Resolution by villagers
- Decision by Villagers
- R & M by Villagers
- Regular Meeting by Villagers
- Area level Informal Institution

- Increase Knowledge & Skill
- Increase awareness
- Change in mind set
- Increase Understanding for Importance of water

- Change in Life style - Improve
  - Quality life
  - Change in food habits
  - Change in Education
  - Change in habit for paying money
  - ‘Shramdan” in habit
  - Change in Cloth wearing
  - Increase saving
  - More expenditure on education, marriage, Cloth, food

- Increase Pucca House
- Increase well and Bore well
- Increase Water Level
- Increase Agriculture Equipment, Asset
- Increase Motor Cycle, Four wheeler, Mobile, TV
- Increase Diesel Engines
- Increase milch animal & milk production
- Increase Labour Income, Employment

- Increase Income
- Good Impression of CBOs at Taluka level
- Good Relationship with Government Department, Panchayat
- Increase Land Cost
- Decrease Migration
- 100 % recovery to government

- Satisfaction due to getting water
- Secure livelihood - “Be time Shanti thi Khavanu Male che”
- Realization that this project for them
- Visitor from out side

- Increase Social relationship
- More leader develop
- Increase Economic status
- Increase Cooperation among villagers
- Seat Common platform& to gather
- Increase Social Status
- Got opportunity for visit and learning at out side
- Unity at village level & Inter village

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1. Earning money is main objective of canal command area farmers. So they use fertilizer more in agriculture, they use four to five times more than earlier, so agriculture land will be unproductive in future.

2. Food crops are decreased and cash crops increased in command area so farmers have to purchase food from market, maybe in future food security problem can rise one day.

3. Farmers have lack of knowledge about sustainable farming. They are more think on money and labour work instead of sustainable farming. Became much more dependent on fertilizers.

4. They are facing problem of leakage and seepage due to that in summer they face shortage of one rotation and also water logging in area.

**Suggestion and Recommendation**

- Due to focusing of getting more money farmers grown Sugarcane and also using more chemical fertilizer, in future it will impact on productivity of land and also in long run shortage of food. So think also on
  - Water efficiency part may be use of drip
  - Change of crop like vegetable
  - Sustainable farming, use of farm yard manure
  - Organic farming
  - It can be overcome through increase production of vegetable

- Annual meeting and committee meeting are to be organized with plan; focus should on regularity of village meeting connect all members with this meeting. So people can aware about all activity of water user association.

- More focus on leadership development and change leader as a part of system. Prepare alternative leadership.

- The major part of farmers get message and regular contact with water operator and Secretary so it recommended, take care about selection of employee and give regular training and update about WUA work so farmers get proper information.

- Registration of federation for all water user association

- Whole Canal Network Rehabilitation, Control on wastage of water

- Volumetric water supply

- Regular Evaluation of water user association should be planned with participation of farmers may be participatory evaluation with indicator like Water distribution and management system, administration (decision making, women participation, leadership, and meeting), asset management and efficiency, community participation, financial sustainability.

- Regular trainings for leaders for management and coordination meeting with government.

- There should be plan of women participation in meeting, decision making system because more than 50% of work in agriculture done by women.

- Regular plan of saving and create balance by water user association it helps to do future agriculture plus activities like credit for farmers, Agriculture input supply, marketing, may be in future agro-processing things, education, health and may be other development things.

- Plan to organize women members of area in institution form and in future they become women federation of 28 villages, they can focus on women issue and development issue of them and also area.

- As per data 97% having mobile and more than 50% having Television, think on use of that in as a part of communication and awareness programme of water user association so the awareness can increase among farmers.
• As per NGO & Go representatives views the recommendation were following :
  o NGO support at least five to six year – Gradually withdrawal , Do work Intensive for four year than Gradually decrease support from two year so slowly withdrawal from two year so total six year work plan should be there
  o Before handing over to WUA, Construction should completed 100 %
  o Regular Coordination meeting between WUA and Government
  o Panchayat and Sarpanch involvement from initial process of project.
  o Involvement of women from initial process
  o Linkage other agencies also like milk cooperative, agriculture department, panchayat from starting
  o Plan work on integrated way not only PIM ,do first two year PIM work than do plan of Agriculture, Animal husbandry
  o Project officer Training & Exposure plan regular , once in six month
  o Plan regular Sammelan, experience sharing work shop
  o Regular award,appriciation and evaluation system of work
  o Recommending of cropping patterns and Package of agriculture practices suitable for the WUAs farmers
  o Soil testing, water quality testing, water table monitoring salt-sodic correction
  o Post-harvest practice(grading, packaging storage and marketing)
  o Cooperating with others WUAs by federation (external area)

• Certification of person based on skill, so person can work as resource person in within area and also outside for the area.

