Experiments with Common Use of Groundwater: *Experience from Dhule, Maharashtra*

Background:

Groundwater plays a very important role in drinking water security and irrigation in India. Rapid increase in its use and declining availability of groundwater has threatened the existence of the very resource itself and ranged the alarming bells in Government, Non-Government, farming sectors as well as community at large. In many parts of the country, especially marked as overexploited zones, groundwater abstraction has reached to its saturation points (there is no scope left for further development because the aquifers are depleted) and started declining.

On the other hand in many poverty stricken areas, where agriculture is their main occupation and groundwater is the only source for irrigation, farmers are not left with any other choice but exploit groundwater for their livelihoods. Here raises the dilemma of choosing between resource conservation and livelihood security, and answer here also is community managed use of the resource by improving the resource availability and supply mechanisms and controlling the demand with the help of strong community institutions.

At present there are very few examples where communities are using groundwater in an organized and collective manner but there are some small ongoing efforts aiming towards that. Desh Bandhu and Manju Gupta Foundation has started one such experiment with community in Dhule, Maharashtra wherein they are involved in implementation of water resource development and mobilizing farmers to use groundwater as a common resource through group wells. The initiative is in its early stage, yet it is showing good result on the ground and significant acceptance in the community.

Desh Bandhu and Manju Gupta (DBMG) Foundation is a CSR venture of Lupin Limited, a pharmaceutical company, working in 200 tribal villages of Dhule district of Maharashtra for their livelihood development. Lupin Foundation, sister organization of DBMG Foundation, is working on watershed development and livelihood generation in Konkan and Junnar areas of Maharashtra. In Junnar, Lupin Foundation is working very closely with ACWADAM, an organization working in the field of groundwater research and management, in Muthalne village.

Concept of Community wells:

Muthalane is a high rainfall but still a water scarce tribal village which is totally dependent on groundwater for drinking water and irrigation needs. Village is located on the sloppy, hardrock hilltop and due to the very nature of the underlying rocks and steep slopes there is very less percolation and recharge to the aquifers. Since the water availability in the wells is less, farmers are restricted to take only one crop i.e. rainfed kharif crop. Lupin Foundation

has done watershed development work in the village with the technical help of ACWADAM. Watershed work has led to some increase in the water availability in the village and now both the organizations are trying to evolve a community based groundwater management system (broadly based on Pani Panchayat's water management principles) in the village. The village has passed a resolution that groundwater will not be used individually but will be used by all on equitable basis through group wells. All farmers are part of 12 water user groups and each group has one well which will be used by all the farmers. Farmers will collectively decide about the amount of land to be cultivated, cropping pattern for the season based on the availability of the water in their well. This concept of community wells is based in the following premises:

a) Groundwater to be treated as a community resource and not as private.
b) Groundwater should be used equitably by all the community members and should not be monopolized by a few resource rich farmers.
c) Controlling the rampant increase in number of wells and groundwater use.

DBMG Foundation also found this idea useful for other water scarce and especially poverty stricken area like Dhule and is experimenting this concept, with some modifications, in Sakri and Shirpur blocks of Dhule district. The work in Dhule started one and half year back and currently there are around 26 operational group wells in these two blocks.

Dhule initiative:

DBGM is implementing community wells programme in two blocks of Dhule district with the objective of providing irrigation water to the farmers in water scarce villages. This includes watershed development activities, constructions of new wells and other water harvesting structures. All the new well are group wells and water is shared among all the group members. In these group wells construction work, pump installation and pipeline lying is also done in collective manner wherein farmers gave 50% monitory contribution and remaining 50% is provided by DBMG foundation. In Sakari block, 22 group wells are constructed and 21 of them are operational from last Kharif season while 5 group wells in Shirpur block are operational from this Rabi season.