During discussion with respondents and group of farmers the following suggestion came out from them for need to support or do this.
Expectations of farmer respondents towards for improving the system

Government

- Regular Visit of Government Officer and provide updated information (Irrigation Department, Agriculture)
- Linkage with Government Scheme (Drip, Greenhouse, Seeds)
- Work for credit linkage & Animal Husbandry
- Need help for implementing rule, Defaulter recovery Collection Information about New technology
- 20 % local fund should give to WUA
- Not increase every year 7.5 %

Water User Association and Farmers

- Improve Canal Structure
- Linkage Ukai to Godadha for enough water for Increase volume water
- Control on wastage of water
- Lining of Field Channel & Repair outlet
- Desilting of Dam
- Provide water as per Design in canal with full capacity up to tail area

Non-Government Organization

- Increase Farmers Cooperation & Integration
- Increase understanding on co operation
- Regular Meeting & awareness programme – Change in mind set for free water
- Motivational Scheme for farmers
- Follow rules Regulation
- Accept new things
- Take responsibilities
- Integration of Other programmers for improving livelihood

Long term Support
- Guidance
- Extend Support of NGO
Hypothesis Verification:

1. Water user association manages the Irrigation management as per PIM act 2007

**True**: Water user associations manages the Irrigation Management as per rules declared by government of Gujarat and it is similar to PIM act, because PIM act declared by government in 2007 but rules are not declared by government so now at present there are rules for PIM is on place for managing participatory irrigation management.

2. PIM policy is favorable in the interest of those farmers who are having land in command area and are the members of water user association.

**True**: By seen the impact of participatory irrigation management this hypothesis is true.

3. In this Participatory irrigation management the water user association receives rebate on time from irrigation department so repair of the canal network are in place.

**True**: Data shows that and during discussion found that all water user association got rebate after taking responsibility of water management. The water user associations done post moon soon repair and maintenance timely by using of rebate money and also doing by “Shramdan”. They have freedom to decide the post moon soon work on their own way and time.

4. Water user association is financially sustainable and addressing the need of farmers for their development.

**Partially True**: Water user associations are financially sustainable for managing their current irrigation management business and they can provide water to farmers. But need to do whole canal rehabilitation for long assurance and for fulfilling tail area farmers need. Need to work on farmers other need like agriculture plus and other social need.

5. Participatory irrigation management provides timely irrigation to farm thus helps to increase crop productivity, change in cropping pattern and increase area under irrigation.

**Partially True**: Impact shows that defiance increases productivity, change in cropping pattern and also increase area under irrigation but same time there are also need to focus on women active participation in water user associations and also on cropping pattern like food crops decrease, cash crop like sugarcane increase and also more use of chemical fertilizer.

6. Due to PIM system in this area people become more powerful to bring sustainability in the development effort

**True**: During research it’s prove that due to this work people become more powerful of overall management of system on family base.

7. In Comparison of other system in Gujarat, the Proposed Research project is working more effectively.

**True**: It’s found that compare to other project like manage by irrigation department this project 100% managing by local people with 100% recovery and with getting rebate and done repair and maintenance by own way. Decide water rotation and water charges by people. Conflict management by villagers and whole system management decision taken by beneficiaries.
8. The Government and NGO support to Water User Association and ensure Participatory Irrigation Management at the field level.

**Partially True**: It’s found that in this project there were good support given by irrigation department and non-government organization but there scope of way to support by GO and NGO.

**Proposed Model for work in Participatory Irrigation Management**

![Diagram of proposed model for participatory irrigation management]

- **Technical**
  - Assured water
  - Infrastructure-Canal
  - Net work
  - Awareness and Participation in planning stage

- **Core Motivator**
  - Participation
  - Transperency
  - Women
  - Participation
  - Attitude toward community

- **Social**
  - Repair & Maintenance
  - Regular Meeting
  - Leadership
  - Accounts and Audit
  - Decision making
  - Equal Benefit Sharing

- **Process for women participation**
  - Potential Mapping
  - Individual Contact
  - Separate Group
  - Link with wua

- **Membership**
  - Selection as a Leader
  - Communication System
  - Presence in planning