DBMG Foundation has organized the farmers in groups, mainly those who do not have irrigation facilities due to their poor financial condition and provided them loans for well construction. There are 5-8 members in each group. Each Group took 1.25 to 1.5 lakh rupees loan from DBMG Foundation which is used as farmer's 50% contribution in well construction, pump installation and laying the pipeline. Only poor farmers who were not in a condition to construct their individual well, ready to be part of the group well and ready to share water within them were selected. There is a formal agreement in each group for common use of well, equitable water distribution and crop planning. These groups have successfully shared the water in last Kharif season and are determined to do the same in future also.

Water availability in wells:

Average depth of the wells is around 40 feet and most of them are penetrating the underlining aquifer system which in most of the cases is made of Vesicular Amygdaloidal Basalt. Water availability in most of the wells was quite good and wells were reported full till December month. During Kharif season farmers were pumping almost every day for 6 hours (electricity is available only for 6 hours). Farmers reported that during Kharif season after 6 hours of pumping wells recover in next 12-15 hours to 1 day time, depending on the geology and location of well.

Water sharing:

There is a formal agreement between group members in each group which governs the whole water sharing process. This agreement is done on stamp paper in front of Tehsil officer, hence has a legal validity. The agreement includes the principles of common use of water and details of water distribution among the farmers. Agreement states that:

1. Water from the group will not be used by any one individual but by the whole group.
2. There will be equal distribution of water among all the group members.
3. All the members will cultivate equal amount of land, looking at the water availability in the well.
4. All the members will follow the same cropping patters, which will be collectively decided by the group in the beginning of the season.
5. Each member will give equal amount of contribution in well construction.
6. Individual farmer will provide land for well construction on suitable site. After construction well will belong to the whole group and not to the one farmer on whose land it is constructed.

Farmers are taking water from the group well according to the decided norms. All members have cultivated equal amount of land and followed the same cropping pattern. Each farmer is pumping the well for one or two days (which is different in different groups) by rotation and pumping for 6 hours. In this part of the district electricity is available for 6 hours every day which also works as a deterrent against unequal distribution and overexploitation of groundwater. Electricity bills are shared by all group members. Farmers are well aware of the fact that the water availability in the wells will not remain same in all seasons so they are planning to reduce the area of cultivation and pumping hours for upcoming Rabi season. Since this is their first Rabi season they are cultivating small patches on trial basis and then planning to build on that in the coming years.

Following are the details of 22 group wells showing number of farmers, loan amount, irrigated area, cropping pattern and returns of each group for Kharif season of 2012.

*Sakari Block Group Well Data year 2012**							
Sr. No.	**Group Well**	**Village**	**No. of farmers**	**Loan Amount (Rs.)**	**Irrigated Land (Acre)**	**Crops**	**Returns (Rs.)**
1	Savarpada	Gartad	7	150500	7	Coriander, Methi, Redgaram	17000
2	Bandarpada -1	Kudashi	5	125000	6	Rice, Redgram & Wheat	25000
3	Navagaon	Khandbara	5	125000	5	Tomato &Coriander	3000
4	Khairkhunta	Umarpata	5	125000	8	Rice, Maize & Chili	25000
5	Talangyapa	Chaupale	6	150000	6	Rice, Coriander & Maize	18000
6	Jamunpada	Gartad	5	125000	8	Rice, Coriander & Nagli	25000
7	Kevadipada - 1	Shendwad	5	125000	7	Rice, Coriander, Red Gram & Wheat	40000
8	Mapalgaon - 1	Mapalgaon	5	125000	8	Chili & Strawberry	20000
9	Kadupada	Umarpata	5	125000	5	Rice, Maize, Nagli & Brinjal	40000
10	Vardadi	Vardadi	5	125000	8	Rice & Wheat	35000
11	Burudkhe	Burudkhe	5	125000	7	Chili, Coriander & Wheat	20000
12	Jamkhel	Jamkhel	5	125000	5	Coriander, Chili & Marigold	15000
13	Bhoyachapada	Bhoyachapada	5	125000	5	Coriander, Red Gram, Wheat & Rose	60000
14	Shivryamal	Shivryamal	6	150000			
15	Bandi Ku.	Kuher	6	150000	10	Nagli, Coriander, Chili & Tomato	30000
16	Bandarpada - 2	Kudashi	6	150000	7	Rice, Redgram & Wheat	25000
17	Ghugsewad	Devalipada	6	150000	8	Rice, Redgram & Wheat	36000
18	Mapalgaon- 2	Mapalgaon	5	125000	13	Rice, Redgram & Wheat	35000
19	Mavchipada	Shendwad	5	125000	10	Rice, Onion, Redgram & Wheat	35000
20	Kevalipada - 2	Shendwad	6	150000	11	Rice, Coriander, Redgram & Wheat	30000
21	Mohgaon - 1	Mohgaon	5	125000	8	Rice, Onion, Redgram & Wheat	34000
22	Pawarpada	Pawarpada	5	125000	5	Rice, Coriander, Nagli & Wheat	40000
	Total	**16**	**118**	**2925500**	**157**		**600800**