- **Communication System set up**
  - Presence in important meeting
  - Regular Training
Part – 1 Training Plan for water user association

<table>
<thead>
<tr>
<th>Type of Training</th>
<th>Description</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Training</td>
<td>Member Awareness Training</td>
<td>Annual General Body Meeting, Leadership Selection, Participatory Irrigation Management, Canal Irrigation Society</td>
</tr>
<tr>
<td></td>
<td>Leadership Training</td>
<td>Budget, Accounts, Liaisoning, Employee Review, Management, Conflict, Communication</td>
</tr>
<tr>
<td></td>
<td>Secretary Training</td>
<td>Account, Fund Management</td>
</tr>
<tr>
<td>Project Training</td>
<td>Project management training (Water operator, Chairman etc.)</td>
<td>Water Distribution Management, Monitoring of system</td>
</tr>
<tr>
<td></td>
<td>Technical training/Construction training</td>
<td>Supervision of Construction, Rehabilitation plan, Quality of Material, Workmanship, Estimate &amp; Rate</td>
</tr>
<tr>
<td></td>
<td>Water Management training (Classroom and Field)</td>
<td>Water Management practices</td>
</tr>
<tr>
<td></td>
<td>Agriculture training</td>
<td>Crop Planning, Agriculture Extension</td>
</tr>
<tr>
<td>Exposure</td>
<td>Internal</td>
<td>For visit of Good model</td>
</tr>
<tr>
<td></td>
<td>External</td>
<td>For visit of Good model of PIM</td>
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<tr>
<td>Workshops</td>
<td>Workshop</td>
<td>Experience sharing &amp; finalize Action plan</td>
</tr>
<tr>
<td>Mass awareness</td>
<td>Mass awareness</td>
<td>Awareness campaign in village level</td>
</tr>
<tr>
<td>Co-Ordination Meeting</td>
<td>Lower Level, Project Level, Circle Level</td>
<td>Review &amp; Planning</td>
</tr>
</tbody>
</table>

Part – 2 Suitable approaches towards Sustainable development:

1. Goal Setting: Introduce MBO approach in finalize of individual and overall goal for water user association. Bottom up approach and assured the participation in decision making of all stakeholders rationally.
2. Change Mentality: Participation from Planning, Implementation and management. Hand over to community from initial stage act like community is owner and other stakeholders as supporter.
3. Management as cooperative way, Demonstration of Value and system of communication to all beneficiaries.
4. Participation of Youth in all level and also regular participate for value addition among youth.
5. Develop a second line leadership by using proper techniques and by delegation of authority as well as decentralization.

6. Towards Self-sufficiency
   a. Resource naturally manage
   b. Control over change in cropping pattern according to local needs
   c. Water Efficiency – Volumetric use of water
   d. Control on wastage of water – water logging
   e. Manage and maintain – Diversity according to nature

7. Infrastructure development without disturbing the flow of nature and natural asset


Brief about model:

The proposed model says that there are two major important aspects in water user association one is technical aspect and one is social aspect, when we work in technical aspect it is important that in canal project water source should be assured so there is no any issue in water availability, with water source the network of canal should be technically good means water can flow easily as per plan and design capacity. Most important things in technical part user participation and awareness from initial stage is very important. So the beneficiaries involved from day one in planning, discussion, decision making, contribution and implementation. It is important that the main role is should be users and supportive role from external agencies like government, on-government organization. So in this process the main owner will be community.

The second part is social aspect, after completing the project the repair and maintenance responsibility should be taken by water user association. Regular meeting for discussion, decision, and implementation and for future plan should be part of system and all stakeholders aware about that. One more important thing is leadership selection; development should be part of system. So institution has an alternative and second line leadership always. Decision making system should be strong and Transparent. The most important part is benefit sharing is should do in meeting and equal. All types of users should be presence in meeting.

The core areas for work and also cross cutting common important area for good governance of participatory irrigation management are 1. Participation of user at all stage 2. Transparency in work and system for this 3. women participation and attitude of all those who work with this should be towards community. This core area will be support for sustainable model and model will decentralize representation of poor, managed by local people with taking care of natural resources.

Model also gives route map for training plan for water user association based on research study and discussion with respondents during research. Model also provide some suitable approaches for work like participation, setting goals with bottom to top approach, management as cooperative way and leadership. May be model will be helpful for decentralized – local people managed sustainable water user association towards rural development for betterment of community.