*Data source, DBMG foundation

Salient features:

The group well initiative in Dhule is still in its early stage yet it a unique experiment. There are very few such examples where community came together and collectively using groundwater. This experiment is a good example to establish that 'YES' groundwater can be used in a collective manner. Following are the salient features of this initiative:

- ***Formal agreements between farmers:***
  During any initiative of community management of natural resources where multiple users are involved and are sharing one common resource, it is very important to clearly define the practical aspects of resource sharing and bring all stakeholders on agreement. In many cases these agreement are at group level and also verbal, which leaves very little scope to catch the individual who are not abiding by the group norms. In this case, DBMG Foundation facilitated group agreement as well as individual declarations from each group member in writing, on stamp paper, in front of tehsil officer to make it a legal agreement. In the absence of any groundwater governing legislation, this formal agreement will give some authority to the group and also keep pressure on the group members to follow the group norms.

- ***Farmers' contribution:***
  In this initiative nothing is given to the farmers as free. Their contribution in the whole exercise of digging new well, setting up pump and lying pipeline is 50% of the total cost. This will help to develop sense of ownership among farmers and increase interest to make this effort a success.

- ***Providing Easy loan to the farmers:***
  In the present scenario agriculture loaning and subsidies it is very difficult for group of poor farmers to get financial assistance for "group well", as all the Government schemes are funding private wells. Here, DBMG Foundation has provided a key support by giving easy loans to the farmers for construction of common wells and paved the way for a community initiative which otherwise was not possible.

- ***Linking with agriculture planning and support:***
  Actual benefit of group wells is always reflected as improved agriculture practices and yields. If the forward linkage with agriculture is not done properly and their agriculture practices are not improved, providing water will not improve farmers' economic condition. DBMG Foundation is working in this front also and is helping farmers with improved agriculture planning and providing them improved verities of seeds. The combination of all these efforts has shown good results and yields in first Kharif seasons had improved 2-3 times from last year.

- ***Whole villages is not involved in the process:***

  This initiative is going on in around 20 villages of Sakari and Shirpur blocks but in none of these villages, the whole village/all the farmers, are covered under group wells. Initiative is going on with those resource poor farmers who do not have private well and are willing to be part of this. So, the programme is covering around 10-20% of the farmers in each village. Working with this approach has its advantages and disadvantages both. On the positive side, only those farmers who are really needy, interested and ready to share the water will come forward. This will also speed up the process because you do not have to wait for consensus building among all the farmers, so the chances of success are very high.

  On the negative side, farmers who are not part of the group will pump water at their will and affect the group wells in the long run. Secondly, there are very high chances that after few years, when their economic condition is improved, group members will also get motivated from non group farmers and go for individual wells. A very good example of water management in Maharashtra, "Pani Panchayats", also faced the similar problems in the past because Pani Panchayats were also working with a smaller group of farmer and not with all the farmers of that village. The free riding of non Pani Panchayat farmers did a great damage to the water availability in group well as well as to the motivation of the group members. One has to be very careful about this in Dhule and also try to find solutions for this possible future problem.

A Comparison of agriculture pattern and yield between year 2011 and 2012, in sample villages

Village: Sendwad, Sakari		
Households	100	
Population	1000	
Average land holding	4 acre	
Total No. of wells	20	
Total No. of Pumps	15	
Lift from River	5	
No. of Group wells	2	
Group-1		
Agriculture season	**2011**	**2012**
Number of farmers	0	5
Area under agriculture	15 (Acres)	15 (Acres)
Source of Irrigation	Non	1 well
Pumping mechanism	Non	3 Hp Pump
Pipeline	Non	640 feet
Irrigated area (Acres)	0	15
Kharif crops	Paddy, Nagali (rainfed)	Paddy, Nagali (irrigated)
Yield: Paddy Nagali	40 Quintal 10 Qunital	80 Quintal 15 Quintal
Rabi cropping	Not significant	Wheat in 15 acres
Group-2		
Agriculture season	**2011**	**2012**

Number of farmers	0	5
Area under agriculture	12 (Acres)	12 (Acres)
Source of Irrigation	Non	1 well
Pumping mechanism	Non	3 Hp Pump
Pipeline	Non	2300 feet
Irrigated area (Acres)	0	12
Kharif crops	Paddy (rainfed)	Paddy (irrigated)
Yield	25 Quintal	45 Quintal
Rabi cropping	Not significant	Wheat in 12 acres
Village: Mapalgaon, Sakari		
Households	210	
Population	1200	
Average land holding	3 acre	
Total No. of wells	25	
Total No. of Pumps	25	
No. of Group wells	2	
Group-2		
Agriculture season	**2011**	**2012**
Number of farmers	0	6
Area under agriculture	12 (Acres)	15 (Acres)
Source of Irrigation	Non	1 well
Pumping mechanism	Non	3 Hp Pump
Pipeline	Non	1800 feet
Irrigated area (Acres)	0	15 acre
Kharif crops	Paddy, Nagli (rainfed)	Paddy, Nagali (irrigated)
Yield: Paddy Nagali	12 6	30 12
Rabi cropping	Redgram (rainfed)	Wheat 7 acre (irrigated)
Village Rohini, Shirpur		
Households	1200	
Population	3500	
Average land holding	4 acre	
Total No. of wells	30	
Total No. of borewells	25	
Total No. of Pumps	45	
No. of Group wells	1	
Agriculture season	**2011**	**2012**
Number of farmers	0	5
Area under agriculture	4 (Acres)	7 (Acres)
Source of Irrigation	Non	1 well
Pumping mechanism	Non	3 Hp Pump
Pipeline	Non	Not complete
Irrigated area (Acres)	0	7 acre
Rabi cropping	Redgram, Jawari (rainfed)	Wheat and vegetables in 7 acre (irrigated)

Scope of improvement

Dhule group well initiative is emerging as a good example of community management of groundwater. Looking at the long term sustainability the ongoing effort needs to be strengthened on following aspects:

1. There is need to assess the water availability and effect of pumping on the aquifer system. Monthly water level data collection in group wells as well as surrounding wells will give an idea about the groundwater availability across seasons. Pump discharge data, drawdown and recovery data after pumping will also provide crucial information and help in estimating the aquifer characteristics, water availability in the well and aquifer's response to pumping, which will be very helpful in crop planning.
2. Use of water saving techniques like drip irrigation and sprinkler is very important to optimize the water use especially during the Rabi season when water availability is less.
3. DBMG foundation needs to scale up the group well programme and bring more farmers under community management system in the same villages for the sustainability of this initiative. Free riding of non- group well farmers can be a threat to the whole initiative in the long run.
4. There is also a need to start recharge protection and artificial recharge measure to increase the water availability in the aquifer.
5. Such initiatives should be brought under one common banner for more visibility, cross learning between different group and eventually as one organization take over the tasks that the support organization is doing at present. DBMG foundation should start working towards bring all well user group under one federation to help in its vertical and lateral growth.
6. Last but most important suggestion for DBMG foundation is to start an advocacy campaign with the help of like minded organizations for mainstreaming of this concept in Government programmes on watershed management and other water resources related schemes implement by NABARD and MGNREGS.